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Original Articles

No paper published or to be published elsewhere as original, will be accepted in this department.

ON THE PRESENCE OF CHOLIN AND NEURIN IN THE INTESTINAL CANAL DURING ITS COMPLETE OBSTRUCTION.—A RESEARCH ON AUTO-INTOXICATION.

(Read before the American Physiological Association at New York, December, 1898.)

BY BEATTIE NESBITT, M.D.

From the Pharmacological Laboratory of the Johns Hopkins University.

In the normal process of digestion the proteids and carbohydrates of our food are changed into more readily assimilated compounds, which are further altered before reaching the tissues; for example, the peptones,* which, if absorbed unaltered into the system, would be very toxic, are changed into nutritive material in passing the intestinal wall. As a result of bacterial activity we may have these compounds broken up in a different manner, giving rise, either as immediate or terminal products of the decomposition of the proteid or carbohydrate molecule to substances of more or less toxic character. Some of these substances, as phenol, the cresols, the dihydroxy-benzenes, indol and skatol, are known to occur as a result of the constant action of putrefactive bacteria in the large intestine. We may also have a large number of organic acids of the fatty series, as acetic, lactic, butyric, caproic, caprylic, etc., which has been shown to occur in various catarrhal condi-

*According to E. Fiquet, the poisonous effects usually ascribed to peptones and albumoses are in reality due to ptomaines or other toxins which have not been removed by the ordinary processes of purification. *Compt. rendus Acad. d. sc.*, 1897, p. 1371.

tions of the intestinal tract, and whose irritating effects have been studied by Bokai.* Gases as hydrogen sulphide, methyl mercaptan,† carbon dioxide, methane and ptomaines, as putrescin (tetramethylendiamin),‡ cadaverin (pentamethylendiamin),§ ethylidendiamin are also more or less constantly met with.

Opinions vary greatly on the toxicity of these substances, as the pharmacology of but one of them (phenol) has been carefully worked out.

For consideration in this respect they may be divided into three classes: (1) the fatty acids and the various gases, whose action in this connection is almost wholly irritative and need not be considered from the point of view of absorption, except perhaps in the case of infants; (2) substances of the aromatic series, which include phenol, the cresols, the dihydroxy-benzenes, indol and skatol, and (3) the diamins, including putrescin, cadaverin and ethylidendiamin. Substances of the second group are all excreted in the urine as conjugate or ethereal sulphates, and it is by their estimation that we judge of the extent of the putrefactive processes, more especially in the large intestine. From the fact that their molecules are of fairly simple structure and in the case of most of them completely oxidized, we may consider the amount excreted as a reasonable index of the quantity absorbed.

With phenol (carbolic acid) we are well acquainted; its use as an antiseptic has for years been general; as a poison it has been taken in large quantities, sometimes without fatal results. It has been administered in various diseases, more especially those in which intestinal antiseptics was sought, as typhoid fever, in amount so much larger than the quantity produced in the intestine and absorbed, that a comparison would be ridiculous. Thus Brieger§ has found the amount excreted in twenty-four hours by a healthy individual to be about 15 milligrammes, while the text books on therapeutics set the minimum daily dose at 600 milligrammes. The cresols or methyl-hydroxyl-benzenes are a later addition to the materia medica introduced by Laplace, and have undoubtedly many advantages over carbolic acid. It has been claimed that they are three times less toxic than phenol. I think from my own experiments that this figure is too high, but I have found that, while their action on blood-pressure and respiration presents the general phenol picture, recovery is more prompt. The injection of 50 cc. of 0.5 sol. of cresol in normal saline solution into the jugular vein of a dog weighing 4 kilos caused the blood pressure to fall 41 mm.; it

* Bokai, *Arch. f. exp. Pathol. u. Pharmacol.*, xxxiii, 27; xxiv, 153.

† V. Nencki, *Jahresh. u. Thier-Chemie*, xx, 369.

‡ Udrinzsky and Baumann, *Zeitschr. f. physiol. Chem.*, xiii, 562; xv, 77. Werigo, *Pflüger's Archiv*, li, 362. Roos, *Zeitschr. f. physiol. Chem.*, xvi, 192. Garcia, *ibid.*, xvii, 513.

§ *Zeitschr. f. physiol. Chem.*, ii, 211.

Charteris, *Lancet*, 1894, i, 501.

returned to the normal in 13 minutes. Paracresylol, according to Baumann and Brieger, occurs in largest amount among the members of this series, all of which give, on distillation, a reaction with bromine, the ortho and meta-cresols occurring in traces.

The dihydroxyl-benzenes—resorcin, hydroquinone and pyrocatechin—are present in the urine only in traces. All three have been used as medicines, their daily doses being respectively, 0.1-0.6 grammes, 0.25-1.5 grammes, and 0.3-0.2 grammes.

Possibly the substance which is attracting more attention than any of these at the present time is indol, which appears in the urine as indican, or indoxyl potassium sulphate. The amount of indican excreted is, for an average man, about 12 milligrammes per day; this is equivalent, if all is excreted that is absorbed, to an absorption of 6 milligrammes of indol in twenty-four hours. Experiments on the toxicity of indol and on its fate in the organism have been made by a number of investigators. Jaffé,* Nencki,† and also Baumann‡ administered considerable quantities of indol to dogs both by subcutaneous injection and by feeding, and although the object of these experiments was to determine the amount of indol that was converted into indican, it was at the same time observed that indol is not a toxic substance. Jaffé found no toxic symptoms following the subcutaneous injection of considerable quantities of indol prepared according to Baeyer's synthesis, and Nencki noted that a dog showed no signs of intoxication after receiving 1 gramme of indol by mouth, but with a dose of 2 grammes during twenty-four hours developed diarrhoea. Experiments more directly relating to the toxic influence of this substance were next undertaken by Christiani,§ who found that a fowl gave no signs of poisoning when it received 0.07 gramme of indol mixed with bread crumb, but that frogs reacted with decided symptoms in about an hour after the subcutaneous administration of from 1.2-2.4 milligrammes in solutions of 1:1000. The average fatal dose for frogs was 12 mmg. in 1 per cent. solution subcutaneously administered. The symptoms were in general like those following the administration of phenol and need not be given in detail. In recent years Rovighi|| and Herter¶ have published more extended researches on the toxicity of indol. Rovighi finds that for rabbits the lethal dose of indol or skatol lies between 1.5 and 2 grammes administered in the course of twenty-four hours by subcutaneous injection, and that these two products of intestinal putrefaction have similar physiological action.

* *Central bl. f. d. med. Wiss.*, 1872, No. 1.

† *Ber. d. deutsch. Chem. Gesellsch.*, ix, 209.

‡ *Pflüger's Archiv*, xiii, 285, and *Ber. d. deutsch. chem. Gesellsch.*, ix, p. 54.

§ *Zeitschr. f. physiol. Chem.*, ii, 273.

|| Abstract in *Maly's Jahresb. f. Thier-Chemie*, xxvi, 456.

¶ An experimental study of the toxic properties of indol, *New York Med. Journ.*, 1898 July 16 and 23.

As summarized in Maly's *Jahresbericht*, the symptoms of poisoning are: torpor, somnolence, widespread paresis, weak action of the heart, reduction of temperature and retention of urine and feces. The autopsy in cases of acute poisoning showed the portal vessels and the supra hepatic veins to be highly congested, while in cases of chronic poisoning, especially after the administration of indol, the bile ducts were surrounded with infiltrating small cells, which also filled up the intercellular spaces. The kidneys were congested. Herter's experiments relate to acute indol poisoning in rabbits and dogs, to chronic indol poisoning in rabbits, and to the effects of modern doses taken by the stomach on man. As in the experiments of Rovighi, it was found that in acute poisoning with considerable quantities, say 70 cc. of a 0.1 per cent. solution of indol, injected slowly into the femoral vein of a dog weighing 15 lbs., the symptoms were cardiac and respiratory depression, general prostration, irregular clonic spasms, increased reflex excitability and marked contraction of the pupils. The cause of death appeared to be cardiac rather than respiratory failure. Observations on the temperature and on arterial pressure were not made. Of great interest are Herter's experiments on chronic indol poisoning in rabbits. The daily injection of such small quantities of indol as 10 cc. of a 0.1 per cent. solution led to death in the course of 13-22 day. Diminished activity, loss of appetite, profound disturbance of nutrition with marked loss of body weight are the points especially emphasized in this connection. A small ring tailed monkey was found to be far less susceptible than rabbits, for the monkey received 4 cc. of a 0.1 per cent. solution daily for two months without any apparent effect. Highly interesting, too, are Herter's contributions to the study of indol poisoning in man. Three healthy men, varying in age from twenty-five to thirty-two years, were induced to take indol during periods of from six to thirteen days in daily quantities varying in the several subjects from 0.025 to 2 grammes. One of these men, a vigorous medical student, aged twenty-five years and weighing 160 lbs., consumed no less than 6.8 grammes in divided doses in six days, taking on one day as much as 2 grammes. The first day, after a dose of 1 gramme, no symptoms whatever were noted. Further administrations with slightly increased doses led to disturbances of sleep and headache but no distinctly toxic symptoms. Without going further into the details of Herter's work, which is of especial value when the clinical significance of indol absorption is to be considered, I will only state that I agree with his conclusion that indol does not ordinarily exert highly toxic effects even when absorbed in unusually large amounts.

My own experiments on indol and skatol relate merely to their effect on arterial pressure. The indol used in my experiments was made according to Nencki's synthesis, acting with

dichlor-ether on anilin. I believe that pure indol is more easily secured in this way than from putresying fibrin. I have found that when injected in doses of 0.1 gramme into the jugular vein of the dog it produces no effect on arterial pressure. In frogs, as pointed out by Christiani* it produces convulsions similar to those caused by phenol. What has been said of indol holds also for the skatol, which has been fed to a dog weighing fifty-five kilos at the rate of 30 grammes in twenty-one days without any serious effect.† In my experiments no change of arterial pressure was produced by jugular injections of 0.1 gramme. In fact, I am satisfied that twenty times as much of either of these substances as are excreted daily by a man of seventy kilos weight may be injected at one time into the jugular vein of a dog of four kilos without producing an appreciable effect on the circulation or respiration. Indol, however, is much the more important of the two, as skatol, though formed in larger quantities, is absorbed only in traces.‡

When we consider, therefore, the amounts in which any of these substances could probably be formed under the most favorable circumstances, and compare these with the quantities which have been administered empirically or experimentally, we cannot but feel that to account for the symptoms in acute cases of intoxication something more active is necessary.

The third class of substances comprises putrescin, cadaverin and ethylidenediamin, all belonging to the diamins. Udransky and Baumann§ have fed both putrescin and cadaverin to dogs in large doses without effect. Grawitz|| has shown that they are both capable, in 2.5 per cent. solution, of producing severe inflammation and necrosis, while Behring¶ has found cadaverin, taken in large doses, poisonous to mice, guinea-pigs and rabbits. The substance found by Kulneff** in a case of gastroptosis is probably ethylidenediamin. It is more poisonous to mice and guinea-pigs than to frogs. In the former it causes lachrymation and salivation followed by violent dyspnea, lasting until death, which follows in twenty-four hours or more. So of these substances it may be said that the first two are extremely toxic and the chemical position of the last is still uncertain.

Of the various toxins which are known to be formed by the action of bacteria, we have not definite knowledge enough to speak until their principles are more completely isolated so that

* Loc. cit.

† Mester, *Zeitschr. f. physiol. Chem.*, xii, 130; Brieger, *ibid.*, iv, 414.

‡ Brieger, *ibid.*, ii, 241.

§ *Ibid.*, xv, 77.

|| *Virehow's Archiv*, cx, 1.

¶ *Deutsch. med. Wochenschr.*, 1888, No. 24.

** *Berl. klin. Wochenschr.*, 1891, p. 1071.

they can be studied as individuals. Of these, however, many are albumoses or of proteid nature and are destroyed, according to Nencki, by various digestive juices.*

As the first three classes of these substances differ from what we commonly have in mind when we speak of poisons, so do the symptoms which they are supposed to produce in the so-called auto-intoxications differ from the toxic picture we see in a case of ileus or acute intestinal obstruction.

We know that the chief symptoms of ileus, such as pain, vomiting, cold clammy sweat, pallid and shrunken features, with possibly sub-normal temperature and ultimate complete muscular relaxation, all of which often result in death within one or two days, can be simulated by poisons formed by bacterial activity, and that, too, within a comparatively few hours, as, for instance, by the tyrotoxin of Vaughan,† Lepine and Molière‡ have occasionally observed in cases of intestinal occlusion symptoms like those seen in atropin poisoning, namely, dilated pupils and marked redness of the skin and these authors surmise that death in these instances may be in some degree due to auto-intoxication from absorption of ptomaines from the intestine.

It is not my purpose to offer a chemical theory in explanation of any of these various symptoms that arise in the course of an acute and complete obstruction of the intestinal canal at different points in its course. It is my object rather to present a chemical study of the intestinal contents in cases of complete obstruction of the small intestines in order to learn whether other or more powerful poisons than the putrefactive products already isolated can be found under such circumstances. Such poisons if present must exert their action and play their part, be it great or small, in the symptomatology of ileus; certainly the substances so far observed in the intestinal canal are not sufficiently toxic to account for any of the symptoms observed in intestinal obstruction. On the other hand, "shock," and similar expressions, are far from giving a rational explanation of the condition described.

When we consider the chemical and physical conditions which exist in a case of this kind we find, first, a closure of the bowel, it may be by hernia, volvulus, intussusception or pressure, but the effect is to convert as much of the digestive tract as may be above the constricted portion into a closed thermostatic tube containing culture materials in the shape of proteids, carbohydrates, etc., kept at body temperature and infected by a varied bacterial

* Ransom (*Deutsche med. Wochenschr.*, 1898, p. 117), however, finds that tetanus toxin passes in large part unchanged through the alimentary canal, its harmlessness when administered by the stomach being due to incapacity of the stomach and intestine to absorb it. Behring (*ibid.*, page 662) considers that other proteid-like bacterial toxins behave in the same way.

† *Zeitschr. f. physiol. Chem.*, x, 146.

‡ Cited from Eichhorst, *Darmstenose*, *Real-Encyclop. d. gesamm. Heilk.*, iii, edit., v, 430.

flora, air being excluded. In this respect the conditions are similar to an experiment conducted in the laboratory, where the same materials are used and inoculated with intestinal bacteria, but with this striking difference, that in the former case the tube is composed of animal membrane through which many of the products may pass by absorption, to be taken up later by the portal system and if unchanged in their passage through the intestinal wall (as pointed out before in the case of pepton), perhaps to be oxidized or otherwise changed by the liver cells before reaching the tissues. So that for a chemical theory not only would poisons have to be formed, but in order to produce alarming effects they must be of such a composition that they are not destroyed by the liver, or they must be produced in such quantities that the liver is unable to destroy them as fast as they are absorbed.

For the purpose of this research lecithin was chosen, a substance which is a constituent of all food materials and is widely distributed in nature. The products formed by its decomposition are not only in some instances of extreme toxicity, but also capable of positive detection and identification. It has been found as a constant accompaniment of cell life, animal and vegetable, but chiefly in brain and nerve tissue, yolk of eggs and the germinating sprouts of plants, and to a lesser degree in milk, muscles, etc.

Chemistry and Fate of Lecithin in the Economy.—It has been known for a long time that there are different lecithins according to the fatty-acid radicle contained, but more recently Lippman* found two lecithins in beet residue, one of which gave cholin on decomposition and the other betain; he has therefore suggested that we may have different lecithins depending on the interchangeability of the basic radicle, as we have different lecithins according to the acid radicles present.

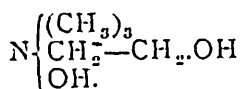
We know that these complex molecules split up into different compounds with different arrangement of their component radicles according to the agents employed, but as a result of chemical action and putrefactive processes it has been abundantly shown that lecithin breaks up into glycerophosphoric acid, fatty acids and basic bodies.

As regards the decomposition and fate in the economy of the different radicles comprising the lecithin molecule, Bókai considers it analogous to the fats, and states that lecithin is decomposed during the digestive processes into glycerophosphoric acid, fatty acids and cholin, and that these products are severally absorbed. According to this view it might be dangerous to consume a great deal of food rich in lecithin (eggs, for instance) as cholin is

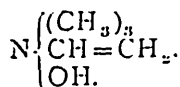
* *Ber. d. deutsch. chem. Gesellsch.*, xx, 3206. See also E. C. Shorey, *Journ. Amer. Chem. Soc.*, xx, 113.

certainly not a harmless substance. Bókai* subjected lecithin to the action of the pancreatic ferments and found that it was split up as above, but he mentions also that bacterial agency was not excluded. From the more recent experiments of P. v. Walther,† it seems fair to assume that some lecithin may be absorbed without decomposition, as he always found it present in the chyle of the dog to the extent of from 0.03-0.096 per cent. Hasebroek‡ has shown in putrefactive experiments, practically anaerobic as he used slime from the River Ill as the source of bacteria, that under these conditions cholin is broken up into methylamin, carbon dioxide and methane.

In the case of the lecithin under consideration, which is much the more common form in foods, the basic body contained in its molecule is almost wholly cholin§ or trimethyl-oxyethyl-ammonium hydroxide. The composition of this base is :



It is readily oxidized to a highly poisonous compound isomeric with muscarin and, on losing a molecule of water, a process which may easily occur in the intestine, it yields the almost equally poisonous compound neurin. Neurin is trimethylvinyl-ammonium hydroxide and has the composition :



The intimate relation between cholin and neurin is further shown by the fact that, as proved by E. Schmidt, neurin can be changed back to the oxyethyl compound, cholin. It has further been shown by Schmidt|| that cholin chloride is decomposed almost entirely by putrefactive action, at 20-30° C., at the end of fourteen days yielding large quantities of trimethylamin and a small quantity of a base whose platino-chloride is similar in crystallization and solubility to the neurin salt, and also agrees with neurin in its physiological action. When decomposition was carried on for ten days at 30-33° C. neither cholin nor neurin were present, nor could the presence of trimethylamin be determined with certainty. There can be but little doubt that the crystals isolated by Schmidt

* *Zeitschr. f. physiol. Chem.*, i, 102.

† *Arch. f. Anat. u. Physiol.*, Physiol. Abth., 1890, p. 329.

‡ Hasebroek, *Zeitschr. f. physiol. Chem.*, xii, 148.

§ Strecker, *Anal. d. Chem. u. Pharm.*, cxxiii, 353.

|| *Archiv d. Pharmacie*, cexix, 481.

from solutions of neutral cholin chloride, which had been infected with hay infusions, consisted in reality of the chloride of neurin, and we must therefore regard the conversion of the relatively non-toxic cholin into the highly poisonous neurin as being within the power of perhaps numerous varieties of bacteria. Hasebroek, as mentioned in connection with lecithin, found on treating cholin solutions with sewage from the Ill, that it was entirely decomposed, yielding methane and carbon dioxide. The solution on treatment with alkali gave an order of methylamin, and Brieger found that a cholin solution, after the action on it of putrefactive bacteria, gave trimethylamin on treatment with alkali. It will be seen that strikingly different results have occurred from putrefactive experiments on cholin. This, however, is to be expected as the flora in many cases is entirely different, but all observers agree that in the examination of the products of putrefaction whenever cholin is present neurin is also present, although it may be in traces only.

In reference to the toxicity of these substances it has been shown that cholin, previously considered non-toxic, is fairly active, since Gaetgens * has proved that 0.59 gramme produced almost instantaneous death in a cat. It has been further shown that cholin chloride produces the same muscarin-like symptoms as neurin, although the latter are much more intense. Brieger † found that 0.005 gramme of neurin chloride would produce the same symptoms in a rabbit as 0.1 gramme of cholin chloride. He further found that the fatal dose of cholin per kilogramme of rabbit was 0.5 gramme, or ten times that of neurin. Boehm ‡ considers the curara-like, paralyzing action of cholin to be like that of artificial muscarin, but the latter is five hundred times more toxic.

If therefore we take it for granted that putrefaction takes place in the intestinal canal during obstruction, the toxicity of the substances formed will depend upon the material present and the character of the intestinal flora. It may be that at the time of obstruction the canal is comparatively free from those bacteria which would give rise to toxic substances, or, on the other hand, it may be highly infected.

If the lecithin contained in the food is decomposed in such a way as to give rise to cholin and possibly to neurin we may demonstrate their presence. On the other hand, failure to demonstrate the presence of cholin would not prove positively that the decomposition does not go on in this way; since, as in all experiments on the digestive tract, the substances formed are either further modified or are absorbed so rapidly that it is almost impossible at

* *Dorpater med. Zeitschr.*, 1870, i, cited from Boehm, *Arch. f. exp. Pathol. u. Pharmakol.* xix, 87.

† *Uebw Ptomaine*, i, 39.

‡ *Arch. f. exp. Pathol. u. Pharmakol.*, xix, 87.

any one time to obtain a sufficient quantity for positive identification. This difficulty is naturally greatly increased when two or three days are allowed to elapse between feeding and the removal of the intestinal content. The intestinal content is then very small and contains so much bile that it is very difficult to handle. Out of six experiments on dogs in only one was I able to obtain a sufficient amount of a platinum salt for analysis.

It was my intention, in these experiments, to determine whether the lecithin content of the food could give rise to cholin and possibly neurin by decomposition in the intestine in cases of obstruction. The dogs used were therefore fed for two or three days before the operation of closing the intestine was performed, on the yolk of eggs, which is very rich in lecithin.

The following protocol from my notebook will serve to illustrate the entire series of our experiments :

Exp. 3. Friday, March 29th, 2 p.m., anesthetized dog, male, weight 55 lbs. Placed ligature around intestine just above ileo-cecal valve. Animal had been fed for three days previously on yolk of eggs. Saturday, March 30th, 6 p.m.—Animal quiet, does not seem very sick, drinks well but does not eat. Urine of sp. gr. 103.2, acid in reaction, no albumin, strong indican reaction. Sunday, March 31st—Dog drinks but does not eat, appears much the same, urine 274 cc., sp. gr. 102.8, reaction acid, no albumin. Indican reaction strong. Monday, April 1st—Dog seemed better, but about 2 p.m. managed to tear open the incision in the abdominal wall, and in consequence a loop of the intestine escaped. Dog was killed with chloroform and an autopsy made. Urine for this day up to this time, 160 cc., sp. gr. 103.1, reaction acid, strong indican reaction. It may be said that in no case was there any marked anuria, as the dogs drank freely and did not vomit. As far as the indican reaction was concerned it was strong, but not much more so than I have seen in apparently healthy dogs.

It must be remembered that the indican reactions as usually made cannot be considered quantitative, as the color is produced by oxidation of the indoxyl which cannot be regulated to give quantitative results, as the same agent at the same time produces indigo red and indigo white. I consider Baumann's the best test, namely, equal volumes of urine and strong hydrochloric acid with a few drops of ferric chloride, as there is less chance of overoxidation by this method.

Autopsy.—Evidences of peritonitis, some excess of peritoneal fluid containing flakes of fibrin, intense venous congestion. This was found to be due to perforation at point of ligature. There were slight adhesions between neighboring intestinal loops. Renal cortex much engorged, papille pale, capsule non-adherent. Liver hyperemic, consistence normal, gall bladder distended, contents

green; adjacent tissues stained yellow. Spleen hyperemic, veins on surface distended. Heart, veins on surface distended, otherwise normal. Lungs, highly pigmented; some calcareous nodules; otherwise normal. Stomach contents small, reaction acid, whole internal surface hyperemic, pyloric third stained yellow. Two small ulcerations in cardiac portion about middle of inferior curvature.

Intestinal content small, reaction acid, intensely bile-stained and whole surface hyperemic. The acid character of the contents continued to within fifteen inches of ligature and this lower portion of the ileum was very dark and had apparently lost all tone. It was filled with fecal material, bright green in color. The most of the mucous surface of the ileum was highly congested, and in the lower portion it was easily separable.

In all the experimental cases, excepting the foregoing, in which there was perforation at point of ligature, the tendency, with ordinary aseptic precautions, is toward recovery. Plastic processes connect the intestinal walls around ligature, necrosis occurs at the point of ligature and a passage is usually established in five to seven days. This was a source of disappointment in the earlier experiments as, in waiting for the full effects of obstruction in order to obtain as much material as possible, the experiments failed because of the escape of material through newly formed passages, re-establishing the continuity of the intestine. In those animals which were chloroformed in from seventy to eighty hours after ligature, there was no abnormal appearance of the internal organs, with the exception of the kidneys in which there was much engorgement of the capsular veins and intense hyperemia of the cortex, though the papille remained pale.

Microscopic Examination.—Kidneys showed infiltration of Bowman's capsule, cloudy swelling of epithelium of convoluted tubules, some necrosis of the epithelium and tube casts.

Chemical Treatment of the Intestinal Contents.—As it was my intention to ascertain by the presence or absence of cholin, whether there had been decomposition of lecithin during the obstruction of the intestine, it was first necessary to choose a method that would totally obviate, if possible, the chemical decomposition of the lecithin in the analytical process employed. The most suggestive work in this connection is that of Marino Zuco,* who claims that, by the methods of the toxicologists, it is possible to obtain cholin from fresh tissues, blood, etc., and that the cholin thus found originates from the splitting up of the lecithins under the influence of the acids and alkalis.

The intestinal contents of the animal described in experiment 3 were removed with the aid of as little water as possible. To-

* The so-called Ptomaines in Relation to Toxicological Researches. Absfr. in *Journ. Chem. Soc.*, xlvi, 342.

gether with the water added, the intestinal contents amounted to 280 cc. and had an acid reaction. The whole was treated with four times its volume of absolute alcohol, and left with occasional shakings for forty-eight hours. It was then filtered, and being still acid was evaporated in a large dish on the water-bath, the temperature of the fluid not going above 70° C. at any time; absolute alcohol was occasionally added to carry off the balance of water at the same low temperature. When the material had been reduced to a thin syrup it was mixed with a large quantity of powdered glass, evaporated to dryness in vacuo at 45°-50° C., and then placed in a Soxhlet extractor and thoroughly extracted with ether. This removes all of the lecithin, cholesterin and fats, a great deal of coloring matter, extractives, etc. It is, of course, understood that the method of treatment was governed by the substance sought. If no cholin was present my question could not be answered in the affirmative; on the other hand, the varying statements in reference to the ease or difficulty with which lecithin is decomposed made it imperative that the possibility of its decomposition should be avoided. Marino Zuco is the chief authority for the statement that lecithin is easily decomposed by analytical methods, and the method devised by him includes digesting on the water-bath for twenty-four hours at 70°. It is apparent, therefore, that much less injury must result from evaporating the fluid at the same temperature in one-eighth of the time. Further, I find that drying at first and extracting with ether in Soxhlet's apparatus much facilitates succeeding operations.

Schulze and Steiger* claim that in the examinations of certain seed contents, made by previous investigators, all the lecithin was not extracted by ether, and they make these deductions from the fact that after shaking the finely ground seeds in a flask with a quantity of ether, allowing it to stand for some hours, and then repeating the process two or three times, they were still able to obtain lecithin. This, however, is quite different from thirty-six hours extraction in Soxhlet's apparatus, as in my experiment. After extracting with ether for this length of time, one may rest assured that every trace of lecithin has been removed.

After the substance had been extracted with ether, as described, it was removed, dried and extracted with absolute alcohol, acidified with hydro-chloric acid. Of the more common putrefactive bases only the chlorides of cholin and neurin are soluble in absolute alcohol, and also the chlorides of some of the amines. The alcoholic extracts were united and evaporated to a small bulk, and were then treated with an alcoholic solution of platinum chloride, the precipitate was thoroughly washed on a filter

* *Zeitschr. f. physiol. Chem.*, xiii, 365.

with alcohol and ether, and was then dissolved off with cold water, in which it proved to be almost entirely soluble. This solution of the platinum-chloride double salt was then decomposed with hydrogen sulphide, was boiled and filtered, and a portion of the filtrate was neutralized and tested with the following alkaloidal reagents :

REAGENTS.	REACTION.
Phosphomolybdic acid.....	abundant yellow caseous ppt.
Phosphotungstic acid.....	white ppt. crystalline.
Potassium bismuth iodide.....	{ dark brown pulverulent ppt. somewhat sol. in excess.
Potassium cadmium iodide.....	white ppt. sol. in excess.
Potassium mercuric iodide.....	yellow crystalline ppt.
Potassium iodide and iodine.....	dark brown ppt.
Bromine water.....	reddish ppt.
Mercuric chloride.....	{ ppt. white, gradually becoming crystal- line.
Gold chloride.....	yellow granular ppt. sol. on heating.
Platinum chloride.....	slight cloudiness
Tannic acid.....	white finely flocculent ppt.
Picric acid.....	no precipitate.

The balance of the filtrate was now evaporated down and precipitated with gold chloride and filtered, the gold salt decomposed with H_2S , and the solution boiled and filtered. The filtrate gave the following alkaloidal tests :

REAGENTS.	REACTION.
Phosphomolybdic acid.....	abundant yellow ppt.
Phosphotungstic acid.....	white crystalline ppt.
Potassium bismuth iodide.....	{ dark brown pulverulent ppt. somewhat sol. in excess.
Potassium cadmium iodide.....	slight ppt. sol. in excess.
Potassium mercuric iodide.....	yellow crystalline ppt.
Potassium iodide and iodine.....	dark brown ppt.
Bromine water.....	reddish ppt.
Mercuric chloride.....	{ white ppt gradually becoming crystal- line.
Gold chloride.....	yellow granular ppt.

On the basis of the above reactions the solution was considered to contain only pure cholin chloride, and it was therefore evaporated down, taken up in absolute alcohol and precipitated with alcoholic platinum chloride. The yellow precipitate of double salts was filtered off, washed with alcohol and ether, dried in vacuo at 100° and analyzed. 0.1457 gramme of this salt gave 0.0463 gramme platinum or 31.77 per cent. For cholin: Theory requires 31.64 per cent. platinum. Found 31.77 per cent. platinum. The presence of cholin in the intestinal contents of the animal experimented upon is therefore proven.

On the presence of Neurin in the Intestinal Contents Examined.
—From the fact that there was a precipitate with potassium

cadmium iodide, tannic acid and also a slight precipitate with platinum chloride, I considered there was neurin as well as cholin present in my final solutions. Gulewitsch,* in one of the most complete chemical studies of cholin which has yet been published, draws attention particularly to the fact that Brieger and others, working with such solutions and using tannic acid to distinguish qualitatively between cholin and neurin, fell into an error in using this reagent. Cholin chloride, in acid solution, will not give a precipitate with tannic acid, but in neutral solution invariably does so. I have stated previously that neurin has been considered to invariably accompany cholin. It is possible that, using only qualitative tests, an error may have occurred when experimenters did not note whether the solution of chlorides was neutral or acid.

It has already been stated that when the platinum salt of cholin was dissolved on the filter by the free use of cold water a small quantity of a platinum double salt remained undissolved. This salt was, however, found to dissolve in hot water and when the solution had cooled, small yellow octahedral crystals were deposited which resembled crystals of the corresponding salt of neurin, as described by Gulewitsch † in his recent paper on neurin and its compounds. Now, these octahedra could not consist of the platinum salt of one of the amines or diamines, for the former were excluded by testing the original solution from which the cholin and neurin were precipitated by the chlorides of platinum and gold and the latter were excluded by the fact that their platinum double salts differ in crystalline character from the octahedral crystals here described. On warming gently the original solution with a slight excess of alkali or a solution of sodium bicarbonate it was not possible to detect the odor of an amine. Unfortunately, this platinum salt, soluble only in hot water, was not obtained in sufficient amount to warrant decomposing it and performing pharmacological tests with it. Nevertheless, I consider the presence of neurin in the intestinal contents, under the experimental conditions set forth in this paper, as almost a certainty.

The following is a tabular statement of the reactions for cholin obtained with the intestinal contents of the dogs used in Experiments 1, 2 and 4, after these contents had been subjected to the chemical treatment already described. In none of these experiments was enough of a salt of cholin obtained to warrant an analysis. The reactions are stated very briefly, but coincide entirely in appearance and character with those given under Exp. 3, and prove that cholin was present in the intestines of all of these animals though in less amount than in those of the animal used in Exp. 3:

* *Zeitschr. f. physiol. Chem.*, xxiv, 513.

† *Zeitschr. f. physiol. Chem.*, xxvi, 175.

REAGENT.	EXP. 1.	EXP. 2.	EXP. 4.
Phosphomolybdic acid	ppt.	ppt.	ppt.
Phosphotungstic acid	ppt.	ppt.	ppt.
Pot. bismuth iodide	ppt. brown.	ppt. brown.	{ ppt. brown.
Pot. cadmium iodide	ppt. white.	ppt. white.	{ ppt. white.
Pot. mercuric iodide	ppt. yellow.	ppt. yellow.	{ ppt. yellow.
Pot. iodide and iodine	ppt. brown.	ppt. brown.	{ ppt. brown.
Bromine	ppt. brown.	ppt. brown.	{ ppt. brown.
Mercuric chloride	ppt.	ppt.	{ ppt.
Gold chloride	ppt. yellow.	ppt. yellow.	{ ppt. yellow.
Platinum chloride		slight cloudiness.	{ slight cloudiness.
Tannic acid			{ ppt.
Picric Acid			

The absence of the precipitates with tannic acid in Exps. 1 and 2 were due most probably to the fact that the solution was acid, whereas in 3 and 4 it was neutralized before tests were made.

On the Occurrence of a Ptomaine accompanying the Cholin and Neurin.—In Exp. 1, in which the dog died during the night and was examined the following morning, a ptomaine was found which possessed the following characteristics: Its hydrochloride is very soluble in alcohol and water and crystallizes in fine needles. It gave all the reactions of cholin, but both the platinum and gold salts were quite insoluble in cold water and difficultly soluble in hot water, the gold salt being more easily soluble than the platinum one. The platinum salt, which had been dissolved in hot water and filtered clear into a watch glass, on cooling gave a deposit, which, under the microscope, had the appearance of small, bright yellow spheres which reacted towards light like crystals. An iridescent scum formed on the surface of the water from gradual decomposition of the salt. The gold salt was dissolved in the water and acidulated with hydrochloric acid, and, as it appeared to be reducing, the liquid solution was quickly filtered and cooled. On cooling it showed a fine yellow granular deposit of spheroidal crystals. On examination the following morning the deposit was quite dark and a beautiful mirror had been formed on the sides and bottom of the crystallizing dish as well as on the surface of the liquid. Both the platinum and gold salt, therefore, are easily reduced compounds. It is also to be noted that the free base has a penetrating, sweetish odor, and that it is easily oxidized to a brown resin when its solutions are left exposed to the air.

The amount of this ptomaine at my disposal was insufficient for

establishing its identity. It agrees in some of its properties, though not in others, with a ptomaine, $C_8H_{13}N$, obtained by Gautier and Etard * from putrefying mackerel and from the decomposing flesh of the ox and horse. It resembles, perhaps, more closely a base, $C_{10}H_{16}N$, which has been isolated from seapolyps in an advanced stage of putrefaction by de Coninck.† The hydrochloride of de Coninck's base forms fine, deliquescent needles, changes to a brown resin when exposed to the air, and both the platino and auro-chloride are decomposed by boiling water.

In the intestinal contents of animal No. 4 apparently the same base was met with, for, on shaking out the ether from the Soxhlet apparatus with acidulated water a few milligrammes of a gold salt were obtained which resembled the gold salt already described and on heating, burnt with a smoky, oily flame which gave off a disagreeable odor.

SUMMARY.

My experiments lead me to believe that complete occlusion of the small intestine at its lower end will give rise to the occurrence of cholin, neurin and perhaps other bases, provided the food taken contains any considerable quantity of lecithin. It is not improbable that still other poisons are formed by bacterial action from other constituents of the food in cases of intestinal obstruction. While cholin would have to be absorbed in relatively large amounts to exert a marked toxic action in human beings it is otherwise with neurin, which is many times more intense in its action and must be classed with the exceedingly active poisons. It has been shown both by the experiments of Schmidt and Weiss and also by those recorded in this paper that the poisonous neurin may be formed from cholin by bacteria. In its physiological action neurin agrees closely with muscarin; especially to be noted here is the paralytic action on the heart and its power to increase the intestinal movements to such an extent that continual evacuations occur. Whether the ptomaine which was found by me is poisonous I cannot yet say. It must be considered proved, however, that highly toxic substances may arise in the intestinal canal during its complete occlusion. The method of treating cases of intestinal obstruction before surgical means are resorted to, namely, washing out the stomach and as much of the gut as possible, often reduces the violent peristalsis, and this is due, perhaps, to the removal of substances out of which irritating and toxic products are formed by bacteria.

In conclusion, I would remark that our knowledge of the fate of lecithin in the digestive canal under normal conditions is very

* Vaughan and Nory, *Ptomaines and Leucomaines*, 3rd edit., 316.

† *Ibid.*, 318.

deficient. The assumption that it is saponified by the fat-splitting enzyme of the pancreatic juice, thus yielding cholin, glycerophosphoric acid and fatty acids, rests on the work of Bókai* in 1877, and, as that investigator himself admits, without excluding bacterial action. This omission throws grave doubts on the results. If the assumptions of Bókai be correct, caution must be observed in the use of some foods that have been considered most nutritious and healthful; for instance, the ingestion of a meal made up largely of eggs would hardly be without danger because of the poisonous action of the large quantity of cholin liberated from the lecithin and the probability of the formation of the highly poisonous neurin.

It is my purpose in the near future to examine this question with the help of modern methods.—*From the Journal of Experimental Medicine.*

TWO MONTHS' WORK IN GENERAL GYNECOLOGY AND ABDOMINAL SURGERY.

BY A. LAPHORN SMITH, B.A., M.D., M.R.C.S. (Eng.), MONTREAL.

Fellow of the American and British Gynecological Societies; Professor of Clinical Gynecology in Bishop's University, Montreal; Gynecologist to the Montreal Dispensary; Surgeon-in-Chief Samaritan Hospital for Women; Surgeon to the Western Hospital.

CASE XXXII.—On the 8th of October, at the Samaritan Hospital, I opened the abdomen of Mrs. W., aged 38, who had come to me for almost constant pain in the right side. She began to menstruate at the age of 12, and had always suffered. She was married at 20, never had any children, but she had a miscarriage at ten weeks, twelve years after her marriage, that is, six years ago, since which she has been a constant sufferer. On careful bimanual palpation the uterus was found completely retroverted and fixed, and the ovaries and tubes were distinctly felt, also fixed in Douglas's cul-de-sac. These were detached from their adhesions, and the uterus was fastened to the abdominal wall with silk worm-gut, and the abdomen was closed with through-and-through silk worm-gut stitches. She made an excellent recovery and felt the benefit of the operation within a few days.

CASE XXXIII.—On the 10th of October, at my private hospital I performed a Schroeder's operation, and an Alexander's on Mrs. S., 28 years of age, brought to me by Dr. Germain. She had a lacerated perineum, and her uterus was in the first stage of prolapse. She had had an operation, possibly an Emmett, performed on the cervix six months ago, but had been worse since, probably on account of a great deal of indurated tissue being

* *Zeitschr. f. physiol. Chem.*, i, 157.

left in. She had terrible headaches at every period, and a very bad smelling yellow discharge. She had two children, the last one three years ago, but no miscarriages. She made a good recovery, and has been seen four months later greatly improved in health and gaining in weight. The headaches and discharge are completely cured.

CASE XXXIV.—On the 17th of October I operated on Mrs. L., aged 41, at the Samaritan Hospital, for a cauliflower growth of the cervix, which completely filled the vagina. As the uterus was fixed, and I felt sure that the broad ligaments were affected, I decided that it was not to her interest that I should remove the whole of the uterus as I would thereby open up fresh avenues of infection. My own experience, as well as that of my colleague, here and in Europe, to whom I have spoken on the subject, is unfavorable to total removal whenever the disease has reached the broad ligaments, the patients dying quicker and having more pain than when left alone. On the contrary, a woman from whom I removed a similar large cauliflower with the ecraseur, cutting through healthy tissue and then amputating the cervix by Schroeder's method, touching the cervix with a cautery before bringing the flaps together, this woman, I say, has not only lived ten years but I have delivered her twice in that time successfully, and I decided to do the same thing in this case. This has been followed by the happiest results. Although she was bleeding constantly and very profusely before the operation, she did not lose a drop afterwards. She has gained in strength and weight, and she was moreover entirely relieved from pain.

CASE XXXV.—Next day I removed two little cancerous growths from Mrs. McK. at the Samaritan. They were situated near the urethra, and were very painful. A good margin of healthy tissue around and beneath them was removed with them.

CASE XXXVI.—On the 20th of October, in my private hospital, I performed fixation of the uterus and fixation of the kidney at the same sitting on Miss Y., whom I had previously treated for retroversion by shortening of the round ligaments. The result was not satisfactory, and when I discovered that the kidney was down I determined to perform ventrofixation at the same sitting to make the cure more certain. This was only the second or third case of failure after shortening of the round ligaments, of which I have done more than one hundred.

CASE XXXVII.—On the 22nd of October I performed an Alexander operation on Miss D. at the Western hospital. She was a servant, and was unable to earn her living on account of the constant pain in her back and head, and of the blocking of the bowels by the fundus pressing on the rectum, the uterus being locked under the promontory of the sacrum. There were no

adhesions, and the uterus was easily lifted up and replaced. There was no difficulty in finding the ligaments and drawing them out without opening the inguinal canal. She was completely cured of her trouble, and is now in a good situation.

CASE XXXVIII.—On the same day and at the same place I performed on Mrs. D., aged 39, a Schroeder's amputation of the cervix for a large laceration accompanied with much eversion and swelling and ulceration. There were also many cysts in the everted lips, and considering her age (39) she would very probably have been a case of cancer, as the delicate ciliated epithelium of the cervical canal was exposed to friction on the vaginal surfaces, keeping it constantly eroded. This operation continues to give very satisfactory results.

CASE XXXIX.—On the same day, Mrs. D., aged 50, with stricture of the rectum was examined under an anesthetic, but it was found to be higher than I could reach, and nothing was done. If it becomes dangerously narrower I will do a colotomy in the epigastric region by a method which I saw used in Leipzig, by which the patient has absolute control over the emptying of the bowels.

As the first of this series of cases was operated upon on the 22nd of August, the cases on the 22nd of October conclude the two months' operative work in general gynecology and abdominal surgery. As I am writing the last of these pages in February, I could report as many more cases which occurred during the two following months, including many vaginal coeliotomies and fixations, and happily without any death; but the reader can form a very good idea of the work from the above brief report of those operated during the month. They have enabled me to call attention to many interesting points, among others to the following:

1st. Every woman suffering from intractable headaches and backaches or hemorrhages should have a vaginal examination. In case one there was profuse menstruation and diarrhea that had pulled the patient down twenty-three pounds in four months, both of which were entirely due to retroversion. This case might easily have been taken for consumption, and I have often seen it happen.

2nd. A thorough curetting almost invariably stops menorrhagia. I have curetted almost six hundred cases for hemorrhage and can not recall one of them that was not greatly benefitted or cured. But it must be done thoroughly and not as I have often seen it done by even well-known operators. In most cases it requires a fairly sharp instrument, and we must go carefully several times over every portion of the mucus membrane lining the uterine cavity, until at last we can feel the curette grating on hard tissue. Also it should always be followed by the application of strong iodine and carbolic to the whole cavity by means of a cotton wrapped

applicator, and the cavity should be packed with a long narrow strip of iodoform gauze squeezed out of sublimate solution, one in a thousand which is left in for two days. 3rd. Shortening of the round ligaments gives splendid results, but great care must be employed in selecting cases, as it is only suitable when there is absolute certainty that there are no adhesions. It has absolutely no mortality. 4th. Ventrofixation gives equally good results, but it must be reserved for cases in which the retroverted uterus is adherent, and when the tubes are not only diseased but contain pus in considerable quantities. Unfortunately it has a slight mortality, about one per cent. I have performed it one hundred and eighteen times with two deaths; although in neither case could the death be attributed surely to that operation. In one case there were large pus tubes, the removal of which entailed several tears in the bowels which were too rotten to hold stitches; and in the other case there were six other operations, including removal of pus tubes, performed at the same time. 5th. Vaginal celiotomy is a godsend for the patient who has to have the abdomen opened for one of the minor diseases of the tubes and ovaries. In several cases I have opened up closed tubes, resected cysts and sclerosed ovaries, removed both ovaries and tubes, or removed both tubes and left in one, or both ovaries, or a part of one. 6th. Vaginal fixation will probably take the place of ventrofixation in minor cases, because it has an equally low death rate, and has the advantage of a very short convalescence, and being entirely free from pain. It is a little too soon to speak of the results in my own cases, but I can safely say that should they prove to be as good after vaginal fixation as after ventrofixation, the former will take the place of the latter in the majority of cases. Even Alexander's operation has a rival in vaginal fixation, which I have done the last few times without opening the peritoneal cavity. The anterior vaginal wall was opened with one or two light strokes of the knife; the bladder was pushed up off the uterus, the peritoneum of the vesico uterine fold was pushed up and a couple of silk worm-gut sutures were placed so as to bring almost the whole anterior wall of the fundus in contact with the anterior vaginal wall. These stitches are left in for a month, but the patients have absolutely no pain and could get up and walk about next day. One of my cases actually went home in eight days, and has been working ever since without any harm. With our increased experience of working on the anterior vaginal wall we can cure easily nearly all bladder cases, especially incontinence of urine and fistulas. Also obstinate cases of cystitis can be drained by means of a button-hole fistula, which can be subsequently closed with the greatest ease. 8th. The tubal pregnancy cases, which are generally so disastrous when left alone, give brilliant results when operated on

early. I have operated on twelve and every one recovered, although some of them were pulseless when I made the incision. When a woman misses one or two periods, and then the flow comes on and continues for several weeks, if she has pain and a *lump in her side*, or in Douglas's cul-de-sac, look out for tubal pregnancy. This is the time to operate, although even after rupture has taken place and the abdomen is half full of blood it is still not too late to tie the arteries from which she is bleeding to death. 9th. I hope that my friends will not think any the less of me for reporting the deaths in their order just as they occurred. Three cases out of forty is rather high, but to make up for them I will probably have a run of cases without a death as has already happened when I have gone a whole year without having a death following operation, either at my private hospital or at the Samaritan or Western. All the deaths are due practically to one of two causes, hemorrhage or cysts, and as we are improving steadily in our technique so much that before long there will be no more deaths from these two causes. As my paper has reached the length limit I will now bring it to a close, with the hope that it will prove of interest to those for whom it was written.

250 Bishop St., Montreal.

Reports of Societies

LAMBTON MEDICAL ASSOCIATION.

The annual meeting of the Lambton County Medical Association was held in the Foresters' Hall, Watford, on Wednesday, February 8th. On account of the severe weather the attendance was not as large as expected. Members present: Drs. Wilkinson and Logie, Sarnia; Dr. Scott, Courtright; Drs. Harvey and Brodie, Wyoming; Dr. Watson, Arkona; Dr. McAlpine, Petrolea, and Drs. Newell and Gibson, Watford.

The officers elected for 1899 were: President, Dr. F. B. Wilkinson, Sarnia; Vice-President, Dr. McAlpine, Petrolea; Secretary-Treasurer, Dr. Gibson, Watford; Auditors, Drs. Newell and Gibson, Watford; Committee on Ethics, Drs. Newell (Wyoming), Logie (Sarnia) and Fisher (Brigden).

Dr. Wilkinson, of Sarnia, read a paper on "Interesting Surgical Cases"; Dr. Newell, of Watford, read one on "Interesting Medical and Surgical Cases," and Dr. Watson, of Arkona, a paper on "Temperature."

The visiting physicians were entertained at a six o'clock dinner at the Taylor House by the local members of the profession, where a sumptuous repast was served. A number of prominent citizens were present at the banquet.

Special Selections

DENTAL SEPTICEMIA OF THE ANTRUM.—TWO CASES WITH OBSCURE SYMPTOMS.*

BY V. A. LATHAM, M.D., D.D.S., Chicago.

In presenting these brief notes on such a common subject, I ask the consideration of the Section, because it seemed as though the period of life at which the disease occurred, as well as the obscurity of the cases for lack of the usual symptoms, would be of interest.

The cases would hardly come under the term "empyema," unless we accept that definition to be a chronic suppuration, as is usually described in the text-books. C. Heath, in his article on "Diseases of the Antrum" in the Dictionary of Surgery, speaks of suppuration or empyema of the antrum as being "a form of chronic abscess, but with the peculiarity that the pus is seldom completely shut in so as to *produce distension*." This statement may be questioned by some when we remember the bulging cheek, even with a copious nasal discharge.

CASE 1.—The patient, aged 8, was first seen and treated for what appeared to be the usual spring discomfort—general malaise, with slight symptoms of la grippe. The mother complained that the child was wakeful and would stay up all night, wandering into the bath-room (which was the warmest room in the house) at the early morning hours, and play over the radiator instead of going to bed. On questioning why she would sit up, she said she could not sleep. After some days the mother became anxious and called a physician.

The main symptoms were: Fever, which varied in degree, more at night, ranging from 99° to 101°; a muddy complexion; constipation; gastro-intestinal irritation; headache, a trifle off and on; a reddening of the skin over the malar bone; extreme fetor of the breath; heavily-coated tongue; no appetite nor thirst, and some nausea; the teeth and mouth showed neglect and were in a bad condition. The left eye showed catarrhal signs, the conjunctiva being injected and watery.

* Presented to the Section on Stomatology, at the forty-ninth annual meeting of the American Medical Association held at Denver, Colorado, June 7th to 10th, 1898.

Beyond these symptoms nothing else could be obtained, and the child persisted in saying her teeth were not poor and she had no pain, which statements her family agreed with. The usual treatment by free elimination, mouth-washes and tonics was given and some benefit obtained. A few days later the cervical glands showed signs of swelling *slightly on the left side, but were preceded* by the submaxillary, and I was asked to see the case. The history as given above was repeated, with the addition that to me the cheek seemed swollen a trifle—the mother thought it natural. After repeated questioning I learned that “this is just the same kind of trouble she had last spring and also the year before, but the face swelled a little the first time; but the doctor said it was only cold and the grippe and would go away in a day or so, which it did.” The child staying awake seemed the dangerous system to the parents. The mouth seemed fairly clean. The gland was somewhat swollen and the cervical chain also. The teeth were carious, especially the temporary teeth—the upper on the left side. There was no soreness; never any toothache nor abscesses. On palpation the cheek showed a slight difference in feeling and sensibility over the malar bone, compared to the right side. The temporary first molar was decayed badly, but not at all loose. The gum around was reddened some and, judging the condition was septic, the temperature now rising one to three degrees, the erysipelatous coloring of the cheek, the general condition and lymphatic enlargement, I opened the temporary molar, found a little thick pus in the pulp chamber and advised extraction, which was done, when more pus came down. The alveolus was cleansed, syringed and probed for evidences of necrosis, but none found. Antiseptic washes were ordered and general remedies. After three days the patient showed more swelling of the cheek, the eye being half closed. The bulging was pronounced and a globular swelling showed at the buccal junction of the lip near the extracted tooth cavity. She complained now of “feeling as if she had a cold in the nose,” slight periodontitis of the teeth on left side and redness of the gums, but denied pain or headache, much to my surprise. On examining carefully I thought I detected slight crepitation, which led me to suppose the antrum was involved. The symptoms continuing, I extracted the temporary second molar. The cavities of both first and second were thoroughly examined and probed with blunt and sharp-pointed steel probes and no necrosis found, but the evidences of roughening of the bone felt. The danger lay in damaging the permanent teeth, but I thought best to open near the median line and just in front of the permanent first molar to the alveolar buccal border, feeling for the cusps of the developing teeth. The cavity was drained of pus, washed with a hot (93° F.) saline solution, followed by borolyptical solution till it came clear. Then some

alcohol and cassia oil, which had been thoroughly shaken in hot water, was injected and the opening packed to keep out food, etc. This treatment was continued for two weeks and then at long intervals, and the opening allowed to close slowly. The patient reports good progress and the permanent bicuspid is slowly coming down.

The chief interest in this case lies in the following points :

1. The age of the child. This patient is younger than any other reported case I have found in the literature available to me, except one, viz., the oft-quoted case of Dr. G. A. Rees (*Med. Gazette*, Vol. iv., n.s.) mentioned by Tomes, Smale and Colyer, of a new-born infant.

2. The lack of the usual symptoms, more especially the pain, swelling, tenderness, the discharge from the nose, roots of teeth, or abscess.

3. The occurrence of some symptoms later, after the extraction of the first and second temporary molars.

4. The periodic recurrence. Every spring for three years a similar condition was described by several members of the family ; and the insomnia so seldom seen in young children.

5. The relative position of the antrum compared to adult life and the difficulty in entering the same, through

6. The danger of displacing or injuring the developing permanent bicuspid teeth.

CASE 2.—This patient was a medical student, blonde, aged 23. She complained of severe facial neuralgia in the left side of the head. I was informed the patient had consulted numerous prominent physicians, oculists and dentists, and tried various remedies for her trouble. Tonics, outdoor life and change of climate all were tried with the same result, the benefit being only temporary. The neuralgia continued, accompanied by a severe headache, and she finally consulted their oculist, who, in consultation, urged spectacles to be worn, and these seemed to benefit for the time being ; then the trouble recommenced with severe earache and taxed the patient's endurance considerably.

The case fell into my hands through a mutual acquaintance who was anxious to get some advice, and I was anxious to see the case for its unusual history.

The patient having been engaged in laboratory work, it was thought the eye-strain was possibly due to the fine work, and so the work was stopped. The eye was injected, as is usually seen in neuralgia of the fifth nerve ; some interference of vision. The patient is of the nervous type, has an anxious, worn-out expression, and has had catarrhal trouble in nose and throat. General history was very good outside the usual trouble. The teeth were in good order, three stoppings (of gold) only, in the mouth, one small an-

terior proximal in the second upper molar, and the tooth seemed a trifle darker in color. This I suspected might be the cause of the trouble, but on testing by the various methods, no evidence of devitalized pulp or hypersensitiveness could be obtained. The third molar was in a fairly good position, though the crown turned toward the buccal fold, erupted fairly and healthy so far as could be learned. On examining with a small electric lamp, the antrum seemed to be slightly opaque. Consultation was held and the attending oculist vetoed the diagnosis of antral trouble—inflammation—but the family physician agreed with me that there was a possibility of its being the cause of trouble and, as there was small danger in making an exploratory incision, the patient gladly consented, and, as she was becoming emaciated, nervous and was suffering severe pain, we punctured through the canine fossa, obtaining some serous fluid with some flakes of fibrin. Covers were spread and a culture made, the result showing streptococcus pyogenes albus, blood cells, epithelial cells, mucous and salivary corpuscles, mixed with micro-organisms and pus germs.

The opening was enlarged, washed with hot saline solution and then with mild antiseptic solutions and a fine silver tube tied in. For two days the discharge continued and the patient complained of severe carache and pain in the eye. The tube was cleared, and a thin creamy pus oozed out, with small pieces of gelatinous tissue resembling the myxomatous structure of a polypus. The opening was enlarged, a flexible probe passed through, and the surfaces carefully examined. The mucous membrane appeared to be somewhat thickened, and over or about the position where the roots of the third molar tooth would lie, there seemed a nodular place with some softened tissue around. The antrum was again cleansed and then touched with carbolic acid and iodine, followed by a curetting, the fresh surface being washed with boric acid and 0.1 per cent. formalin (of 40 per cent. strength sol.), then cauterized with iodine, and the tube inserted and plugged. The third molar was extracted, for fear it was abscessed, although seeming healthy. The pushing up and engaging of the forceps caused the crown to break very easily, and on examining the tooth a large cavity with carious material was found, but the nerve was not exposed, and the tooth alive. The root is curved and slightly roughened on the apical knob, and evidently was the one felt in the antrum, and by pressure was causing necrosis and absorption.

The patient progressed well, though slowly, under tonics, local antiseptics and packing, and at the present time, nine months, has had no recurrence of the neuralgia. An interesting point is the cause of such severe pain in that region and what caused the carious tooth, for the coronal surface showed no evidence of fissures or cavities, as was testified to by a number of the examining phy-

sicians and dentists. There was no history of abscessed teeth, soreness or pain in any particular tooth, neither was any sensitiveness found with electricity, ice or percussion; neither was the cheek swollen.

ON MENSTRUATION AND THE OVULATION IN MONKEYS AND IN THE HUMAN FEMALE.

BY WALTER HEAPE, M.A.,
Trinity College, Cambridge.

Menstruation in monkeys was described by Rengger as occurring at irregular periods in cebus, by Sainte Hilaire and Cuvier as a regular monthly discharge in cercopithecus, cynocephalus, and macacus, and by Sutton as fairly regular in macacus. The late Mr. Bartlett, Superintendent of the Zoological Gardens in London, and Mr. Sanyal, superintendent of the Zoological Gardens in Calcutta, both assure me that monkeys menstruate regularly in their establishments, and I myself have observed regular menstruation in *semnopithecus entellus*, *macacus cynomolgus*, and *cynocephalus porcarius*, during the short time specimens of these animals were under my notice in Calcutta. *Semnopithecus entellus*, living in the jungles on the south bank of the Hooghly, have a definite breeding season, and it is to be noted that the specimens under my notice for three months menstruated regularly, although it was not their breeding season. Dr. Aitchison assures me that *M. rhesus*, living in the hills at Simla, also has a definite breeding season; and I have very strong evidence that the same species living around Muttra in the plains has a definite breeding time, although it is a different time from that given me by Dr. Aitchison for *M. rhesus* at Simla.

Although absolutely regular menstruation throughout the year is not definitely proved for all species of monkeys, still it is quite certain some of them menstruate during the non-breeding period, and this is a fact to be noted, for it would appear to be a connecting link between the lower mammals who come on "heat" only at breeding times, and the human female, who is, generally speaking, capable of breeding at all times. This relationship is brought still closer by the facts that some women, of peoples who live very far north, do not regularly menstruate during the winter months, and that a special breeding season among human beings is not only suggested by the customs of widely-separated peoples but is actually observed by some of them.

The histological phenomena of menstruation, exhibited by *S. entellus* and *M. rhesus*, is divided into four periods. Periods of rest, of growth, of degeneration, and of recuperation. The period of growth shows two well-marked stages: the growth of stroma and the increase of vessels; while the period of degeneration has four well-marked stages, the breaking down of vessels, the formation of lacunæ, their rupture, and the formation of the menstrual clot.¹

Two processes of peculiar interest are noticeable in this menstrual history—the behavior of leucocytes and the remarkable adaptability of the uterine mucosa tissue. The leucocytes are early attracted to the peripheral vessels, presumably by the degenerative changes which are going on in the tissue there; they arrive in great numbers, but the waste products are otherwise disposed of, by the denudation of the superficial mucosa, before the great majority of leucocytes have time even to attack the offending degenerate tissue. Many of them are contained in the discarded tissue, but few migrate from the vessels, and large numbers are to be seen adhering to the ruptured walls of the vessels; later they are again seen within the newly-formed vessels retiring from the field. This is what happens during healthy menstruation; but in cases of suppressed menstruation they are probably actively engaged, and in many diseases of the menstrual organ play a very important part.

As regards the adaptability of the mucosa tissue, it is chiefly of interest as evidence of the archaic nature of that tissue. The devastation witnessed within the uterus when the mucosa is denuded is astonishing, and yet a few days afterwards it is again possessed of glands, blood vessels, and superficial epithelium. This happens every month, and it is a remarkable feat of which no other organ in the mammalian body is capable. Moreover, it is noticeable that by far the larger number of capillary blood vessels, together with some of the epithelium, is formed from the indifferent elements of the mucosa—a remnant, it seems, of that power of reproducing lost parts which some of the lower animals possess.

A review of the various modern views of menstruation in the human female leads to the opinion that it will be found that while the histological phenomena accompanying menstruation in the latter may differ somewhat in detail from those in monkeys, they are practically identical processes; further, menstruation and "heat" are very much more similar than has hitherto been recognized.

With regard to the relation of ovulation to menstruation, if it is granted that menstruation in monkeys is the same process as

1. The various stages may be followed with the help of the drawings in Mr. Heape's paper on "The Menstruation of *Scenopithecus Entellus*" (Phil. Trans., Vol. clxxv., 1894).

menstruation in women, then it can definitely be stated that ovulation does not occur during each menstrual period, and that it does not necessarily occur during any menstrual period. In *S. entellus* and *M. rhesus*² I have shown that the menstruation frequently occurs without ovulation—probably this is the case during the whole of the non-breeding season; while Leopold and Miranoff have shown that ovulation may occur independently of menstruation in the breeding human female.

The want of power to ovulate is no doubt one of the causes of sterility, and the importance of all considerations dealing with the process of ovulation is obvious to those who have to combat sterility. It is a fuller knowledge of the cause of ovulation which is required, and it is hoped it will be forthcoming, and be found of assistance to those who desire to induce ovulation.

THE PREVENTION OF TUBERCULOSIS.

The meeting which was summoned by the Prince of Wales at Marlborough House on Tuesday, December 20th, 1898, will mark an epoch in the long and disastrous history of tuberculosis in this country. It was a private meeting to further the objects of the National Association for the Prevention of Consumption and other forms of Tuberculosis, which will in future date its existence, and what we trust may be a career of great usefulness, from this occasion. Though the meeting was private, the Prince had asked a number of representative men to meet him, and after Sir William Broadbent had read a lucid statement of the objects of the Association, and of the means by which it is sought to obtain them, Sir T. Grainger Stewart, speaking as President of the British Medical Association, and as Professor of Medicine in Edinburgh University; Dr. J. W. Moore, speaking as President of the Royal College of Physicians of Ireland; Professor Macfadyean, as Principal of the Royal Veterinary College; and Sir Samuel Wilks, as President of the Royal College of Physicians of London—all bore testimony from their several points of view to the importance of enlisting public opinion in the fight against tuberculosis.

The Marquis of Salisbury, in moving a resolution approving the objects of the Association, and commending the method adopted of seeking to instruct public opinion, and to stimulate public interest rather than to advocate compulsion, laid special stress upon the necessity of educating the public mind. His speech indicated very clearly that the Government is not prepared to accept the proposal which has been put forward in some quarters

2. The Menstruation and Ovulation of *Macacus Rhesus*. Phil. Trans., Vol. clxxxviii., 697.

with a view of making a resort to the tuberculin test compulsory on dairy farmers. We believe that the opinion is very widely held, not only by veterinarians and agriculturalists, but also by those who are responsible for public health administration. With the growth of an enlightened public opinion, it seems reasonable to hope that commercial enterprise and the pressure of competition will eventually lead to very great improvement in the conditions under which dairy cows and cattle for slaughter are kept. Very much may also be done by local health authorities, not only by improving the general conditions of the housing of the people and the trade in milk and meat, but by educating the public mind to appreciate the importance of domestic hygiene.

There are already many encouraging signs of the growth of public opinion in this matter. We are no longer satisfied to fold our hands in resignation before the scourge of consumption, or to regard it as a mysterious product of inheritance or of bad climate. We recognize that it is an infective disease to be prevented. We are no longer content to seek to afford euthanasia to its victims, but have learnt that the means most effective for its prevention are also most effective for its cure. The change in medical opinion dates from the epoch-making research of Koch, by which he demonstrated that a specific bacillus was the cause of tuberculosis in all its forms. Since then hundreds of workers—physicians, pathologists, and sanitarians—have built upon the solid foundation laid by Koch, have proved that tuberculosis is a preventable disease, and have indicated the means which must be taken to prevent it, both in man and in animals. Gradually a change has been taking place in the whole attitude of public opinion. Owing to the insistent teaching of members of the medical and veterinary professions, it is beginning to be understood that tuberculosis is preventable, and the question which the Prince of Wales put on a memorable occasion with regard to other infectious diseases is beginning to be asked, "If preventable, why not prevented?"

The Prince of Wales, by lending his countenance to the movement now on foot, has added another to the many great services which he has rendered to this country. It was obvious to all who had the pleasure of hearing the thoroughly practical speech which he delivered on Dec. 20th, that he took a deep personal interest in the question, and that he had been at considerable pains, to inform himself upon the means which had been taken both for the prevention of tuberculosis in cattle and for the cure of consumption in man. The Prince of Wales has always shown a great interest in all matters affecting the prosperity of agriculture in this country, and as a landowner and active supporter of the Royal Agricultural Society he has become well aware of the importance of extermin-

ating tuberculosis from our herds. He has also by a visit to Falkenstein made himself acquainted with the hygienic treatment of consumption in man, which has been attended with so much success. His aspiration that similar sanatoria may shortly be established on an adequate scale in this country is in a fair way to be fulfilled, and we believe that many sufferers in the future will have cause to be grateful to the Prince for the assistance which he has given to the National Association for the Prevention of Consumption at this early stage of its career.—*British Medical Journal*.

REPORT OF SEVENTY-EIGHT CASES OF PULMONARY TUBERCULOSIS TREATED WITH WATERY EXTRACT OF TUBERCLE BACILLI.

A report of seventy-eight cases of pulmonary tuberculosis, treated at the Winyah Sanitarium, at Asheville, N.C., in 1898, with watery extract of tubercle bacilli, by Dr. Karl von Ruck, appears in the February number of the *Therapeutic Gazette*.

The author, giving due credit to the advantages of the favorable climate of the Asheville plateau, as well as to the systematic employment of hygienic and dietetic methods in a special institution, shows nevertheless by his results the unmistakable favorable influence of this preparation, which he perfected in his laboratory in February, 1896.

He, with many others, notably Professor Koch, have long realized that the bodies of tubercle bacilli contain a soluble substance, a proteid upon which the curative action of all tuberculin preparations and modifications must depend, small and variable quantities of which were thought to enter into the culture fluid from which the tuberculin preparations are made.

Experiments upon animals have shown that the injection of dead tubercle bacilli produce both curative and immunizing effects, but they have always produced abscesses at the point where they were injected and often spurious tubercle in the animals experimented upon, conditions which seemed to preclude their use in the treatment of human tuberculosis.

A solution of the tubercle bacilli, without injury to the curative proteids was therefore naturally sought for, and in April, 1897, Professor Koch announced that he had accomplished this in the production of Tuberculin R., which was then given to the profession.

Several weeks later Dr. von Ruck announced his success in also making the desired solution and communicated his experiments

and methods in a paper read before the American Climatological Association and published in its transactions for 1897 and also in the *Therapeutic Gazette* for June, 1897. His method of preparation differs from that published by Professor Koch and is briefly as follows:

The tubercle bacilli are filtered out of the rapidly growing and highly virulent culture, after washing with distilled water for the removal of the remains of the culture fluid, they are dried in a vacuum dessicator. Next they are powdered in an agate mortar and then extracted with sulphuric ether. This extraction removes the fats. They are again dried and powdered as before and their further extraction takes place in sterilized distilled water over a water bath with a temperature of 120° F. The proteids becoming dissolved in the distilled water, the fluid is then decanted and filtered through porcelain, when finally the amount of proteids is determined and the preparation standardized to a certain per cent.

Professor Koch simply triturated his tubercle bacilli and then put them into distilled water and separated the undissolved germs with a centrifugal machine. His preparation did not, however, pass through a porcelain filter and it was subsequently shown that when an attempt of filtering through porcelain was made, a residue collected in the filter consisting of tubercle bacilli.

Virulent infection followed the injection of this residue in animals and for this reason Professor Koch was obliged to withdraw his Tuberculin R., it being an emulsion of tubercle bacilli and fragments of such, rather than a true solution.

Koch's claim that in a true solution of the tubercle bacilli the final perfection of a specific remedy was attained, would appear to be verified by the results which Dr. von Ruck reports.

He treated with his watery extract twenty cases in the early stages, all of which recovered, with an average gain of eleven pounds in weight, and subsidence of all symptoms.

Of thirty-seven cases in a more advanced stage twenty-seven recovered, seven were greatly improved, three improved and none grew worse, gaining on an average nearly thirteen pounds each.

Twenty-one cases in a seriously advanced stage were also treated, of which three recovered, nine were greatly improved, seven were improved, only two grew worse or died, there being an average gain in weight of ten and a half pounds each.

The remedy was also given for trial to Dr. Denison, of Denver, Dr. Taylor, of St. Paul, and Dr. Williams, of Asheville, all of whom obtained good results. Dr. Williams supplies the date of twelve cases treated by him with von Ruck's extract: of seven early stage cases, all recovered; of three cases in the second stage, one recovered and two were greatly improved, and of two far advanced cases, one recovered and one grew worse.

Comparing his previous results with those obtained with the watery extract in von Ruck's institution he shows the results as follows:

	Cases.	Recovered. per cent.	Improved. per cent.
Treated without Specific Remedies.....	816	12.1	31.0
Treated with Koch's original Tuberculin.....	379	35.5	37.5
Treated with Antiphthisin and Tuberculoceidin.....	182	32.5	46.3
Treated with Tuberculinum Purificatum (von Rock).....	166	43.4	36.2
Treated with Watery Extract of Tubercle Bacilli (von Ruck)	78	64.1	33.3

Among other matters of interest, the report also contains mention of Dr. von Ruck's efforts to produce a serum, as suggested by Professor Koch, in his paper by using Tuberculin R. and his watery extract for immunization. Dr. von Ruck used goats for this purpose and injected them in increasing doses reaching 70 c.c. per single dose in the course of six months.

Serum taken from these animals failed to protect or cure guinea pigs, and finding his results entirely at variance with the claims of Dr. Fisch, he purchased serum from Dr. Fisch's laboratory and treated a number of guinea pigs, all with negative results.

These experiments are given in detail and it does not appear that the degree of tuberculosis or its course was in any way modified by the injection of this serum; the control animals showing no greater progress in the disease than did those which were treated.

Full directions are given for the use of the watery extract, the beginning dose being 1-1000 of a milligram, and this is gradually increased to 5 milligrams. There are three solutions, No. 1 containing 1-100 of one per cent.; No. 2, 1-10 of one per cent., and No. 100 containing one per cent. of the anhydrous extracts.

THE BLOOD-SERUM OF CONVALESCENTS IN THE TREATMENT OF TYPHOID FEVER.—E. Walger in the *Centralblatt für Innere Medicin.* of September 3rd, 1898, reports four cases in which the serum of convalescent typhoid cases was injected into patients suffering from typhoid fever. All of the cases received a single injection of ten cubic centimeters, except one in which a relapse occurred, in whom a second injection was given. All of the cases were seemingly severe, the temperature was high, and the prognosis was regarded as unfavorable. The author thinks that the fact that two of the cases were followed by relapse is proof that the disease was of considerable severity. After each injection of the serum there was a prompt improvement in the subjective symptoms; the temperature did not immediately fall, but declined slowly. The duration in each case seemed to be very much shortened. From these observations, in which Walger had been preceded

by Weisbecker, it is apparent that there is clinical as well as theoretical grounds for the belief that serum-therapy in typhoid fever will have an extended range of application. We shall watch with interest the development of this subject, as there is no disease in which serum-therapy offers such hope of successful results. The brilliant achievements in the treatment of diphtheria cannot but lead to the hope that similar results may follow in other infective diseases. As having a bearing on this question of immunity and the serum treatment of typhoid fever, we would refer in this connection to a recent report of M. Vincent to the French Academy of Medicine, in which he states that French soldiers in Africa are a hundred times more susceptible to typhoid fever than the native Arabs. M. Vincent holds the opinion that this exemption of native Arabs from infection by typhoid fever does not depend upon a previous attack nor upon a gradually developed immunity by the use of water contaminated with typhoid fever germs, but to a natural immunity. An examination of the blood by Widal's test showed no serum reaction. It thus appears that the immunity possessed by the Arab consists in ability to resist the invasion of typhoid fever germs, and is a racial rather than an acquired peculiarity.—*Medicine.*

VENOUS CONGESTION AND ITS GERMICIDAL ACTION UPON ANTHRAX BACILLI IN THE SUBCUTANEOUS TISSUES.—In a recent number of the *Centralblatt für Bakteriologie* (Band 24, No. 9) Prof. H. J. Hamburger, of Utrecht, describes a number of very interesting experiments, in which he demonstrates that the germicidal action of blood and lymph is greatly augmented in the presence of carbon dioxide. The conception of this simple principle in bacteriology and its application in practice is not original with Hamburger, nor does he claim originality. His operations are in principle similar to those that have been for some time conducted in the clinics of Bier, Mikulicz and others, in the treatment of tubercular affections of the extremities, especially of the joints. The fact that CO_2 added to pure cultures of tubercle bacilli has a decidedly deleterious effect upon the germs led a number of surgeons to the belief that, since the increase of carbon dioxide in a part can be so readily produced in the extremities of the animal, this fact might prove of practical use in the treatment of certain tubercular affections. The increase of CO_2 in the affected extremity was readily accomplished by simply producing, through the means of a ligature, a venous congestion, a passive hyperemia. The results obtained have been varied, some claiming good results, others testifying to the impracticability of the procedure. Hamburger through his experiments

demonstrates not only that the germicidal action of the blood and lymph is increased through venous hyperemia, but that this action is due to the carbon dioxide, and not to phagocytosis, etc., as has been claimed by some. With a view of selecting pathogenic germs whose virulency could be quickly and readily determined, he used the anthrax bacilli, in some cases with spores, in others without. In order to exclude the phagocytic action of the leucocytes, the bacilli growing upon small bits of agar were wrapped tightly in pergameneous paper, so that the bacilli could not escape and invade the surrounding tissues, and the leucocytes could not gain entrance to the germs. To determine the influence of congestion alone upon the virulence of the bacilli, the question of individual power of resistance and the point of infection must be eliminated. With the above three points in view, a small pocket as described was introduced into the subcutaneous tissues of each foreleg of the animal (dog, rabbit, etc.). After the small wound had been healed and all possibility of gaping and sloughing was eliminated, venous congestion was produced by the introduction of a ligature about one leg, the other being left free. The ligature was watched closely, and the edema from time to time relieved. After from seven to eleven days the agar bits were removed, and were used in the inoculation of white mice, etc. Without exception it was found that the mice inoculated with bacilli from the non-congested leg died, while the mice inoculated with bacilli from the congested extremity were not killed. Hamburger concludes that the experiments demonstrate that under the elimination of phagocytic influence of the white corpuscles, venous congestion certainly destroys the anthrax virus in subcutaneous tissues.—*Medicine*.

SUGGESTIONS TO MEDICAL WRITERS: NO. 2. THE MANUSCRIPT.—A little attention to several seemingly unimportant matters on the part of medical writers would be helpful in many ways and to quite a number of people. Do not, for example, write on paper less in size than "Congress-letter" (which is about 8 by 10 inches), and leave at least one inch of blank space at the left-hand side. Good paper is the cheapest, and a moral man always uses ink and pen, not pencil. Do not write upon both sides of the paper; number each page. Let the lines be so widely separated that there is space, if needed, to insert words or sentences between them. The type-writing of manuscripts is advisable when it is possible. Be doubly sure that proper names (of which the type-setter may know nothing) are written so plainly that there is no possible doubt as to their proper spelling. Do not paragraph your manuscript; leave that to the editor, although, if you prefer to do so, indicate your choice of paragraphs by the sign ¶

in the blank space at the left side. For fear our meaning may not be clear we will put this in another way:—Commence every line at the same relative position, leave no blank ends or beginnings of lines, nor any blank spaces. The reasons for this rule are several in number and are good ones. Do not put foot-notes at the bottom of the page (or, worse still, upon another page), but run them in "solid" with the principal writing, indicating them by two upright lines before, after, and at the side. A single underscoring indicates italics, double underscoring capital letters. Unless you hate the man to whom you send a manuscript do not roll it. The greater your fame, your literary and scientific ability, the more you may ignore these little suggestions, because all journals and publishers are glad to get literary gold however disguised in deceptive quartz; but if you are a kind-hearted man you will consider the detrite type-setter and proof-reader by attention to such seemingly trivial things. Moreover, your work will more surely appear correctly and to your satisfaction by a little forethought. Surely the poor editor is biased in favor of a clean, tidy, and presentable manuscript, and he is much inclined to think that clear thinking will lead to a writing that requires the least work to read and to prepare for the printer.—*Phil. Medical Journal.*

THE EFFECTS OF MIXED DIETS ON SALIVARY DIGESTION.—“The fourteenth ordinary meeting of the session of the Edinburgh Royal Society,” says the *British Medical Journal*, “was held on Monday, July 4th, 1898, Lord McLaren, vice-president, in the chair. Dr. W. Aitchison Robertson read a paper on the ‘Effect of Mixed Diets on Salivary Digestion.’ The research was made with the object of determining whether the digestion of starch was affected favorably or unfavorably by its admixture with other articles of food. He found that porridge formed a fairly easily digested article of food, and that the greater the dilution of the porridge with water or milk the greater was its ease of digestion. In fact, well-made water-gruel was one of the most easily digested of foods. The reason why potatoes were so often badly borne by the stomach was probably due to the manner in which they were prepared. If after being boiled they were finely powdered, so that the saliva could gain ready access to the starch granules, they were easily and rapidly digested. On the other hand, when potatoes were sent to the table whole, the probability was that they would be imperfectly masticated and swallowed in fragments of greater or less size. In such a case the saliva could only act on the outer surfaces of the fragments, and the result was a very imperfect digestion. In respect of the digestion of bread, the experiments showed that it was much less acted upon by saliva

when eaten alone than when taken along with some indifferent fluid as water. Newly-baked bread was not as rapidly acted upon by saliva as stale bread, but the ultimate degree of starch conversion was greater in the former than in the latter. So far as the experiments showed, stale bread was not more easily digested than newly baked bread. The addition of milk to bread caused a remarkable enfeeblement of the salivary ferment, while broth exerted a slight restraining influence upon it. Alcohol, even in solution, retarded salivary digestion of starch, but the action was much less marked than in the case of infusion of tea. Wines had a very marked inhibitory influence on the digestion of starch by saliva, and that was almost wholly due to their acidity. Even after three hours' digestion in the presence of sherry, port, or claret, the starch had undergone hardly any conversion."—*The Dietetic and Hygienic Gazette*.

BICYCLING.—In the Journal of October 29, you have something to say about the ill effects of bicycle riding, and among other things is mentioned the long-since prophesied ill effects on the female pelvis, by way of distorting or contracting the same, and rendering childbirth more difficult. A little further on you say: "We are not aware that the obstetricians are having any greater difficulty in delivery than formerly." And why should they? The gentleman who had prophesied that the bicycle would have a serious effect on childbirth had a mistaken idea of the entire proposition. While bicycle riding may deform the pelvis, it will have little or no effect as regards the ease of childbirth. And why? For the simple reason that "bike" riders do not have babies. Where or who is the physician that has attended a "bike" rider in confinement? Will the female rider throw aside her wheel long enough to have a baby, let alone to rear a respectable sized family? The bicycle is a nuisance and a curse instead of a blessing. While it may have a beneficial effect physically upon a few, yet the ill effects upon the many ten thousand times overbalance it. The deaths and the maiming from wheel accidents almost equal perpetual war. The injury to heart and kidneys of thousands must be added. Then what of the nuisance of the machines on street and sidewalk everywhere? In the public thoroughfare they are a constant menace to teams and footmen, and as, there is no bounds to the impudence and effrontery of these wobblers, they presume also to usurp the sidewalks in most cities, whether permitted or not by law. Think of such ungovernable vehicles approaching foot-people on sidewalks every few rods as they proceed, at a speed of twelve to fifteen miles an hour, jingling their little bells, warning you to jump

aside or be run over or maimed! And when one steps aside there is no telling but the cranky thing will make a dive for his solar plexus or coccyx, since all sorts of wobblers presume to usurp the walks that were in times past before we became so civilized, supposed to be for footmen only. The advent of this horrid means of locomotion is an instance in which the inventive genius of man has overtoppled itself, or at least he has invented a machine that causes a great many individuals to be overtoppled. Here in Seattle, bicycle riders pay a license and are permitted by law to ride on the sidewalks, so footmen step aside as they whiz by or take the chances of suddenly converting the momentum of one of these machines and its rider into heat, light and electricity.—*A. C. Simonton, M.D., in The Journal of the American Medical Association.*

CASTRATION OF THE IDIOTS.—The question of the desirability of unsexing certain of the criminal classes has been given considerable attention in the editorial columns of the medical press for some time, but the possibility of preventing the multiplication of the mentally unfit seems to have received less consideration than it deserves. Anyone who has taken the pains to observe the pauper-classes, whether in large or small towns, is aware that its ranks are being increased from year to year, mainly by multiplication of its own kind; it is true that immigration has added to the numbers and that some degenerates have fallen into the ranks from the higher classes of society, but the greater part of the pauper-tax is for the support of sons and daughters of paupers. Reports of boards of charities show that the number of paupers is steadily increasing, and with this increase is a corresponding increase in the burden of taxation for their support. Criminals of any given class are not all totally depraved, sometimes they have been led astray by evil associates, and it is difficult to see how a law could be framed suitable for a cases, but there is no great difficulty in determining at the age of puberty whether a child has sufficient intelligence to be able to support itself. Inasmuch as the State has to provide for the vast majority of imbeciles, why should its officers not be given power to prevent the multiplication of this class? This matter is by no means as novel as it may first seem, as is evidenced by the fact that a prominent surgeon in one of our large cities has several times been consulted with regard to this matter and has performed castration at the request of intelligent but unfortunate parents upon their imbecile children. Whilst there is an occasional imbecile child born of intelligent parents, the vast majority illustrate the law, "like begets like." Not only would castration preven

procreation by these unfortunates; it would also do away with masturbation and venereal disease among them, conditions horrible for the patient and loathsome and disgusting for attendants. Nature weeds out a considerable proportion from these classes by the tedious and painful process of disease: unsexing of both males and females would be a swift and merciful way of accomplishing the same end.—*Philadelphia Medical Journal*.

THE PHYSIOLOGICAL ACTION OF LACTOPHENIN.—Namirez (*La Belgique Méd.*) has investigated the physiological action of lactophenin, which has been recommended as a safe and sure hypnotic (*vide* "Epitome," vol. ii., 1898, par 448), by experimenting on dogs and rabbits. (1) One of the first results of administering the drug is some loss of consciousness, which even after moderate doses is followed by diminished sensation going on to complete anæsthesia of the skin and mucous membranes, though the nerve trunks retain their irritability. This anesthetic action is most marked in the extremities, in the anterior half of the back, and in the territory supplied by the trigeminal nerve. At this stage the pupils are dilated, and there are muscular tremors, which increase when voluntary movements are executed. The reflexes are preserved with doses up to 1 gram per kilo. of body weight, but with larger doses are completely abolished, the last to go being the corneal reflex. There is considerable loss of motor power, and the tendency to sleep becomes irresistible. Finally, with still larger doses (2.50 gms per kilo.), death occurs in general convulsions, or from cardiac paralysis. (2) The respiratory rhythm is, as a rule, unaffected, but very characteristic is a remarkable increase in the amplitude of the respiratory movements, which certainly follows moderate doses in dogs and rabbits. (3) With moderate doses (not more than 0.50 gram per kilo.) the cardiac systole is increased in force, the frequency remaining unaltered, and the blood pressure usually rises. (4) The temperature invariably falls. In common with all drugs of this class, toxic doses are required to reduce the normal temperature 1° C., though in man febrile temperatures are reduced by it promptly with doses forty or fifty times less powerful. (5) Lactophenin is but slightly toxic. Calculating from the quantities fatal to animals, the writer concludes that a dose of 138½ grains given by the mouth would be required to endanger the life of a man weighing 154 pounds, and since a dose ten times less is sufficient to produce marked hypnotic effect during the disease, it is evident that this substance will prove to be of great therapeutic value.—*Brit. Med. Jour.*

PRACTISING ABORTION FOR A LIVING.—The case of Dr. Collins, who has recently been sentenced in England to a term of seven years' penal servitude for performing an illegal operation upon a woman which resulted in her death, has once again attracted attention in that country to this too frequent form of crime. The *Times*, commenting on the prevalence of abortion among the women of the upper classes in England, says that these cases throw a lurid light upon some of the consequences of modern luxury and upon some of the standards of morality which are accepted in certain circles of modern life. These words, we fear, will apply with equal force to the upper classes of America. With regard to Great Britain, and especially London, it has been for long a matter of common knowledge that there are medical men who are willing for the sake of gain commensurate with the risks they run to commit the crime of foetal murder. The men who thus prostitute their abilities are either those who, like Collins, have lost their reputation and are unable to practise their profession in a legitimate manner, or those who are driven to these evil ways by the stress of poverty. But although their conduct is of course indefensible, it must be said that much of the blame rests with the women themselves, who, determined not to undertake the duties of maternity, tempt weak-minded medical men by large offers of money to commit this detestable crime. The judge, when summing up in the Collins' trial, took occasion to say that "the woman who submits herself to an unlawful operation is guilty of felony just as much as the agent she employs," and it might go far to prevent the murder of the unborn were this aspect of the case more dwelt upon. The fear of disgrace and punishment in this world often acts as a more efficient deterrent from crime than does any dread of consequences in the hereafter.—*Med. Record*.

TIGHT LACING AND PERIODIC HEMATURIA.—Professor Rovsing, of Copenhagen, very well known in Europe as a genito-urinary specialist and a conservative surgeon of acute observation, reports in the *British Medical Journal*, November 19th, 1898, a case of hematuria occurring at intervals and finally so serious in character as to necessitate operation. It was found that the bleeding was due to the traumatic effect of extremely tight corsets, "the superior pole of the kidney having been pressed between the liver and the ribs." Professor Rovsing concludes his report with the remark, "As I have never seen this alteration of the kidney mentioned among the sequelæ of tight lacing I will call your attention to this fact as a hitherto neglected and perhaps frequent cause of renal hemorrhage of apparently mysterious origin." The

case is of additional interest because it occurred in a young woman of typically nervous diathesis, slightly built, frequently changing color, and varying humor, in whose case the temptation to diagnose some form of nervous hematuria would be especially strong. In the intervals between the hemorrhages the urine was perfectly normal. We are tempted to wonder how many of the cases of so-called idiopathic hematuria, hematuria without a cause, renal epistaxis, etc., or of such indefinite origin as "renal hemophilia," or "neurotic hematuria," or "hematuria neuralgia," or "malarial hematuria," with no other manifestations of malaria present, or finally, that delightfully satisfying, because charmingly full-mouthed etiologic discovery, "renal angioneurosis" are due to this simple yet hitherto unnoted cause.—*Medical News*.

AN EXPERIMENTAL STUDY OF FAT STARVATION, WITH ESPECIAL REFERENCE TO PRODUCTION OF SEROUS ATROPHY OF FAT.—C. A. Herter, writing in the *Journal of Experimental Medicine* for May, 1898, says that the experimental study which forms the basis of his paper was originally undertaken to determine whether the lesions of rickets or similar lesions can be produced in growing animals by withholding fats from their foods as far as practicable. This inquiry was suggested by the alleged frequently low fat content of the milk of women whose children have grown rachitic on breast-milk, by the occurrence of rickets in children fed largely on condensed milk, which is poor in fat, and by the fact that the clinical indications of rickets are often lessened by a diet rich in fats. The common pig, *Sus scrofa*, was the animal chosen for the experiment, partly because of his omnivorous habits, and partly because the nutritive vigor of this animal seemed likely to render possible the extension of the necessarily depressing experiment over a long period of time. The lesions resulting from fat starvation, at least in the case of pigs, do not resemble or even suggest those of rickets. Prolonged fat starvation leads to the entire disappearance of fat from the adipose tissues. The form of fat atrophy observed as the result of experimental fat starvation corresponds to the serous fat atrophy described by Flemming, and is essentially the same type of fat atrophy as that found in the epicardial and perirenal fat in the human subject as the result of wasting disease. The lecithins of the brain and the fat of the liver are not materially reduced by fat starvation. Fat starvation does not lead to advanced serous fat atrophy of the subcutaneous fat if the animal be given a large excess of carbohydrate food or a considerable excess of the carbohydrate and proteid constituents of milk. Fat starvation causes a very imperfect absorption of the salts of P_2O_5 from the intestine.—*Thera. Gazette*.

A CLAIM FOR PRIORITY IN STATING THE PRESENCE OF THE BACILLUS TYPHI ABDOMINALIS IN THE GALL-BLADDER.—(Gustav Fütterer, M.D., Chicago.) Over ten years have elapsed since I discovered the presence of the typhoid bacilli in the gall-bladders of two individuals who had died of typhoid fever. My observations were published in the *Münchener Medicinische Wochenschrift*, No. 19, 1888, under the title "Untersuchungen ueber Typhus Abdominalis." The paper was published under the joint authorship of Dr. B. Anton and Dr. G. Fütterer. Since the publication of this paper, the fact that I was the first to call attention to the presence of the typhoid bacilli in the gall-bladder has been largely overlooked by medical writers. The paper in question is divided into two parts. The first, having been written by Dr. B. Anton, deals with a case of parotitis, giving the clinical description of the case and the ante-mortem conditions. The second or anatomico-bacteriological part gives the post-mortem findings in the above-mentioned case of parotitis, and describes the post-mortem examination of two typhoid fever cases. It was in the last two cases that a bacteriological examination of bile in the gall-bladder revealed the presence of typhoid bacilli. The second part of the paper is published in my name only, and is, I believe, the first statement of this kind to be found in medical literature. In view of these facts I feel that I may justly claim to have been the first to discover the presence of the typhoid bacilli in the gall-bladder. I also claim priority for expressing the opinion that the relapses of typhoid fever are caused by typhoid bacilli entering the intestines with the bile, a conclusion easily reached from these findings.—*Medicine*.

GALVANISM OF THE NECK IN OBSTINATE VOMITING.—As early as 1884, Apostoli read an article before the French Society of Electrotherapy upon galvanism of the pneumogastric nerve for vomiting. In his earlier communication Apostoli gave exact rules for the application, the duration of each sitting, and strength of current to be employed. Two methods were advised—in one the positive pole was placed on the side of the neck and the negative over the epigastrium. In this way he believed that the descending galvanic current was passed along the pneumogastric nerve. He also described a method known as the bipolar, in which a current was passed transversely through the neck just below the mastoid region. Galvanism applied in this way is very efficient in the control of vomiting from reflex causes, and especially those of a hysterical character. Experience shows that the passage of the current from one side of the neck to the other is somewhat more efficient than when the current is passed from the neck to the epigastrium. We have used the term galvanism of

the neck in designating Apostoli's method as it conveys no doubtful theory of the structures acted upon by the current. The act of vomiting is a very complex one, and in addition the uncertainty of passing a descending galvanic current along the pneumogastric nerve is so great that we prefer to employ the term galvanism of the neck as indicating a procedure of considerable value in the treatment of obstinate cases of vomiting.—*Medicine*.

THE TREATMENT OF RINGWORM OF THE SCALP BY CHLORIDE OF SODIUM.—George D. Perkins (*Lancet*, October 22nd, 1898) says that for the past fifteen years he has treated every case of ringworm which has come under his care with chloride of sodium, and with complete success in every case. The first case in which he adopted this treatment was a chronic one of five years' standing. The child was well in three weeks, and had no return. Many of the cases have been chronic. The method Perkins adopts is the following: Have some chloride of sodium finely powdered and mixed with a little vaselin to make an ointment. The affected part having been shaved, rub the ointment in well night and morning until the place is sore; this takes from two to four days. Then apply some simple application to aid healing. When well from the soreness, the hairs will be found growing healthily, and the tinea trichophyton destroyed.—*Medical Age*.

FORMALIN FOR SWEATING FEET.—Gerdeck (*British Medical Journal*) advocates the use of formalin in this malady. The sole of the foot should be painted with pure formalin three times a day; between the toes only once, and not at all on the dorsum of the foot. In addition it is useful to pour four or five drops of formalin on the boot and warm it; this serves to disguise the odor of sweat, and is also a good preservative of leather. The results are said to last for three or four weeks, when a repetition of the treatment is necessary. If the pure formalin is objected to, two to three per cent. solution may be painted on more frequently. The formalin acts as a deodorant and is non-toxic. The skin becomes as dry as leather, and no longer sweats. No harm was observed amongst the soldiers whose foot-sweating was stopped by this treatment.—*Medical Age*.

TOXICITY OF APPENDICITIS.—Dieulafoy (*Le Progrès Méd.*, November 12th, 1898), in the course of a paper read before the Paris Academy of Medicine, speaks of appendicitis as "the great abdominal disease," and says that besides the danger of peritonitis we have to face the possibility of toxemia. This complication,

the existence of which is demonstrable by experiment, may be mild, severe or fatal. The ordinary mild form is revealed by albuminuria and icteric hue. This toxic icterus may or may not portend a severe attack. If the latter result, either the brain or medulla will be attacked, with the clinical picture of a typhoid state. This process of intoxication may be arrested by suppression of the poisonous focus; hence no one should die of appendicitis.—*Medical Review of Reviews*.

OIL OF GAULTHERIA IN CHOREA.—Luigi (*Rif. Med.*) has met with considerable success in the treatment of chorea by means of oil of gaultheria used externally. He used from 6 to 10 grams of the oil, either pure or mixed with vaseline, as dressing for the upper and lower limbs, alternately, the limbs being afterwards covered with oiled silk to prevent evaporation. Phenol could be detected in the urine six hours after the oil was applied. In some of the cases the drug was given internally as well. The results were very satisfactory, so that the author recommends the use, especially in cases where the other salicylates are not well tolerated. Moreover, the good effects were not confined to cases where distinctly rheumatic symptoms were present.—*Brit. Med. Jour.*

PUERPERAL GLYCOSURIA.—Keim (*Le Progrès Méd.*, November 26th, 1898), in a recent paper before the Obstetrical Society of Paris, says that glycosuria occurs only exceptionally during pregnancy, and when present it is due to auto-intoxication, which may lead to eclampsia. During the puerperal state, on the other hand, glycosuria is almost present. Keim found it in twenty cases out of twenty-five. Nearly all cases appear with the establishment of the secretion of milk. A few cases which are present before the milk is formed are probably due to the act of labor itself.—*Medical Review of Reviews*.

NUTRIENT ENEMA IN CANCER OF THE STOMACH.—In case of obliteration of the cardiac or pyloric orifice, the following is recommended for rectal alimentation:

R. Yolk of eggs	No. 2.
Dried pepton	ʒ i-ʒ v.
Wine	ʒ iv.
Bouillon	ʒ viii.
M. Sig. For injection.	

Issued February 22nd, 1899,
P. L. Bryce, Secretary.

MONTHLY REPORT.

Issued by the Provincial Board of Health of Ontario for January, 1899. Showing the deaths from all causes and from contagious diseases in the Province as reported to the Registrar-General by the Division Registrars throughout the Province.

Year.	Month.	Total population reported.	Total number of patients reporting.	Total deaths reported from all causes.	Scarlatina.	Diphtheria.	Measles.	Whooping cough.	Typhoid.	Tuberculosis.	Rate per 1,000
1898	January	2,322,053 98	717 92	2,154	23	48	5	9	15	184	0.1
1898	December	2,173,006 96	687 88	237	10	51	2	12	15	141	0.1
1898	November	2,153,415 95	677 87	284	17	59	6	6	50	146	0.3
1898	January	1,659,771 70	582 75	238	16	51	4	8	13	146	0.1
1897	December	1,540,914 69	560 72	218	5	39	0	13	15	136	0.2
1897	November	1,520,523 68	563 72	221	5	43	3	9	34	127	0.2

Registration Divisions of Province. 777.

Population of Province, 2,983,182.

N.B.—Division Registrars will please notice that the Act requires that a return be made before the 5th of each month, whether any deaths have occurred or not. The month of January, 1899, includes deaths from all causes, but the other months from contagious diseases only.

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THE ORTHOPEDIC HOSPITAL.

We were pleased to see that the deputation organized to support this institution did not receive any encouragement from the Government. No one doubts the ability of the staff nor the need of good orthopedic facilities, but everyone knows that the passion to multiply charities is demoralizing the people and injuring the profession.

There is no necessity for every man who claims to be a specialist to have a hospital to advertise the fact. There is, moreover, another very serious objection to this multiplication of charities, and that is that the money which might be devoted to useful purposes is simply frittered away.

A few old maids with a mission and a parson with spare time are a guarantee for the launching of some new charity, in which 50 per cent. of the money will be devoted to salaries, and the balance to publishing reports.

Take the new Sanatorium at Gravenhurst. No one will deny that it is as well conducted from a business standpoint as any of these institutions, yet 25 per cent. of the annual income goes to salaries; and now we have a new one being organized here. We would be understood as in no way decrying the necessity for carrying on charitable work. On the contrary, we most earnestly believe in a much greater socialism than exists to-day. We believe

that the money obtained from taxing estates should be devoted to charitable purposes and to those alone. This money should go to a permanent fund for aged people homes, for the aged well are as much deserving of help as the aged sick. But we do denounce the entire lack of business principles which characterize this whole charitable competition work.

Why multiply boards of directors, why multiply managers and managers' assistants, until out of a dollar spent part of a quarter reaches the Lord's poor, and the balance sticks with the drones.

Mr. John Ross Robertson was perfectly right in insisting that the orthopedic work had been done and well done in the Hospital for Sick Children for almost a quarter of a century. This institution stands pre-eminent among charitable institutions for the way in which it has been conducted. Let the charitably disposed take a leaf out of the book of business progress, and combine their efforts and reduce their management, instead of dispersing the one and multiplying the other. Here, of course, directors appear to be everything, but unless all teaching is false, in the world to come ordinary shareholders may have some rights.

SOMEBODY BLUNDERED.

A month or so ago we had an editorial on that old topic of ours, the city coroners, in which we advocated the appointment of the police surgeons as coroners. We stated then, as we have often stated before, that the position was one in which much more care should be exercised in the choice of men; that ability backed by corporation influence, or ignorance backed by hustle, were neither of them the best qualifications for coroners. We have time and again denounced the system, or rather the methods, which have been developed under the system in this city.

It has been known that warrants signed in blank have been left at the central station. A case is known where a warrant was issued for an inquest on a man now alive and well. All this in the face of the fact that the coroner is supposed to view the body before issuing the warrant.

To what depths the system has reduced the profession when for the paltry fee men will descend to such indecent acts as have characterized not a few inquest "chases" in this city.

We absolutely fail to see why some men are so anxious to obtain these cases. The fees certainly can not be a great object to any man with a practice, and surely there are no members of the profession who have fallen so low as to race after this method to beat the ethical injunction "thou shalt not advertise."

We would not object to this unseemly rush if only the coroners were the victims, but recently we have had a glaring case of the innocent being punished and the guilty escaping. Three members of the profession in this city were lately hauled before the courts, tried, found guilty and fined several hundred dollars—for what? According to the verdict, for breaking into a man's house and holding a *post mortem* on his wife in spite of the remonstrances of himself and children.

Could anything have a greater effect upon the public mind, or more tend to increase that irritation against the profession which many have endeavored to excite, than an incident like this? There is nothing that arouses public feeling so much as this, what they are pleased to call mutilation of the dead. Our professional brethren deserve all our sympathy for the unjust verdict rendered against them and for the opprobrium they have sustained. It was clearly shown at the trial that a warrant had been issued, and they had been instructed by the coroner to make a *post mortem* examination and report. As stated by them, without their knowledge the warrant was withdrawn. They had gone to perform an official duty and should have had official notification that the necessity no longer existed. It was either gross stupidity or gross negligence in the local justice department that permitted these physicians to be placed in such an unenviable light before the public. It is simply the cap sheaf to the disgraceful manner in which the office of coroner has been abused in this city. We can only hope, if the present condition of affairs is to continue, that the same facilities for withdrawing inquests as for holding them may be enforced, and that the police department be provided with withdrawal forms signed in blank, so that when a man refuses to admit physicians in their official capacity to make a *post mortem* as least as much authority be shown them as is often required to hold the inquest.

THE WORKING TOOLS OF THE CRAFT.

Coincident with the onward progress of the medical art has been the advance in our knowledge of the cause of disease. As the practice of medicine and surgery has gradually but surely emerged from the darkness of charlatanism and empiricism and approached more nearly to the dignity of a science, the pressing demand for better facilities and better "working tools" has been met alike by the skilful instrument maker and the modern expert pharmaceutical chemist. The surgeon of to-day has at his command a full armamentarium of ingenious instruments of pre-

cision, cunningly devised for certain specific purposes and upon which he can confidently depend. The modern physician also has been furnished with therapeutic instruments of precision, originated by the physiological chemist as a result of the close study of nature's laws and elaborated and perfected by expert pharmaceutical skill. Contrast for a moment the "working tools" of the physician of a hundred years ago with those of the practitioner of to-day; the bolus and nauseous decoction as against the dainty tablet and the palatable elixir. Up to this point the modern surgeon possesses no advantage over his medical confrere as far as his "working tools" are concerned; but here the parallel ceases. The surgeon, when he needs a new scalpel for an important operation, examines the stock of a reputable dealer and personally selects an instrument of the best quality obtainable. He sees it, handles it, and assures himself that it is well made and properly tempered. If perchance the knife is not as represented he soon discovers it, and promptly discards it for one which is more satisfactory and reliable. The surgeon not only *personally selects*, but *personally employs* his instruments, and therefore cannot be deceived in them. But how about the equally important "working tools" of the physician, *i.e.*, the remedies which he orders for his patients? After a series of careful clinical experiments with various remedies of a certain character he comes to the deliberate conclusion that one particular preparation gives him the best therapeutic results and that it will hereafter become one of his trusted "working tools." Take for instance Pepto-Mangan "Gude," the value of which almost every modern practitioner is now familiar with. The physician has learned from experience just what this particular remedy will accomplish; he knows its advantages, limitations, indications and dosage, and prescribes it in properly selected cases, with full confidence in its action and effects. Just here, however, the physician *loses control of his "working tool"* unless he is positively certain that his prescription will be filled exactly as specified. It is, of course, manifestly impossible for the busy physician to personally follow up every prescription in order to assure himself that some inferior and more or less worthless substitute is not dispensed in place of the article prescribed, and he must therefore adopt some other means to prevent this reprehensible practice. There are three ways in which the physician can protect himself and his patient against this unwarranted, inexcusable and dishonest interference: (1) Let him be certain that his prescriptions are filled only by pharmacists known to him to be above such disreputable catchpenny practices. (2) Specify plainly and unmistakably the particular preparation desired. (3) When possible order an original unbroken package. We feel strongly about this very common and nefarious

practice of substitution, which is injurious alike to the welfare of the patient and the reputation of the physician, to say nothing about the injustice to the reputable manufacturers who have spent brains, time and money in putting valuable and eminently eligible "working tools" into the hands of the profession.

Editorial Abstracts.

AMYLIUM NITROSUM CARBONISATUM.

WINKLER, F.—On the change of the action of amyl nitrite after saturation with carbon monoxid. (*Zeits. f. klin. Med.*, v. 36, 1898, p. 30.) Winkler's earlier experiments showed that amyl nitrite injures the heart and causes œdema of the lungs, pulmonary rigidity and swelling with dyspnoea. At the time, when in non-curarized animals, dyspnoea and in curarized animals, rigidity and swelling of the lungs occurs, methemoglobin appears in the blood. This simultaneous appearance of methemoglobin in the blood and the change in the work of the heart suggests an intimate relation between the two. As carbon-monoxid renders the blood very resistant to external influences, he saturated the amyl nitrite with it so as to bring small quantities of carbon monoxid in the blood and thus prevent the appearance of methemoglobin. The specimen used contained 0.005 per cent. CO. The preparation he calls amylium nitrosum carbonisatum. Its inhalation causes, like amyl nitrite, hyperemia of the face, but without the feeling of fulness, giddiness or coughing, while only a temporary injurious action on the cardiac work occurred. Although the carotid pressure sunk at each inhalation it soon rose above its old level. The cardiac work was increased even double. The blood during the inhalation remained free from methemoglobin; at the last, during the period of cardiac injury, carbon monoxid bands appeared. Although the new preparation is toxic, yet it is so to a far less extent than pure amyl nitrite and the post-mortem find is different. Auto-experiments corroborate those on animals. Amyl nitrite saturated with nitrous oxide has not the same satisfactory action.

ACOINE.

TOLLDENIER.—The anesthetic properties of alkyloxyphenyl-guanidine (Acoine). (*Therap. Monats.*, 1899, p. 36.) Dogs of from five to nine kg. bore daily doses of 0.5 gm. without any disturbance, while 0.75 and over caused vomiting and even death, due to acute gastro-enteritis and cerebral congestion. The guanidine prepara-

tions are far less poisonous than cocaine. Applied in concentrated solution, or powder, to a rabbit's cornea it caused anesthesia lasting for several days and at the same time severe inflammatory irritation of the cornea and conjunctiva. With an aqueous solution 1-1000 the anesthesia lasted fifteen minutes, while that from a 1-40 solution lasted over a day. The anesthesia appeared at once or in one to two minutes, according to the strength of the solution. The last solution (1-40) irritated the eye without causing any permanent injury. Solutions between 1-100 and 1-1000 caused complete anesthesia without untoward symptoms. The anesthesia may be prolonged in the case of weak solutions, by allowing them to act over one minute or by repeating the instillation after a few minutes. In dogs subcutaneous injections (6-100) caused local necrosis if more than 3 c.c. were used—but were unattended by general toxic symptoms. Used according to the Schleich method there was only pain during the first injection and was not followed by after pains. As the morphine when injected alone caused pain without any anesthetic action, acoine was used alone as in the following formula: Aconi, 0.1; Sodii Chlorid, 0.8; Aq. dest, 100.0. The anesthesia is prolonged longer than in the case of Schleich's own method, remaining forty to fifty minutes. The solution is slightly influenced by light, though fungi do not affect the solution. In concentrated solution, it is antiseptic, and in weak ones fungi do not thrive. The solution after standing from three to eleven days, was transferred to agar and proved aseptic. Acoine is less toxic than cocaine and is more rapid and permanent in its action.

LARGIN.

KORNFELD, F.—Experiences with largin. (*Wien. med. Presse.*, 1898, No. 33.) Largin is a silver albumen combination, which is made by the action of an ammoniacal solution of silver nitrate upon the alcoholic solution of the air-dried product of the decomposition of paranucleo proteids. It is a grayish white powder easily soluble in water, but not in alcohol or ether. It remains unchanged in the absence of light. In solutions of 1-4000 it can kill gonococci even in five minutes, and after ten minutes no growth upon the medium occurs. In this respect it is superior to protargol or silver nitrate, while it renders the medium even more unsuitable for the gonococci than argonin. Silver nitrate for this purpose is, however, superior to all silver albumin preparations. It was used as an injection in twenty-nine cases of gonorrhoea; beginning with $\frac{1}{4}$ and rising to a $1\frac{1}{2}$ per cent. solution. The injections were used three times a day and the fluid was held in the urethra from two to ten minutes. It exerted a favorable and prompt

action upon the cases of acute anterior urethritis and hindered its involving the posterior urethra. In sub-acute posterior urethritis it was likewise of service and could be used as an instillation or irrigation. In chronic processes it is equal to protargol and other silver albumen combinations, but is not superior to silver nitrate.—From *Therap. Monats.*, 1899, p. 56.

ACTION AND USE OF DIONIN.

KORTE, J.—Clinical experiments on the action and use of Dionin. (*Therap. Monats.*, 1899, p. 33.) Dionin, the hydrochlorate of ethyl morphine, $C_{17}H_{23}NO_3 \cdot HCl + H_2O$, is a white crystalline powder with moderately bitter taste. It is easily soluble in water and alcohol. It is a certain agent in combatting the cough of beginning pulmonary phthisis. It has a milder narcotic action than morphine and does not act markedly on the digestive tract, while it acts stronger and more persistently than codeine, causing better and quieter sleep, rendering the expectoration freer. Ethyl combinations act more energetically than the corresponding methyl. Its general analgesic properties are not so marked as in morphine. Dionin may be given in doses of 0.03 gm. in the evening or 0.015 repeated many times during the day.

℞ Dionin..... 0.3

Rad et Succu Liquir, q. s. ut. ft. pil. No. XXX. Sig.: Three or four times a day, or two to three pills in the evening.

PREVENTATIVE TREATMENT OF IMPENDING COMA DIABETICUM.

In diabetics, after the appearance of the aceto-acetic acid reaction in the urine, the antidiabetic régime should be replaced by a milk diet and thirty gm. of sodium sulphate and twenty gm. of sodium bicarbonate administered internally. The cardiac activity should be stimulated with digitalis, coffee and theobromin, while ammonium fluoride is to be given to combat the ferment action.

℞ Ammon Fluor..... 0.5
Aq. destillat 300.0

D. S.—One teaspoonful after each cup of milk. Twice daily a gram of a 25% solution of sodium glycerophosphate is to be injected and oxygen inhalations begun. (ROBIN.)—*Therap. d. Gegenw.*, 1898, n.s., v. 4, p. 714.

PICRIC ACID IN THE TREATMENT OF ENTERO-COLITIS.

In the treatment of entero-colitis muco-membranosa Chéron recommends clysters of picric acid. In the morning an evacuatory

enema should be used. It should consist of a litre of water with a half tablespoonful of boracic acid. After the stool a second enema consisting of a one-quarter liter of water, to which a teaspoonful of the following solution has been added :

℞ Acid Picric	1.0
Aq. distill.....	120.0

This second enema should be held a long time. The picric acid acts directly upon the epithelium.—*Ther. d. Gegenw*, 1898, n.s., v. 4, p. 15.

INFLUENZA.

In influenza, beginning with high fever and nervous symptoms, Baccelli recommends the following formula :

℞ Quinin Salicyl.....	0.2
Phenacetin	0.15
Camphor	0.2

M. f. p. to six powders in twenty-four hours. When the catarrhal symptoms begin, he recommends the addition of 0.02 to 0.03 antimony sulphide.—From *Ther. d. Gegenw*, n.s., v. 4, 1898, p. 662.

A METHOD OF RENDERING MILK DIGESTIBLE.

Milk which is not well borne may be rendered digestible by boiling with a little eichel cacao ; one to three teaspoonfuls of cacao to one-half liter of milk is sufficient. The cacao is in too small a quantity to cause constipation. Milk so prepared will be borne where milk and cognac or milk with some aromatic would be rejected.—*Therap. Monats*, 1898, p. 640. "Eichel cacao is a preparation of cacao deprived of its fatty matter and mixed with an infusion of roasted acorns, a little sugar and meal."—*Foster*.

TRIPHENIN.

Triphenin (propionylphenetidin) is made by boiling a mixture of para phenetidin and propionic acid. It is a white, odorless crystalline powder with a slightly bitter taste. It fuses at 120° and is soluble in 2,000 parts of water. The dose varies from 0.5 to 1.0 and is best given in oblates. The daily dose should not exceed 3.00. It is a certain antipyretic, a sure and rapidly-acting antineuralgic and nervine, and also at times acts as a hypnotic.—*Ther. d. Gegenw*, n.s., v. 6, 1898, p. 693.

Physicians' Library.

The American Year-Book of Medicine and Surgery. Being a yearly digest of scientific progress and authoritative opinion in all branches of medicine and surgery, drawn from journals, monographs, and text-books of the leading American and foreign authors and investigators. Collected and arranged with critical editorial comments by Samuel W. Abbott, M.D., John J. Abel, M.D., J. M. Baldy, M.D., Charles H. Burnett, M.D., Archibald Church, M.D., J. Chalmers DaCosta, M.D., W. A. Newman Dorland, M.D., Louis A. Duhring, M.D., D. L. Edsall, M.D., Virgil P. Gibney, M.D., Henry A. Griffin, M.D., John Guiteras, M.D., C. A. Hamann, M.D., Alfred Hand, jun., M.D., Howard F. Hansell, M.D., Milton B. Hartzell, M.D., Barton Cooke Hirst, M.D., E. Fletcher Ingals, M.D., Wyatt Johnston, M.D., W. W. Keen, M.D., Henry G. Ohls, M.D., Wendell Reber, M.D., David Riesman, M.D., Louis Starr, M.D., Alfred Stengel, M.D., G. N. Stewart, M.D., J. R. Tillinghast, jun., M.D., J. Hilton Waterman, M.D. Under the general editorial charge of GEORGE M. GOULD, M.D. Illustrated. cloth, \$6.50; half morocco, \$7.50. For sale by subscription. W. B. Saunders, Philadelphia. Canadian agents, J. A. Carveth & Co., Toronto, Ont.

It is impossible in the space of a review to go into the excellencies of this work. The collaborators have been chosen from the best men in the various departments. The great advantage of such a work is its thoroughness and independence. For instance, under Ammonol which has been extensively advertised as a new coal-tar derivative, it is shown that it is simply a mixture of acetanilid sodium bicarb. and ammonium carbonate with a little coloring matter. It is just such information as this that the practitioner wants and should have. The only omission in the book, but to our mind a very glaring one, is that there is no mention under the department of physiological chemistry of the only distinctive piece of work on this subject, certainly from a medical standpoint, to the credit of science for '98. That is, the isolation, purification and analysis of *epinephrin*, the active principle of the supra-renal capsule. It could hardly have escaped the notice of Professor Abel, who has charge of this department, as he did the work himself. We hope, with the publishers' permission, to reproduce selections from this work for our readers' benefit. In the best of books that come to hand, so many of them merely reproductions and rehashes, the work of the reviewer is often

unpleasant, as he may have to "damn with faint praise" the work of a friend, and so it is a relief to meet a work like this. We say without fear of contradiction that Gould's Year-book is absolutely the best published on this continent to-day.

THE Macmillan Company announces the early publication of "Surgical Technique: A Hand-book and Operating Guide of all Operations on the Head, Neck and Trunk." With five hundred illustrations, by Fr. von Esmarch, M.D., Professor of Surgery at the University of Kiel and Surgeon-General of the German Army, and E. Kowalzig, M.D., late First Assistant at the Surgical Clinic of the University of Kiel. Translated jointly and edited by Prof. Ludwig H. Grau, Ph.D., formerly of Leland Stanford University, and William N. Sullivan, M.D., formerly surgeon of U. S. S. *Corwin*, and Assistant of the Surgical Clinic at Cooper Medical College, San Francisco. This work, now for the first time translated into English, has been thoroughly revised and enlarged by the translators, who have brought every operation up to date. It is a book which has for some time been of much importance to all surgeons who can read it in the German. The translation has been undertaken under the authorization of the German publishers, Messrs. Lipsius & Fischer, and the text used is that of the latest German edition, the sheets of which are now going through the press. There are upwards of five hundred illustrations of operations upon the head, neck and trunk. The translators have also embodied the best American instruments in the illustrations, and have omitted such German illustrations as are of little or no value for the American surgeon. In a word, their reproduction will form a complete practical operating guide for the American surgeon.

A BOOK for boys is announced for publication by the Macmillan Company. "Ben Comee: A Tale of Rogers' Rangers," (by M. J. Canavan) is its title. Ben Comee tells his story himself. He gives in a healthy, stirring way a description of his boyhood and youth in Lexington in the middle of the last century, the coming on of the Old French War, and how he and two companions enlisted in the winter of 1758-59 in Rogers' Rangers. With this celebrated corps, "the eyes and ears of the British army," they served two years near Lake Champlain and Lake George against the French under Montcalm, going in dangerous scouting parties and taking part in the battles. In the course of the story we meet with Lord Howe, John Stark and Israel Putnam, and the adventures end with



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The Coming Age, a new magazine, which is apparently up to if not in advance of date. An interesting article appears from the pen of John Uri Lloyd on "Do Physicians and Pharmacists Live on the Misfortunes of Humanity?" *The Coming Age*, 506 Olive Street, St. Louis. Price, 20 cents.

PAMPHLETS RECEIVED.

"Clinical Report from the Winyah Sanitarium : Seventy-eight Cases of Pulmonary Tuberculosis Treated and Discharged in 1898." By KARL VON RUCK, B.S., M.D., Director of the Institution, Asheville, North Carolina.

"A Rapid Treatment of Chancroid and Ulcerative Syphilitic Lesions." By A. H. OHMANN-DUMESNIL, A.M., M.D., St. Louis, Missouri.