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NOTES ON THE BACTERIOLOGICAL STUDY OF DIPHTHERIA.*

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My original object in studying cases of diphtheria bacteriologically was to settle the nature of a series of those doubtful cases in which a diagnosis is practically impossible by the ordinary means of observation, and where the occurrence of post-diphtherial paralysis or the outbreak of similar or more typical sore throats is the earliest positive proof of the true nature of the case. As I have found it impossible to continue the work on account of the difficulty in obtaining clinical histories of the cases, I wish to publish the results obtained from the examination of another series of cases, most of which were capable of being diagnosed as diphtheria without much difficulty.

Some time ago I showed before this Society cultures obtained from cases of diphtheria in which the growth had presented the typical characters of the Klebs-Lœffler bacilli. The main characteristics of this organism are:

(1) Rapid growth in serum at blood temperature leading to the formation of well characterized colonies in 16 to 24 hours.

(2) Peculiarities of structure, especially the presence of involution, bacillus forms having clubbed or swollen ends, with granular, unevenly stained protoplasm.

(3) Toxic effects, producing pseudo-membranous inflamma-

* Read before the Medico-Chirurgical Society of Montreal.

tions, followed by characteristic paresis, in cats and rabbits, and uniformly killing guinea-pigs in two to five days when injected subcutaneously, with production of necrosis, surrounded by local inflammations and œdema at the site of inoculation, and usually associated with more or less marked parenchymatous degenerations and areas of cell-necrosis of the viscera. This condition is distinguished from other forms of experimental septicæmia by the fact that bacteria are absent from the blood and viscera.

These toxic effects are most striking, and serve to distinguish this organism absolutely from all other species of bacteria. They depend on the fact that the diphtheria bacilli generate an albuminous poison or toxin which, when absorbed into the system, produces fever, cell necrosis and paralysis, which symptoms and lesions can be also brought about by the injection of sterilized cultures containing the *toxin* alone without any living bacilli. The primary local lesions in diphtheria are probably due both to the toxic action of the poisonous substances evolved and the presence of the bacilli.

The disease diphtheria is therefore complex in nature; the presence of the local exudation of false membrane and the toxic constitutional effects being each a necessary part of all cases of true diphtheria. As the diagnosis is naturally based upon the local inflammatory appearances, and as diphtheria is by far the commonest cause of pseudo-membranous inflammations, the term diphtheritic has come to be applied to all severe inflammations attended with the formation of false membrane and accompanied by necrosis, while the term croupous is applied to milder inflammations where there is no necrosis. It should be borne in mind that the terms diphtheritic and croupous are of anatomical and not of ætiological significance, as the neglect of this distinction has led to a great deal of confusion. Diphtheritic inflammation is most often caused by the disease diphtheria, but is not by any means invariably due to this cause, since every sloughing inflammation of a mucous surface presents diphtheritic characters and must be called, on anatomical grounds, diphtheritic. On the other hand, croupous inflammations have been shown by Paltauf-

Kolisko to be sometimes the effect of the action of the Klebs-Lœffler bacilli, so that in this case we have a *croupous non-diphtheritic diphtheria*.

To prevent error, the terms diphtheria and diphtheritic should not be considered synonymous; and since the word diphtheritic has become too firmly established to be dropped from the vocabulary, it might be well if a suggestion of Dr. MacAllister (*Practitioner*, June, 1890) were adopted and the word *diphtherial* used always to express ætiologically in relation to the specific cause diphtheria, applying the term diphtheritic simply in its more general anatomical sense.

There is evidence to show that cases occur in which an anatomically genuine diphtheritic sore throat may be caused by other organisms than the Lœffler bacilli. Roux and Yersin (*Pasteur Annales*, July 1890) record with great care several such cases where the infection was due apparently to streptococci. Out of 80 cases of angina admitted to the diphtheria wards of the Childrens' Hospital, the bacilli were found in 61. Roux and Yersin had no scruples in classing the other 19 cases, in which no bacteria were found, as non-diphtherial angina. A much more remarkable series was that published by Dr. T. M. Prudden, where, in 24 cases of diphtheritic sore throat occurring in children, streptococci were found in 22 and staphylococcus aureus in 2, while the Lœffler bacillus was not met with in a single instance. It is important to note that these cases were obtained from an epidemic among children who were inmates of an institution in which scarletina and erysipelas were epidemic at the time.—(*Amer. Jour. Med. Sci.*, May 1889.)

A subsequent series of 12 cases, all fatal, by the same author (*N.Y. Medical Record*, April 18th, 1891), showed the presence of the virulent Lœffler bacilli in every instance, and a carefully prepared table appended, giving the total number of cases investigated in this manner by various authors up to date, shows that the Lœffler bacilli were found in 307 out of a total of 342 examined—about 90 per cent. The suggestion that the cause of diphtheria in America differed from that in Europe had been previously disproved by Prof. W. H. Welch and Dr. A. C.

Abbott, who, in a most exact study of eight cases of typical diphtheria occurring in Baltimore, found the Lœffler bacilli present in every instance.—(*Johns Hopkins Hosp. Bulletin*, Jan. 1890.)

That diphtheritic membrane can be produced amongst other causes by the streptococcus pyogenes is shown by the uniform presence of this organism in the diphtheritic endometritis occurring in puerperal fever. The only statements as to the absence of the Lœffler bacilli in diphtheritis of other regions than the throat is that furnished by Paltauf and Kolisko, who were unable to find the bacilli in this condition or in intestinal or cutaneous diphtheritis phagædena.—(*Wiener med. Wochenschrift*, No. 8, 1889.)

I have tabulated below the cases collected by Dr. Prudden and added my own cases. (I have not included in this table the cases where I was not able to obtain satisfactory material for examination, as I found in cases A 2 and A 3 that the bacilli might easily be missed if the secretions only were examined, and although found in portions of actual membrane).

Observer.	Reference.	No. of Cases Examined.	Lœffler Bacilli.	
			Present in.	Absent in.
Babes	Zeitschrift f. Hygiene, Bd. 5	42	42	0
D'Espine	Revue Medicale de la Suisse, Romande, 1888, No. 1	14	14	0
Ortman	Berl. Klin. Wochen., 1889, No. 10	16	15	1
Spronck	Central. f. Pathol., Bd. 1, p. 218.	7	7	0
Roux and Yersin	Annales de L'Institut Pasteur, Dec. 1888	15	15	0
Paltauf and Kolisko	Wiener Klin. Woch., 1889, No. 6	50	50	0
Zarniko	In Aug. Dissertation, Kiel, 1889	20	18	2
Beck	Zeitschrift f. Hygiene, Bd. 8	52	50	2
Sorensen	Nordiskt Medicinskt Archiv, Bd. 18, No. 25	10	7	3
Escherich	Cent. f. Bacteriologie, Jan. 2, '90	22	20	2
Tangl	Cent. f. Pathologie, Bd. 1, p. 795.	18	18	0
Briegn and Fraenkel.	Berl. Klin. Wochen.. Mar. 17, '90	22	22	0
Prudden (1st series)	Am. Jour. Med. Scie., May 1889.	24	0	24
Welch and Abbott	Johns Hopkins Hosp. Bul., vol. 2, No. 11	8	8	0
Prudden (2nd series).	N. Y. Med. Record, April 18, 1891	12	12	0
Johnston	Montreal Med. Jour., Sept. 1891.	10	9	1
		342	307	35

The method of examining is very simple, and no one having an elementary training in bacteriology would have any trouble in carrying it out. Following the directions of Roux and Yersin

(*Annales Pasteur*, July 1890), I employed sterilized serum, obtained either from ox-blood or from hydrocele or pleuritic exudation. I can quite confirm the statements of these observers as to the advantage of this medium over agar-agar jelly, since by employing serum the colonies of the diphtheria bacilli are readily recognizble at the end of twenty hours, or even earlier if the serum be "improved" in the manner recommended by Lœffler, through the addition of one-fourth its bulk of a broth containing peptone, beef-tea and sugar. On the other hand, if agar-agar be employed, the colonies are never recognizable before the end of forty-eight hours, and show nothing strikingly characteristic before the fourth day. As the essential object of the examinations is to make an early and positive diagnosis, the saving of twenty-four hours would seem to be of vital importance in itself, but the serum method has also the advantage of permitting the diphtheria bacilli to bring their colonies to maturity before the other bacilli which are present have even commenced to form visible colonies. With agar, on the other hand, the two days needed for the appearance of the diphtheria colonies affords ample time for the development of the putrefactive forms, if these are present in any large number. The only advantage of the agar method is that the pyogenic staphylococci and streptocacci which are usually present have more characteristic growth than on serum—a matter of secondary importance.

There is a current impression that the serum is difficult and troublesome to prepare, and this has led to its use being avoided in many laboratories when any other medium can be substituted. This idea is quite erroneous, as serum is as easily made as any of the other nutrient media—in fact, far easier than gelatine, if prepared according to the method given by Hueppe (*Centralb. f. Bact.*, July, 1887), which consists in coagulating and sterilizing the serum at once simultaneously. After the tubes are filled to a depth of one to two inches they are laid obliquely in rows in a thermostat, which is then heated till the inner temperature reaches 68° to 75°C. After half an hour or more at this temperature the tubes will be found to have coagulated, leaving the serum nearly transparent. The temperature can now be raised

to about 90° by bringing the water in the jacket to the boil, and the tubes should be exposed to this heat for half an hour each day on three or four successive days, when, on placing them in the incubator in the usual manner, all but a few will be found to remain perfectly sterile. If Lœffler's serum is required, the serum is mixed with one-fourth its volume of Lœffler's bouillon before filling into the tubes. This addition does not interfere with the property of coagulating and remaining transparent. If blood serum is employed, care should be taken in collecting it that the clot is allowed to form before transporting the jars of blood. After standing forty-eight hours in a refrigerator or in a cool cellar, an abundant supply of clear serum can be obtained. The presence of small traces of hæmoglobin in the serum does not much impair its translucency, certainly not enough to render it unsuitable for the isolation of diphtheria bacilli.

The serum tubes could be prepared and kept in stock by druggists if the method ever comes into general use, which seems unlikely. The examination may be made from material taken direct from the throat by scraping the membrane, or, preferably, a piece of membrane may be detached by a pair of forceps or a swab of cotton wool. If the membrane has to be transported, it may be put into a clean, dry test-tube or folded up in blotting paper. To examine, it need only be moistened by a drop of sterilized water. A microscopical examination can be made by smearing the piece of membrane over the surface of a cover-glass, passing it three times through a flame. After drying and staining with a drop of any aniline stain, but preferably by Gram's method, the diphtheritic bacilli are seen as short thick rods (about the same length as tubercle bacilli), lying in little groups. These bacilli are present in enormous numbers in the early stages of diphtheria, but diminish rapidly in number as the membrane softens. The highly characteristic involution forms, which assume comma or club shapes with swollen ends, and present a protoplasm broken up into small granules, are only recognizable with a good immersion lens.

The cultures are made by drawing the infected needle in parallel lines along the surface of the serum. By treating two

or three tubes in this fashion, the infecting material at first abundant and producing a continuous dense growth, will in the second or third tube only implant a very few bacteria, so that the colonies can be studied separately. The tubes are to be kept at about body temperature for twenty-four hours, when minute white points appear on the surface of the serum, attaining about the size of pin-heads or of split peas. These, if found under the microscope to consist of bacilli, are probably the diphtheria bacilli, as the other forms would not have attained such size in so short a time.

The other colonies which attain such proportions in twenty-four hours are almost invariably found to be micrococci, usually the staphylococcus pyogenes.

I will not go further into the culture experiences with the bacillus than to say that I have been able, in all my cases, to confirm the statement first made by Welch and Abbott, of the Hygienic Institute, that the bacilli form an abundant invisible growth on potatoes, a medium stated by previous observers to be unsuitable for its cultivation. I also can substantiate the statement of Beck, that the agar cultures do not show the characteristic involution forms.

The method, however, has a serious defect, since an organism exists which is identical in size and appearance with the Lœffler bacillus, and grows on serum in a similar manner, though totally devoid of pathogenic properties. This is called the pseudo-diphtheria bacillus, and has been frequently found in the throats of healthy persons, as well as in follicular tonsillitis. The proof, therefore, is not absolute until substantiated by the inoculation of some susceptible animal. How far this pseudo-diphtheria bacillus would interfere with the method in practical work is not yet certain. Personally I have so far only met with the virulent or true bacillus.

The results of my examinations are as follows:—

Of nine cases examined in which the diagnosis of diphtheria could be made without much difficulty from the symptoms and the appearance of the throat, the Klebs-Lœffler bacillus was found in eight. In the case where it was not found, the con-

dition was one of an undoubted false membrane which contained, microscopically, large numbers of bacilli which appeared to be the organisms in question but did not appear in the cultures. When the specimen was taken the throat had just been freely sprayed with a solution of hydrogen peroxide, and the negative result may have been due to its disinfectant power of inhibiting the growth, though the fact that colonies of staphylococcus aureus appeared make that less likely. There was an anomalous course in this case, since the throat was found perfectly clear of membrane on the following day, preventing my repeating the experiment. In spite of this the disease appears to have been true diphtheria, as the nurse stated that the patient had a distinctly nasal voice when he left the hospital, ten days later. The bacillus was also found in an anomalous case where an extensive false membrane existed with almost no disturbance of the general health. In this case there was no paralysis.

In six cases where the diagnosis was doubtful, the bacilli were not found. Several cases of follicular tonsillitis and a case of scarletinal sore throat were examined with negative results.

I have divided the cases into two groups—(*a*) where the condition was clinically like diphtheria, and (*b*) anomalous cases. The cases are as follows, the first being given in detail and the remainder summarised in a table at the end of the article.

Case 1.—M. L., female, aged 21, admitted April 9th, 1891, into the female medical ward of the Montreal General Hospital, under Dr. Ross, with a suspicious-looking patch of membrane in both tonsils and a tiny membranous patch on the side of the uvula; temperature 102½°. Next day an extensive patch of dirty gray membrane was seen in the uvula and soft palate. Transferred to diphtheria ward. Seen on April 11th; temperature 100°; had a patch of membrane on left anterior pillar of fauces. Discharged May 2nd; no paralysis.

Microscopic examination of the membrane showed an enormous number of short, thick bacilli, a few larger bacilli, and some clusters of micrococci.

Cultures in serum made on May 11th and kept at 35°C. showed on the following day numerous small, flat, white colonies

composed of short, thick bacilli, having the typical appearance of the Lœffler bacilli. Involution forms numerous. In agar plates small, flat colonies appeared on the second and third days, showing superficial thin concentric growth from a small central white spot. In stale culture in agar the growth, on first transplantation, was barely visible, but in subsequent generations the colonies became more distinct, forming always flat, circular, concentric, white growths on surface about the entry point of the needle. Microscopically the bacilli in the agar cultures were short, thick rods with rounded ends; their length was about 0.0015 to 0.002 mm. (one and a half to two-thousandths of a millimetre). None of the agar cultures showed involution forms.

April 28th, 1891. — Inoculated a very large, full-grown female guinea-pig with 0.7 ccm. of a watery suspension obtained from washing a seven days old culture in six per cent. glycerine agar-agar. Injected subcutaneously in right flank.

May 6th.—Found dead in cage; had been quiet and refused food for past three days. In right flank, at site of inoculation, induration and gray opacity of skin and subcutaneous tissue, with some hemorrhage; marked œdema extending from this spot to right axilla and backward to right groin.

Microscopically, a few bacilli corresponding in size to Lœffler bacilli found in the œdematous fluid. Microscopic examination of blood, lungs, liver, kidneys and spleen negative. Kidneys swollen, opaque and grayish in sections; extensive swelling and degeneration of epithelium in convoluted tubes; a few casts seen in the tubules. From œdematous fluid cultures in two serum tubes showed on following day numerous small colonies of a bacillus corresponding to Lœffler bacillus with well marked involution forms, staining well by Gram's method. Cultures from blood, spleen, lungs, liver and kidneys, all remained sterile.

The remaining cases, except a few of special interest, are briefly summarised in a table, as they were for the most part practically repetitions of the one given above. One case was of special interest and occurred in the private practice of Dr. Major. In this case, which I saw for the first time on the seventh day,

the membrane had nearly all gone, and on the first examination no Lœffler bacilli were found, although two agar tubes and two serum tubes, as well as three Petri dishes, were all seeded from a piece of membrane. In this case an oïdium appeared strongly resembling that of thrush, and I considered the case to be thrush complicated with staphylococcus infection. Dr. Major stated, however, that at the onset the condition was unmistakeably that of diphtheria, and the correctness of his diagnosis was proved some days later by the onset of severe and persistent paralysis of the palate. In the interval I had obtained a fresh piece of membrane which yielded two colonies of the Lœffler bacillus. This case shows that a negative result is of no diagnostic value when the membrane is clearing, even when a fairly exhaustive examination has apparently been made. In another case I found an oïdium growth, readily distinguishable, however, from thrush, associated with a large number of Lœffler bacilli.

The uncertainty of examinations made at a late period in cases going on to recovery was shown in another case, for the opportunity of examining which I am indebted to Dr. W. S. England. In this case I saw the patient on the seventh day. A distinctly membranous exudation had been present, returning within twenty-four hours after being scraped off, but always confined to the tonsils. In this case smear cultures on five glycerine agar tubes failed to show any bacilli, the seeding being done directly from the membrane in the throat. In this case a tiny particle of membrane which had been obtained at the time of examination was seeded on serum a week later, and yielded two colonies corresponding to the Lœffler bacilli, one of which was tested and found to kill a guinea-pig in the typical manner.

In two cases I had great difficulty in obtaining suitable material for examination, owing to the affection being confined to the posterior nares, and where a prolonged local examination seemed unjustifiable owing to the profound exhaustion of the patient. In these cases I made cultures daily from the nasal discharge for several days, but without in any case obtaining the Lœffler colonies. In one of these cases (Case A 2) the nurse afterward obtained for me a small fragment of membrane

from which I obtained colonies having the characteristic culture appearances, and which killed a guinea-pig in the typical manner. In the other case (Case B 2), staphylococcus aureus and citreus were present in enormous number, together with a few streptococci, but no Lœffler bacilli were found.

In a fatal case (Case A 9), where an autopsy was performed by Dr. Finley, who kindly sent me the respiratory organs for examination, the larynx and trachea showed an extensive sheathing of diphtheritic membrane extending down to the main bronchi. Large numbers of the Lœffler bacilli were obtained from this membrane, and an area of pneumonia from the lung showed a small number of the bacilli associated with a large number of small diplococci. No streptococci were found.

In an anomalous case already cited, brought to my notice by Dr. H. S. Birkett (Case B 5). an extensive soft, yellowish membrane covered the posterior nares and extended over the epiglottis and into the larynx. This membrane could be readily removed without causing bleeding, but tended to recur. The general health of the child was unaffected. Cultures on agar yielded an abundant growth of a single bacillus form, forming prominent yellow white surface colonies. Inoculated into the conjunctiva of rabbits, no effect was produced, and I was inclined at the time to regard the bacteria as being possibly the pseudo-bacillus, but on re-investigating the cultures some three months later I found that they gave the typical Lœffler colonies on serum, with an abundant invisible growth on potatoes, and showed on both these media most characteristic involution forms. Inoculated into a guinea-pig, this organism showed a high degree of toxic virulence, killing the animal in thirty-six hours. The autopsy on this animal showed an opaque hæmorrhagic, reddish-gray indurater area at the spot of inoculation, surrounded by a zone of serous œdema. Cultures from the organs and from the serous exudation remained sterile, but typical Lœffler colonies were obtained from the circumscribed hæmorrhagic patch at the site of inoculation. These colonies, on being transplanted on agar, gave only the characteristic, flat, compact, concentric surface growth of the Lœffler organism, and not the abundant

prominent growth of the original tubes. For this reason it appears probable that the original colonies were impure, containing both the Lœffler colonies and some other form, which latter was subsequently eliminated in passing through the serum culture.

In cases which were examined at an early stage the Lœffler bacilli were found almost in pure culture. In most cases the staphylococcus aureus was found, but it was usually scanty. The colonies closely resemble those of the Lœffler bacilli for the first day, but can be distinguished at the end of forty-eight hours. Streptococci were seldom met with, and then only in isolated colonies, the scarcity of this organism being contrary to what I had been led to expect from a study of the literature. In the anomalous or doubtful cases, on the other hand, either staphylococcus and streptococcus, or both together, were present abundantly in all instances. The influence of these pyogenic bacteria on the course of true diphtheria is a point greatly needing investigation.

In cases examined during the period when the membrane had begun to soften—that is to say, after the third day in ordinary mild cases—the falling off in the number of diphtheria bacilli was most marked. This did not seem to be due here to the antagonistic action of saprophytic bacteria, as has been commonly assumed, since, as a rule, the cultures made in late stages in cases going on to recovery remained perfectly sterile, except for the few scattered colonies of Lœffler bacilli. This result I attribute to the inhibitory action of the local disinfectant applications—in most of the cases a spray of peroxide of hydrogen was employed—but I have made no experiments to determine this point.

A matter of considerable interest is the question whether this method of examination will ever come into general use, and if such be the case, what class of practitioners could carry it out to the best advantage. This point is considered by Prof. Welch of Baltimore in an address delivered before the ninety-third annual session of the Medical and Chirurgical State Faculty of Maryland in April, 1891 (*Medical News*, May 16, 1891). In

this address, which by a masterly treatment of the facts places the prophylaxis and treatment of diphtheria on a broad scientific basis, Professor Welch does not think that the hopes of Roux and Yersin, that the method may yield good results in the hands of unskilled persons, are likely to be realised. He thinks that an elementary training in bacteriology is needed in those carrying it out, and suggests that as elementary courses on bacteriology have now become so common that it will not be long before most communities will possess at least one person capable of doing the work satisfactorily. My own experience has shown me that doubtful cases, which are those in which the value of the method should be best shown, the chief difficulty is in obtaining suitable material for examination are of two kinds—first, those where the condition resembles tonsillitis and the exudation is confined to the tonsils; and, second, those where the local disease is situated in some part of the respiratory tract not readily examined, or where the severity of the constitutional symptoms renders a prolonged examination difficult. As the procuring of a small piece of the false membrane at the earliest period possible is the *sine qua non*, and to do that in this latter class of cases requires a special manipulative skill only possessed by a skilled laryngologist, the task will properly fall to this individual. The aid of a throat specialist seems indispenable in cases where the local examination presents much difficulty. Possessed of suitable material, the best results in the further examination would certainly be obtained in a properly equipped laboratory.

In the cases where the confusion arises from the membrane being confined to the tonsils, the case is much more simple, and there is less need of the services of the laryngologist; all that is required being to detach a small piece of the exudation, wrap it in paper, and send it to some laboratory for examination.

Considering the gravity of the interests at stake in the prompt recognition and isolation of cases of diphtheria, one would naturally suppose that a method which enabled a positive diagnosis to be made within twenty-four hours, in cases seen during the first days of the illness, would be welcomed eagerly by the profession. That this has not happened is due probably in great part

to the wise precaution of treating all doubtful cases as if they were cases of diphtheria, and possibly, too, in some degree to a tendency to pride ourselves upon our sagacity, valuing the result of a clever guess more than that obtained by a less brilliant, though more certain, method. As a matter of experience, a large proportion of the doubtful cases, especially the tonsillitis group, declare themselves to be one thing or the other by the time the doctor makes his visit on the following day.

In conclusion, it may be stated :

(1) That in almost all cases where strong clinical grounds exist for the diagnosis of diphtheria, the bacteriological examination has shown the almost invariable presence of the malignant Lœffler bacilli.

(2) That, excepting in connection with scarletina, measles or erysipelas, the number of cases of diphtheritic sore throat due to other causes is very small.

(3) That in doubtful cases the accuracy of the method depends chiefly upon obtaining suitable material at an early stage of the disease.

(4) That the method is not of much service in doubtful cases where the difficulty is due to the infection occurring in localities difficult to examine without skilled manipulation, unless suitable material is obtained for examination.

Summary of Method for Detecting Loeffler Bacilli.

Microscopical Examination.—Stain a cover-glass smeared by a bit of membrane with any aniline dye. The bacilli are arranged in small clumps, and are short, thick rods, about same length as tubercle bacili, but much thicker; numerous beaded and drumstick shapes met with —in solution forms. Gram's staining method can be employed.

Cultures.—Can be made direct from membrane in throat or from small bit of membrane folded dry in clean paper. No special antiseptic precautions necessary. Touch or scrape membrane with a sterilized platinum needle and draw it in parallel streaks over the surface of a serum tube, using two or more successive tubes before reinfecting the needle. Keep the tubes at body temperature. In 20–24 hours the Loeffler bacilli appear as small grayish-white points, size of pin-heads, showing under the microscope the characteristic appearances of the bacilli in the original membrane.

Diagnosis.—(*a*) Other bacilli do not form visible colonies at twenty-four hours. (*b*) Staphylococcus colonies resemble those of Loeffler bacilli to naked eye appearance, but recognized on microscopic examination. (*c*) Pseudo-diphtheritic bacilli have microscopic and culture characters of the Loeffler bacilli, but have no pathogenic properties.

Pathogenesis.—Subcutaneous inoculation of guinea-pig kills in two to five days, with hæmorrhagic necrosis and œdema at site of inoculation. The bacilli can be recognised microscopically and by culture near spot of inoculation, but blood and viscera give negative results. Disseminated parenchymatous degeneration of liver and kidneys.

The following is a tabular analysis of the cases, divided into two groups :—

GROUP A.—Cases evidently diphtheria.
Number of cases examined, 9. Result: Positive 8; Negative, 1.

No.	Name.	Sex.	Age	Service.	Course.	Result of Examination.	Remarks.
1	M. L.	F	21	M. G. Hospital.	Recovery	Typical.* Oidium also found.	Began as Tonsillitis,
2	L. E.	M	2	Do.	Death.	Typical.	Nasal diphtheria. Bacilli in bit of membrane. None in nasal secretion.
3	Mrs, T.	F	28	Dr. England.	Recovery	Two colonies only.	
4	W. P.	M	16	M. G. Hospital.	Do.	No Loeffler bacilli; abundant staphylococcus pyogenes aureus.	Rapid disappearance of membrane, (nasal voice).
5	L. M.	F	10	Dr. Major.	Do.	Only two colonies found. Oidium present	Marked diphtherial paralysis.
6	F. P.	M	8	M. G. Hospital.	Do.	Typical.	
7	E. G.	F	10	Do.	Do.	Typical.	
8	L. P.	M	13	Do.	Do.	Typical.	
9	M. G.	F	4	Do.	Death.	Typical.	

* In cases marked "typical" a large number of the virulent Loeffler bacilli were found.

GROUP B.—Anomalous cases.*
Number of cases, 5. Result: Positive, 1; Negative, 4.

1	O. P.	F	20	M. G. Hospital.	Recovery	Negative.	Exudate confined to Tonsils.
2	C. W.	F	24	Do.	Do.	Negative.	Nasal diphtheria? Nasal voice. Local examination unsatisfactory.
3	A. C.	M	1	Do.	Do.	Negative.	Local examination unsatisfactory.
5	W. J.	M	8	Do.	Do.	Negative.	Scarletina.
6	S.	M	8	Dr. Birkett.	Do.	Positive.	

* Cases 1, 2 and 3 of this series were placed in the diphtheria ward of the Montreal General Hospital. Several cases of follicular tonsillitis were also examined, always with negative results.

CASES IN PRACTICE.

By Archibald E. Malloch, M.D., Hamilton, Ont.

I.—Traumatic Suppurative Synovitis of Left Knee—Recovery in Straight Position with very Limited Motion.

May 12th, 1890, 8 *p.m.*—Visited F. H., aged 12, at his home and found him suffering from acute inflammation of the left knee, with the following history: On the 8th he fell on a thorn, which pierced the skin on the inner side of the patella; he thought little about it, and did not mention the accident to his mother; the following day he went to the country apparently well, and returned this afternoon unable to walk or even to put his foot to the ground. The leg lies on its outer side perfectly rigid, with knee slightly flexed, and with an angry red blush from middle of leg to above the knee; there is general swelling without appreciable joint distension; the most tender as well as the reddest spot, where there is slight puffiness, is over the head of the tibia on its inner side, two inches below the site of puncture, which is marked as a slightly dark-reddish spot the size of a small pin's head; large superficial veins course from the knee upwards on the thigh. No foreign body is to be felt at site of puncture; he assures me the thorn was not broken. Joint thoroughly washed and wrapped in towel wet with carbolic-sublimate solution, and placed on back splint reaching from top of thigh to heel and supported with sand-bags, and weighted with one to counteract the "startings." Temperature 101°F.

May 13th, 4 *p.m.*—Joint swollen. Under chloroform, a three-inch opening was made into the joint on the inner side, letting out some thin purulent matter with flakes of lymph; the lower angle of the wound being well down on head of tibia. No foreign body was felt; the track of the thorn-wound was cut out. A similar three-inch incision was made into the joint on the outer side of the patella. The joint was then thoroughly douched with 1 to 1000 carbolic-sublimate solution, drainage tubes inserted, and dressings applied; splint, etc.

May 14th, *a.m.*—Pulse 102; temperature 99°F. 6 *p.m.*—Pulse 106; temperature 101°F.

May 15*th*, 10 *a.m.*—Pulse 104; temperature 100°. Dressed under chloroform; knee quite in marked contrast to its appearance on the 13th; some serum escaped from the tubes. Dressed and put up in Watson excision of the knee splint (to permit of dressing without disturbing the limb, using paraffine bandages). Suspension to cradle. Though improvement in the general symptoms followed this treatment, there was fever of from 99° to 100° at night. The knee was dressed daily.

May 23*rd*.—Eats well; complains only of pain in the knee at night; slight discharge on dressings; wounds broader than originally, and there is pain on pressure on the head of the tibia and on the condyles of femur, showing some degree of osteitis. 9 *p.m.*—Temperature 99°.

May 25*th*, 9 *p.m.*—Temperature 99°.

May 27*th*.—Splints removed and reapplied, as there was some pressure on the malleoli.

After this date the wounds ceased to spread out and cicatrization began. The temperature, which was always slightly raised in the evening, fell to normal on the 19th of June, and did not rise subsequently.

July 12*th*.—Splints removed and passive motion commenced.

July 17*th*.—Leg straight; slight motion, but he will not let me make passive motion; his mother can do nothing with him.

In the fall the knee was slightly flexed and there was slight motion. By means of a posterior hinge splint with extension screw the leg was straightened in a few days. He was ordered to keep the leg in a splint at night. Slight motion as at first.

March 17*th*, '91.—Limb straight, very slight motion; walks without crutches; ordered to use the hinge splint at night, flexing the leg as much as possible with the screw and straightening it in the morning. Cannot advise forcible flexion under chloroform, as I know he will not allow the necessary subsequent passive motion to be made.

II.—Traumatic Suppurative Synovitis of Left Knee—Recovery with Perfect Motion.

May 30*th*, 1890.—Saw Miss M. W., aged 8, with Dr. Ross of Dundas. The following history is taken from his notes which

he kindly sent to me: Slight habit; no history of illness; mother's family healthy; father said to suffer from consumption. While playing, she ran or was forced against a nail sticking in a fence, which appears to have penetrated the left knee just to the inner side of the patella; not much attention was paid to it; she walked about until the 25th. On the 28th Dr. Ross first saw her, when the joint was swollen and distended. There was on the dressing a considerable amount of discharge resembling white of egg, and which apparently came from the joint. From the knee upwards there was swelling, heat and redness, and most of the pain was referred to the part above the knee; the leg was swollen. She was put to bed and cloths wrung out of perchloride solution were applied, with hot poultices externally. The following day there was no discharge, and the swelling was not increased. A probe passed about one-quarter of an inch into the wound, but no pus was seen. On the afternoon of the 30th the swelling, pain and redness were increased, especially on the thigh; she had had a bad night, and the temperature was 104°F. Dr. Malloch being in town, I showed him the case; he recommended opening the joint, and assisted in doing this. Under chloroform, a free incision was made over the situation of the wound, giving exit to a large quantity of thin and flaky pus; a counter opening was made well down on the outer side of the joint, the cavity fully syringed with a 1-1000 perchloride solution, a drainage tube on each side, gauze and jute dressings applied, and the leg put on a back splint. 11 *p.m.*—No pain; temperature 100.8°F.

May 31*st.*—Temperature 99.6°F. Swelling has subsided, especially in the thigh; discharge not great; syringed thoroughly with perchloride solution and dressed as before.

June 1*st.*—Temperature 101.6°F.; discharge small and not offensive; wounds syringed and tubes replaced; solution does not pass through from one side to the other.

June 6*th.*—Temperature 99.2°F. Swelling less; inner wound quite wide and bulging in the centre; communication established between the wounds.

June 10*th.*—Condition since the 6th much the same. Under chloroform, passed tube from one wound to the other; made an

opening lower down on inner side and passed a tube from upper wound to this; dressed and put up leg in permanent splint, which admitted of dressing without disturbing the splint; joint suspended; temperature 100°F.

June 14th.—Temperature 99.8°F. Doing better; less pain and tenderness; swelling abating; appetite improving.

From this on, the temperature went down to normal and the swelling, tenderness and pain subsided. On the 28th of June the tubes were inserted only in the lower wounds. On July 6th the inner one was dispensed with, and on the 10th the outer one, the patella being then found moveable. The splint was removed on the 14th and the joint found moveable. She shortly after began to go on crutches, and by practising passive movement the mobility of the joint steadily increased.

March 30th, '91.—Dr. Ross writes: I saw her a few days ago and the joint is just as useful as the other, and if it be not quite as moveable, is almost so.

III.—Pistol Wound of Left Knee—Recovery with Perfect Motion.

Dec. 8th, 1890, 1.15 *p.m.*—C. McQ., aged 14 years, when attempting to uncock a pistol of 32-calibre with its muzzle resting on his left thigh, his knee being flexed in the sitting position, it went off, the ball entering about three inches above the patella, in a line with the hollow between that bone and the inner condyle of femur. The skin was scorched and black for some distance around the ragged wound. He states that the pistol was pointing downwards, forwards and outwards, and though there is no effusion, Drs. Mullin, Roxburgh and myself felt quite sure the joint was in all probability injured. There was no other wound. The doctors attended to the preliminary washing, while I went home for instruments, etc. Chloroform was then administered an hour and a half after the receipt of the injury, and on exposing the limb decided effusion into the joint was noticed; the wound was enlarged upwards and downwards, and the track followed to the upper limit of the sub-crural synovial pouch, the tissues being charred to that depth. The joint was then opened

by a free incision on its inner side, and a director having been passed under the patella, it was cut down upon at the most dependent part of the joint on its outer side and the wound enlarged upwards. The lower angle of this wound corresponded with what seemed to be the direction of the pistol wound, and about it there was some unusual fatness, but the bullet which we expected to find there was not felt. All the burnt, blackened tissue in the thigh was cut away; the knee was then thoroughly douched, as well as the thigh wound, with 1–1000 carbolic-sublimate solution, drainage tubes inserted, moist gauze dressings applied and a long posterior splint. 9 *p.m.*—Vomiting; pulse 90; temperature 98°F.

Dec. 9*th*, 10 *a.m.*—Restless night, with startings of leg; pulse irritable and fast; temperature 99°F. Dressings removed and wounds syringed through the tubes with 1–1000 carbolic-sublimate solution. Some pent-up fluid escaped from the inner knee incision; redressed. 9 *p.m.*—Pulse 120; temperature 100°F. Complains of dull, heavy feeling in leg, with occasional startings; a bran pillow was applied over thigh to counteract the startings.

Dec. 10*th*.—Passed a fairly good night after a quarter grain of morphine; took a fair breakfast; pulse 98°F.; temperature 98.2°F.; dressed and syringed as before.

Dec. 11*th*.—Dressed as before; limb quite quiet, but the thigh wound is broader; feels easy and eats well.

Dec. 21*st*.—On removing the shortened drainage tube from the external joint wound and introducing the metal nozzle of the syringe it grated upon something; with a pair of forceps the bullet, which was lying apparently loose in the wound, was extracted. (Where was it, and why was it not found at first?)

Dec. 24*th*.—Drainage tubes removed.

Dec. 31*st*.—Wounds quite superficial, the knee ones nearly healed; with the leg on the splint he bent his knee slightly, and was ordered to do this each day.

Jan. 29*th*, '91.—Seen at office; wounds have been healed some time; can nearly semiflex the joint; passive motion to be made each day.

It should have been noted that his left leg and left arm have been partially paralyzed since infancy.

April 4th.—His mother reports that he walks as well as he ever did.

Cases of septic injury to the knee are of especial interest, from their rare occurrence in general practice and from the fact that they were considered among the most serious of surgical cases, leading as they did in general to anchylosis, frequently to amputation, and occasionally to loss of life. Since the days of antiseptic surgery, however, and from its use, of the disappearance of the old dread of free incisions into synovial cavities, better results are to be had. When sepsis is present in such a complicated joint as the knee, it can hardly be expected that one flushing with antiseptic will overcome the mischief, which in two of these cases had been breeding for days.

I have no doubt but that the case of F. H. would have been materially shortened had daily syringings been practised, as was done in the other cases. F. H., however, has himself to thank for the stiffness, for had passive motion been allowed such would not have been the result.

In these sepsis cases with suppuration, early and free incisions with thorough primary flushing with 1 to 20 carbolic acid solution, or 1 to 500 carbolic-sublimate solution, daily subsequent flushings with a weaker solution so long as the temperature rises at night, with perfect rest from the first on a splint permitting of subsequent dressings without disturbing the limb, must be the rule.

Reviews and Notices of Books.

International Clinics: A Quarterly of Clinical Lectures on Medicine, Surgery, Gynæcology, Pediatrics, Neurology, Dermatology, Laryngology, Ophthalmology, and Otology, by Professors and Lecturers in the leading Medical Colleges of the United States, Great Britain and Canada. Edited by John M. Keating, M.D., J. P. Crozier Griffith, M.D., J. Mitchell Bruce, M.D., F.R.C.P., and David W. Ferilay, M.D., F.R.C.P. April, 1891. Philadelphia: T. B. Lippincott Company.

The editors propose to make this periodical a complete post-graduate course of medical instruction. It will be their endeavour to publish those clinical lectures only which are most instructive and most practical. All the most prominent teachers and the best known schools and hospitals of the United States, Great Britain and Canada will be represented. In the present volume we are pleased to see Canada represented by the late lamented Dr. R. L. MacDonnell, who contributes a lecture entitled "A Case of Enlarged Liver with Jaundice," and by Dr. J. Chalmers Cameron, Professor of Obstetrics, McGill University, on "Elevation of Temperature during the Puerperul Period." Other contributions and contributors to this volume are: Acromegaly, by James Ross, M.D., LL.D., F.R.S.; Sore Throat, by Christopher Heath, F.R.C.S.; Pneumonia; Cirrhotic Kidney and Liver; Fibroid Degeneration of the Heart, by A. L. Loomis, M.D.; Hydrothorax (Pythorax ?) with Dexiocardia, by W. T. Gairdner, M.D., LL.D.; Modern Methods in Surgical Operations, by W. W. Keen, A.M., M.D.; Ulcers, by D. W. Cheever, M.D.; The Early Diagnosis of Pregnancy, by Matthew D. Mann, A.M., M.D.; Cancer of the Vagina, by Wm. Goodell, A.M., M.D.; The Remote Effects of Traumatisms as Seen by the Neurologists, by H. C. Wood, M.D., LL.D.; The Treatment of Obstinate Sciatic Pain by Splint-Rest and Cold, by S. Weir Mitchell, M.D., LL D.; Psoriasis, by Geo. H. Fox, M.D., &c.

We understand that this work is for sale in the Dominion

through the Canadian Subscription and Publishing Company of Montreal. We can especially recommend it to our esteemed friend the general practitioner.

SECRET REMEDIES IN FRANCE.—In the *Journal d'Hygiène* of June 11th, 1891, is published the reply of M. Crinon to a letter from Sir Edward Sieveking to the French Society of Hygiene, asking for precise information on the subject of secret remedies in France. It runs thus: "There are a very considerable number of secret remedies in France. Among secret remedies are included every drug not contained in the French Pharmacopœia, or not approved by the Academy of Medicine. Since the publication of the last edition of the Pharmacopœia no drug has been formally approved by the Academy, and therefore every non-official drug comes under the heading of 'secret remedy.' Slight variations of official formulæ do not, however, come under this heading, as they are allowed in practice to be legal." This comprehensive and sweeping definition of a secret remedy may have the virtue of simplicity, but it has the drawback of including these new drugs which are in no sense secret. It bans all new therapeutical substances with an unpleasant name, until they have been formally received into the French Pharmacopœia, even though their formulæ and mode of preparation are as well known as those of any official drug. —*British Medical Journal.*

Society Proceedings.

BRITISH MEDICAL ASSOCIATION.

EXTRACTS FROM THE ADDRESS IN MEDICINE.

By T. Lauder Brunton, M.D.,
D.Sc. (Edin.), LL.D. (Aber.), F.R.C.P., F.R.S.,
Lecturer on Materia Medica and Therapeutics and Assistant Physician St. Bartholomew's Hospital.

Advances in Knowledge and Teaching Due to Experimental Method.—These changes have occurred both in the profession itself and also—to some extent in this country at least—in the education and training of the men who enter it. We notice, first, that a very great increase has occurred in the knowledge of the nature, causation, and treatment of diseases possessed by the profession as a whole, but perhaps a still greater gain is in the general adoption of the experimental method by which most of our recent knowledge has been acquired, and from which we may hope even greater advantages in the future. In correspondence with the acquirement of knowledge, we notice also a great alteration in the teaching of medicine, and especially prominent is the tendency to make such teaching practical instead of theoretical by training men to place their dependence upon objective facts, and not to receive without experimental data the theories or speculations of any master, however great he may be.

Practical Training.—Five-and-twenty years ago, not only was practical training such as we now find in the scientific departments of medicine—chemistry, physiology, pathology, and to a certain extent also pharmacology—almost entirely wanting, but even in general clinical medicine, not to mention the special departments of the throat, eye, and ear, it was very deficient as compared with what it is now. The greatest advance made in the last quarter of a century has been in the direction of the accumulation, co-ordination, and teaching of facts instead of theories, of the phenomena of Nature as opposed to the fancies of the human mind.

Co-ordination of Facts.—But the mere accumulation of facts is of little use unless they can be so arranged, compared, and grouped as to bring them into relationship with some general law, and this we find in the world's history has been done from time to time by some master-mind. In the case of medicine, this has also occurred to a great extent during the last five-and-twenty years.

Influence of Darwin.—Medicine, both in its principles and practice, is really a subdivision of biology, and this, like all other branches of knowledge, has been most profoundly modified by the general acceptance of Darwin's great thoughts—the doctrine of evolution, the struggle for existence, and the survival of the fittest. Wherever we turn we find that Darwin's influence has modified the direction of thought, and whether the study concerns the evolution of the elements, the evolution of the planetary systems, of living beings, of communities, of customs, of laws, of literature, science or art, in every department of human knowledge we find that men, consciously or unconsciously, are influenced by Darwin's work. It is with shame I confess that five-and-twenty years ago, although I had taken a university degree not only in medicine but in science, and might therefore be supposed to be acquainted with his work, I did not even know of the existence of his "Origin of Species," and I first heard its name in Vienna from the lips of an Austrian who was speaking of it in terms of the highest praise. "What is it?" I asked, and my question then seemed to cause my foreign friend as much astonishment as it causes myself now, when the possibility of such ignorance seems to me, as it must to you, almost incredible, and yet such was the fact. The publication of Darwin's "Origin of Species," in 1859, has done more to change the current of human thought than anything else for centuries, but while its influence is everywhere felt, biology and all its subdivisions have been more especially affected.

Struggle for Existence in the Profession.—I was much struck a year or two ago with the evidence of this severity which I saw in the house of a medical man residing in a neighborhood which had gradually deteriorated. This doctor had a large

practice, and was very hardworked, but his fees were small; and in order to educate his children, some of whom were in the profession, expenses had to be greatly retrenched at home. The house was large, and at one time had been tastefully decorated, but the paint was faded on the walls, the carpets were worn threadbare, and the furniture was poor and old. The severity of this struggle is, no doubt, due to the excessive number of men who have been entering the profession notwithstanding the barriers raised by the entrance examination; for this very barrier, by raising the quality of the men, has naturally raised the estimation in which the profession is held, and has, therefore, made it more attractive. But the excessive severity of the struggle, on the other hand, has a tendency again to lower the profession by rendering it so difficult for medical men to make a bare living that they are sometimes tempted to think more of their fees than of the welfare of their patients, and occasionally to resort to such means of making money as tend to bring discredit both on themselves and on the profession to which they belong. It is possible that the new regulation of the Medical Council requiring a five years' curriculum may tend to lessen this evil by preventing so many men from entering the profession. This longer curriculum is becoming absolutely necessary on account of the rapid progress which is being made in medicine and the time required to master the increased knowledge, not only regarding the nature of disease and the means of treating it, but regarding the means of ascertaining its presence. Long ago the doctor's means of diagnosis consisted in inspecting the tongue, feeling the skin, counting the pulse, shaking the urine, and looking at the motions and the sputum. But now, in addition to a thorough training in auscultation and percussion, students have to learn the use of the laryngoscope, ophthalmoscope, and otoscope, and the application of electricity. They have to acquire a knowledge of the chemistry of the urine and its alterations in disease, and, what takes still more time, they have to learn the microscopical appearances, not only of the tissues and excretions in health, but their alterations in disease, and must be acquainted with the methods of staining so as to detect tubercle bacilli and other disease germs.

Apparent Change in Disease.—Increased knowledge of diagnosis has led to an apparent change in the mortality of different diseases. Thus, the frequency of deaths from heart disease appears to be much greater, and that from apoplexy much smaller now than fifty years ago. In all probability this difference is not real but only apparent, and is due to the more accurate diagnosis by which the presence of cardiac disease is now ascertained. The supposed increase in the frequency of cancer is probably in great measure due to a similar cause, for I am quite certain that many cases which were formerly classed as chronic diarrhœa, dysentery, jaundice, or dropsy, were really due to malignant disease of the abdomen, while others probably depended upon unrecognized disease of the kidney. For up to a recent date so little attention was paid to the condition of the urine that about fifteen years ago, when examining proposers for life assurance in place of a friend who was away on his autumn holiday, I was astonished to find that there was no apparatus at the office for examining urine, and I believe that it is only within the last ten or twelve years that an examination of the urine for life assurance has become general.

Real Changes in Disease.—But real changes as well as apparent ones have occurred in diseases. Some have become more frequent and others are rarer. Thus, typhoid fever is almost certainly more common, because the increase of our sewage system has given greater facilities for its spread. Typhus fever, on the other hand, has become comparatively rare, and the story of its extermination in Edinburgh is very interesting. Five-and-twenty years ago your President was constantly wearing a smoking-cap because his head had been shaved during an attack of typhus, and a few months later one of the physicians and two of the house physicians to the hospital in Edinburgh died of the disease, while one just escaped with his life. There were, I believe, at the end of 1867 nearly 150 typhus patients in the hospital at once. A few years later the disease was completely exterminated by the alterations in the town necessitated by the new university buildings. A certain narrow lane called Hastie's Close, which was a hotbed of typhus fever, and from

which the disease used to make periodical excursions into the neighboring districts, was pulled down, and since then typhus has almost entirely disappeared. Pyæmia is another disease which, although not totally extinct, is very greatly lessened in virulence. When I was a student it was the dread of the surgical wards, and I remember one patient dying of it who had been admitted simply for a slight injury to the finger tip, which necessitated amputation of the last phalanx. Now, thanks to the antiseptic treatment introduced by Lister, such cases are almost unknown.

Departments of Greatest Advance.—Five-and-twenty years ago we knew only too well that typhus was infectious, and that pyæmia and erysipelas were likely to spread in a ward when once they got into it, but we did not know then the causes of these diseases as we do now, nor had we the same means at our disposal wherewith to combat them. The departments in which the greatest advances have been made within the last five and-twenty years are in those of fevers and diseases of the nervous system. A new era in the study of the latter was foreshadowed by the experiments of Fritsch and Hitzig on the brain of the dog, but it can only be said to have fairly begun with Ferrier's localization in the brain of monkeys of the cortical centres, both motor and sensory, for the brain of the dog was too unlike that of man for experiments upon it to be of much practical use in the diagnosis of human ailments, while the likeness in the brain of the monkey to that of man at once allowed conclusions drawn from the experiments upon the former to be transferred upon the latter. Yet if we try to describe in one word the department in which medicine has made the greatest progress within the last quarter of a century, that word must be "fevers;" for during this time we have learned to recognize fever by the use of the thermometer in a way we never did before; we have learned the dependence of the febrile process in the great majority of cases upon the presence of microbes in the organism, and we have become acquainted with an immense number of chemical substances which have the power both to destroy the microbes and to regulate the febrile process.

Introduction of the Thermometer.—It is true that the thermometer was used by Danielssen, in leprosy, before the year 1848, and its more general use began with Wunderlich's observations nearly thirty years ago, but it is only within the last five-and-twenty years that its use has become at all general. It was only during the latter period of my service as house-physician that the clinical thermometers introduced into this country by Aitken came into use in the Edinburgh Infirmary, and cumbersome instruments they were, for they were nearly a foot long, and I used to carry them about the wards under my arm in a case big enough to have held a set of amputating instruments. Their size and brittleness combined were a complete obstacle to their general employment in practice, whereas the small, accurate and yet moderately priced thermometer is now to be found in every doctor's waistcoat pocket. During one of the last years of my student life I saw a man suffering from double pneumonia nearly die, his life being saved by the accidental presence of a Swedish doctor. The man was completely comatose, and everyone thought he would die; but the Swede, who had seen similar cases saved by bleeding and cold effusion, proceeded to apply these remedies with complete success. No one who witnessed the wonderful way in which the man was snatched from the jaws of death could fail to be deeply impressed by the scene, but no one knew then why the man was dying or how the remedial measures acted. Now the use of the thermometer enables the merest tiro to recognize such a case as one of hyperpyrexia saved by the abstraction of heat. The constant employment of the instrument shows everyone, nurses as well as doctors, when the temperature of a patient is rising so high as to be dangerous, and allows them in many, perhaps in most cases, to prevent a further rise by the use of antithermic measures, such as cradling, cold sponging, cold effusion, cold baths, or by the administration of antipyretic remedies.

New Methods.—The rapid increase in our knowledge has been due not merely to the constant use of old methods, but to the introduction of new ones, and more especially to the general recognition of the fact that the same strategy which has often

proved so successful in war is to be applied in attacking complex problems. They are to be separated as far as possible into their several components and each of these is to be overcome in detail. As presented to us by observation at the bedside, the problems of disease are too complex for us to solve, and we are only succeeding in doing it by examining the various factors one by one in the laboratory. The greatly increased powers of the microscope and the better methods of illumination have been of the greatest service, but their utility would be very much less than it is had it not been for the general introduction of the microtome and the invention of new methods of staining. When I was a student the microtome was only used for cutting sections of wood in the class of practical botany. About that time it was employed by Mr. Stirling, Professor Goodsir's assistant, in the preparation of animal tissues, but I believe that we owe its general introduction to Professor Rutherford. The facility with which sections are made by it has made microscopical research much less tedious, and has enabled trained histologists to do more work in a given time, and medical students to acquire knowledge more rapidly. But without the method of staining introduced by Weigert and Ehrlich, we should, even with the best microscopes, be unable to recognize most of the microbes which are so important in the causation of disease.

Small and Great, Foolish and Wise.—In looking at another of the greatest advances which medicine has made—namely, the knowledge of infective disease—we can see how enormous results can arise out of very small beginnings, and the safety of nations may be consequent upon a research which many men would have termed useless or even frivolous. I can hardly fancy any better illustration of St. Paul's observation about the foolish things of this world confounding the wise than Pasteur's researches on tartaric acid; for what could seem more foolish to the so-called practical man than the question, "Why does a crystal of tartaric acid sometimes take one shape and sometimes another?" Yet from an attempt to answer this question has arisen the whole of Pasteur's work on fermentation in general, and on that of wine, beer and vinegar in particular, whereby he

has been able to save millions to his country by accelerating the production of vinegar and preventing the souring of wine and beer. His observation that tartaric acid sometimes turned the ray of polarization to the right, sometimes to the left; that, indeed, there were two crystals apparently alike, but really different; and that these could be combined so as to form a symmetrical crystal having no power of rotation, led him to look to life and living beings as the source of asymmetry. He tried to produce this asymmetry in salts of tartaric acid by fermentation, and found that during the process an organism developed which eats up the dextro-tartaric acid, and leaves the lavo-tartaric acid behind. This led him to investigate such minute organisms, and, by simplifying the soil in which they grew, and separating the organisms one from another, he learned the conditions of their growth, and showed most processes of fermentation were due to the presence of living organisms. It is true that while Pasteur was still a boy at school, Peyen and Persoz had shown that the liquefaction of starch and its conversion into sugar was due to diastase, and that Dumas in a report of a paper by Guerin-Varry had pointed out that, although unlike diastase, the active principle of the gastric juice had not been isolated, it was probably a ferment of a somewhat similar kind. Dumas classed yeast as a ferment along with diastase, and the fact that such a process as conversion of starch into sugar could be effected without a living organism, naturally rendered it all the more difficult for Pasteur to prove his thesis that most fermentations were due to living organisms.

Chemical and Biological Views of Fermentation.—The two views of the action of ferments—namely, the chemical and the biological—may, I think, fitly be likened to Pasteur's two kinds of tartaric acid, each of which is lopsides and incomplete by itself, and only when united forming a symmetrical whole. There can be no doubt of the truth of the chemical view that diastase is not a living organism, and yet converts starch into sugar. There can be as little doubt of the biological view that yeast and other organisms which cause fermentation are living bodies, and that without the presence of these living bodies alcoholic, acetic, and other forms of fermentation would not exist.

Microbes and Enzymes.—But recently we have come to recognize that these living organisms may produce their effect by manufacturing chemical ferments, and that these ferments may occasionally do the work, although the organisms which form them may be absent. It is quite true that it is difficult—perhaps impossible—to get fermentation from the dead yeast plant, but we may find a parallel for this in the fact that the pancreas of the higher animals sometimes yields an active ferment and sometimes not. Nor need we wonder that the ferments produced by microbes have but a slight action compared with those of the microbes themselves, if we remember how very little power of digestion a dead pig's stomach has as compared with the amount which can be digested not by the live animal itself only, but by the herds of swine consisting of its "fathers and mothers, its brothers and sisters, its cousins and its aunts," during all the term of their natural lives; for in the process of fermentation microbes are growing, fermenting, and dying with great rapidity, and many generations occur in a fermenting fluid in the space of a few hours, so that the total effect they produce will be out of all proportion to any which can be got from the microbes themselves at a single instant.

Microbes and Disease.—From organisms as a cause of fermentation and of the diseases of wine and beer, Pasteur went on to investigate their action as causes of disease in living beings—first in the silkworm, next in the lower animals, and, lastly, in man. He established the dependence of the silkworm disease and of anthrax upon the presence of specific microbes which could be transmitted and communicate the disease, and by destroying the infected eggs of the silkworm he eradicated the disease and restored the silk industry to France.

Pure Cultures.—Pasteur's plan of growing disease germs outside the body in broth, although of the utmost value, did not allow a convenient separation of different germs; but this can now readily be done by Koch's plan of sowing them, not in a liquid medium but on solid gelatine spread on glass plates, so that the growth of the germs can be daily watched under the microscope and inoculations made from single colonies on other

plates until pure cultures have been obtained. By thus isolating the different microbes we learn their life-history, the mode in which their growth is influenced by differences of soil, of temperature, of moisture, by the addition of various substances which either favor or retard their growth, and, last but not least, the effect which one microbe has upon another when they are grown together at the same time.

Struggle for Existence amongst Microbes.—For even amongst these minute organisms the struggle for existence and the survival of the fittest exists, like that which Darwin pointed out so clearly in the case of higher plants and animals. When two microbes are growing together, one may choke or destroy the other, just as weeds in a garden may choke the flowers, or, on the other hand, successive generations of one microbe may render the soil suitable for another, just as decaying alga and mosses may furnish mould in which higher plants can grow.

Struggle for Existence between Microbes and the Organism.—But it is not merely between different species of microbes or different cells in an organism that this struggle occurs. It takes place also between the disease germs and the cells of the organism which they invade, and the result of the struggle may be determined, not by some powerful agency which weakens or destroys either the organism or the microbe, but by some little thing which simply inclines the scale in favor of one or the other. Thus, in the potato disease the victory of the invading microbe and the destruction of the potato, or the death of the microbe and the health of the tuber, may depend upon some condition of moisture or possibly of electrical change in the atmosphere which aids the growth of the microbe disproportionately to that of the potato. These atmospheric conditions need not necessarily be antagonistic to the potato, they may even in themselves be advantageous to it; but if they help the microbe more than the plant, the microbe will gain the victory and the plant be destroyed.

Fight between Cells in Higher Organisms.—The fight between the organs which Æsop describes in his fables actually occurs between the cells in some vertebrate animals, and the

schism predicted by St. Paul as the result of such a fight actually takes place. For in the tadpole, at one stage of its existence some of the cells at the base of the tail begin to eat up others, with the result that schism occurs and the tail falls off.

Phagocytosis.—This struggle for existence between the cells of an organism and microbes has been beautifully shown by Metschnikoff in the daphne or water flea, where the process of the cells eating up the microbes or the microbes destroying the cells can be actually observed under the microscope. This process of phagocytosis is now regarded by many as only a small part of the struggle between an organism and a microbe, but it is impossible to see one part of a microbe half digested by the cell in which it is imbedded, while the part outside half remains unaltered, without believing that the process is one of great importance. At the same time, it seems that the process of phagocytosis, where the microbe and the cells meet in close conflict, bears about the same relationship to the total struggle that a bayonet charge bears to a modern battle. The main part of the fight is really carried on at some distance by deadly weapons, by bullets in the case of the soldier, and by ferments, poisonous albumoses, and alkaloids on the part of the cells and the microbes. In some of Metschnikoff's observations we can almost see this process, for he has figured leucocytes dead, and apparently burst by the action of conidia, lying close to but yet outside them, as if these conidia, like the dragons of fable, had spit out some venom which had destroyed them.

Venom of Microbes —Within the last two years attention has been gradually becoming directed less to microscopical examination of the microbes themselves and more to chemical investigation of the ferments and poisons which they produce; yet, strangely enough, the very moment when chemistry is becoming more important than ever has been chosen to minimize the teaching of it in medical schools, and examination in it by licensing bodies. It is now possible to separate the albumoses and poisons from the microbes which produce them either by filtration, or by destroying the microbes by graduated heat; for, as a rule, they are destroyed by a lower temperature than the albumose or poisons which they form.

Microbes and Enzymes.—As the albumoses produced by microbes are nearly allied, chemically and physiologically, to those formed in the alimentary canal of the higher animals by digestive ferments, it is natural to suppose that microbes, like the higher animals, split up proteids, starches, and sugars by enzymes, which they secrete, and which in both cases may be obtained apart from the living organisms which produce them; that, in fact, we should be able to isolate from microbes bodies which correspond to pepsine or trypsine, just as we can isolate these from the stomach or pancreas of an animal. In some, although not in all cases, this attempt has succeeded.

Poisonous Albumoses.—The albumoses produced by microbes resemble those formed during normal digestion in being poisonous when injected directly into the circulation, although they may not be so greatly absorbed from the intestinal canal. One of the most remarkable discoveries in regard to albuminous bodies is the fact that some of them which are perfectly innocuous, and, indeed, probably advantageous to the organism in their own place, become most deadly poisons when they get out of it. Thus the thyroid and thymus glands, which are perfectly harmless and probably useful, were found by Wooldridge when broken up in water to yield a proteid which instantaneously coagulated the blood if injected into a vein, so that the animal died as if struck by lightning, while Schmidt and Mühlheim, under Ludwig's direction, found that peptones had an exactly opposite effect, and prevented coagulation altogether.

Neutralization of Poisonous Albumoses.—Perhaps the analogy is too vague, but we seem to find here something very like Pasteur's two kinds of tartaric acid, one rotating polarized light to the right, the other to the left, but, when united together, having no action at all, for here we have two bodies, one of which destroys coagulability entirely, the other increases it enormously; while many albuminous bodies have no action upon coagulation whatever. This view would lead us to suppose that one form of albumose may neutralize the action of another, thus rendering them both completely innocuous, while either alone might be a deadly poison.

Zymogens and Enzymes.—Perhaps a similar process of splitting up and recombination may explain the formation and disappearance of the enzymes, such as pepsin and trypsin, by which digestion is carried on. The pancreas of a fasting animal will not digest albuminous bodies like fibrin, while the pancreas of an animal killed during full digestion will do so rapidly. Yet the fasting pancreas contains the zymogen, or mother substance, which yields the digestive ferment, and, as Kühne has shown, by treating it first with acid and then with alkali, it becomes active. Again, to recur to the analogy of Pasteur's tartaric acid, we seem to find that the inactive, and possibly symmetrical, albuminous substance of the fasting pancreas is split up by this treatment after death or during the process of digestion in life, and yields the lopsided and active pancreatic ferment. But, if this be so, what becomes of the other half which has been split off? We do not at present know, but curiously enough Lépine has lately shown that while the pancreas is pouring into the digestive canal a ferment which will form sugar, it is at the same time pouring into the circulation another ferment which will destroy sugar.

Immunity.—We must be very careful in our speculations and test them by experiment, but such observations as these may tend to throw some light upon the nature of immunity. Immunity is probably a very complex condition, and is not dependent altogether upon any single factor, but we can now understand that if a microbe has gained an entrance into an organism, and produces a proteid or an albumose poisonous to the organism which it enters, it may grow, thrive, and destroy that organism, while the injection of some other proteid which would neutralize the poison might save the animal while the microbe would perish.

Cure of Anthrax.—Thus Hankin has found that while a mouse inoculated with anthrax will die within twenty-four hours, a rat resists the poison altogether; but if the mouse after being inoculated with the disease has a few drops of rat's serum injected into it, instead of dying, as it would otherwise certainly do, it survives just like the rat, and from the spleen of the rat Hankin has isolated a proteid which has a similar protective action to that of the serum.

Cure for Tubercle.—Working on similar lines, Bernheim and Lépine used the injection of goats' blood in phthisis so as to stop, if possible, the progress of tubercle, and Richet has used the serum of dogs' blood. Lately I have used the serum of goats for a similar purpose, for the goat is quite immuned, and the dog is to a great extent, though not entirely, immuned from attacks of tuberculosis. The injection of goats' blood in somewhat large quantities has been given up, while dogs' and goats' serum in small quantities of 15 to 20 minims at intervals of several days is still under trial.

Antisepsis.—Perhaps no better example of this can be found than antiseptic surgery, from the time of the good Samaritan down to Ambroise Paré and Sir Joseph Lister. The good Samaritan bound up the wounds of the poor traveller, pouring in oil and wine, which, only a few years ago, was recommended in an Italian journal as an excellent antiseptic. Ambroise Paré, when his ointments ran out, could not sleep for thinking of the miserable soldiers to whom they had not been applied, and was greatly astonished to find in the morning that these wretched neglected ones were better and happier than their comrades who had been treated *secundum artem.* I have no doubt that Paré's predecessors in trying to improve upon the methods of the good Samaritan and upon the still useful friars' balsam, which is a powerful antiseptic but stings the whole wound, had tried to make their applications more and more irritating, not knowing that it was the antiseptic power and not the irritant qualities which were desired. Paré abolished the ointments with the irritation they caused, and thus did great service to surgery. But a greater one yet was rendered by Lister when he recognized that the danger of operations was due to the entrance of germs and by preventing this has completely revolutionized surgical practice; nay, more, he has to a great extent revolutionized medicine, for the diseases of the internal organs which were formerly entirely under the physician's care, are now becoming amenable to surgical treatment, and diseases of the stomach, intestine, liver, kidney, and lungs, and even of the brain and spinal cord, are now successfully treated by surgery when medicines are

powerless to heal. The most remarkable of all the recent triumphs of surgical operations upon the brain in which Mr. Horsley has gained such well-deserved fame, would have been impossible without Ferrier's localization of cortical centres, and would have been equally impossible but for Lister's antiseptic method.

Disinfection.—But it is not only in surgery that recognition of diseased germs as a source of danger to the organism has led to their destruction outside the body, and ensured safety from their attack. This occurs in all infective diseases, and this term now includes many which were not formerly regarded as such, for neither consumption nor pneumonia were formerly regarded in this light; but just about twenty-five years ago tubercle was shown to be inoculable, and since then the discovery of the bacillus of tubercle by Koch, and of pneumonia by Friedländer, have caused us to class both these diseases as not only infective, but as caused by definite organisms.

Prevention of Epidemic Diseases.—So long as people were ignorant of the causes of epidemic diseases, they were utterly unable to combat them, and they either in fury slew defenceless people for poisoning the wells, as in the Middle Ages, or appointed days of fasting and prayer, as in our own times. But once an epidemic is known to depend upon the presence of a certain organism, precautions can be taken for destroying the organism outside the body by means of disinfectants, or by lessening the susceptibility of the organism to its ravages inside the body by inoculation, or combating its effects by means of antipyretics. A knowledge of the life-history of microbes has enabled us to ascertain the power of different substances, either to destroy them completely, or to arrest or retard their germination and growth, and in this way to prevent the occurrence of the diseases which these microbes might otherwise produce.

Old and New Remedies.—In comparing the drugs at our disposal now with those we possessed twenty-five years ago, we are at once struck by two facts, namely, that we not only have a very much larger number of powerful remedies than before, but that we also know better how to use the old ones. Both of these

gains we owe to experimental pharmacology, to the testing of drugs upon the lower animals.

Antivivisection.—Every now and again a loud outcry is raised against this method, partly from ignorance and partly from prejudice. Many—probably most of the opponents of experiments on animals—are good, honest, kind-hearted people, who mean well, but either forget that man has rights against animals as well as animals against man, or are misled by the false statements of the other class. These—namely, those who, blinded by prejudice, regard human life and human suffering as of small importance compared with those of animals, who deny that a man is better than many sparrows, and who, to the question that was put of old, "How much then is a man better than a sheep?" would return the reply, "He is no better at all"—such people bring unfounded charges of cruelty against those who are striving, to the best of their ability, to lessen the pains of disease both in man and also in animals, for they, like us, are liable to disease, and, like us, they suffer from it. I may perhaps be allowed to quote two sentences from a paper which I wrote twenty-four years ago, and therefore a considerable time before any antivivisection agitation had arisen, for they expressed then and they express now the objects of experimental pharmacology: "Few things are more distressing to a physician than to stand beside a suffering patient who is anxiously looking to him for that relief from pain which he feels himself utterly unable to afford. His sympathy for the sufferer, and the regret he feels for the impotence of his art, engrave the picture indelibly on his mind, and serve as a constant and urgent stimulus in his search after the causes of the pain, and the means by which it may be alleviated."

Gains by Experiment on Animals.—It is said that our mouths are full of promises, but our hands are empty of results. The answer to this is that anyone who doubts the utility of experiments upon animals should compare the *Pharmacopœia* of 1867 with our present one. To it we owe, in great measure, our power to lower temperature, for to it is due not only the introduction of new antipyretics such as salicylate of soda, antipyrin,

antifebrin, and phenacetin, but the extension of the use of quinine from a particular kind of fever—malaria—to other febrile conditions. To it also we owe our greatly increased power to lessen pain by the substances just mentioned, which have not only an antipyretic but an analgesic action, and give relief in the torturing pains of neuralgia and locomotor ataxy when even morphine fails to ease, unless pushed to complete narcosis. The sleeplessness, too, which is such a frightful complication in some fevers, can now be combated by other remedies than opium and antimony; and we have the bromides—chloral, sulphonal, paraldehyde, urethane, chloralamide, and others which, either by themselves or added to opium, enable us to quiet the brain instead of exciting it to further action, as opium alone so frequently does. Our whole ideas regarding cardiac tonics also have undergone a complete revolution within the last quarter of a century, for I was told when a student that digitalis was a cardiac sedative, and was apt to depress the heart, whereas now we know that it and its congeners—strophanthus and erythrophlœum and spartein—increase the heart's strength, raise the vascular tension, and are useful not only in sustaining the circulation, but in aiding elimination.

Future of Pharmacology.—But perhaps the most promising thing about pharmacology is that we are now just beginning to gain such a knowledge of the relationship between chemical structure and physiological action that we can, to a certain extent, predict the action of a drug from its chemical structure, and are able to produce new chemical compounds having a general action such as we desire, for example, anæsthetics, soporifics, antipyretics, and analgesics, although we have not yet arrived at the point of giving to each one the precise action which would make it most suitable in any particular case. Even when we do not know the chemical structure of a drug we may be able, from noticing one of its actions, to infer that it possesses others. I was led, from the fact that one or two cardiac poisons have a local anæsthetic action, to suspect that they would all have this, and the truth of my supposition has been experimentally demonstrated. The fact, ascertained by Binz, that hydrocelemine

alters the blood much in the same way as nitrates led me to suppose that this drug would also alter the blood pressure like nitrates, and this supposition, which was testified with the assistance of Mr. Bokenham, proved quite correct. We are, indeed, getting a knowledge of the action of drugs both of known and unknown chemical structure and a power of making new remedies which will, I believe, enable us within the next five-and-twenty years to cure our patients in a way that at present we hardly think.

ABSTRACT OF THE ADDRESS IN SURGERY.

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My hero for to-day, whom I never saw, but whose one great work has been to me a classic, taught me to value a great principle, and I cannot but think that those present who knew him personally, who worked with him and were taught by him, will be the first to acknowledge that in taking him, and the great idea which he loved to inculcate, as my mainstay to-day, I am leaning on a strong staff, and that it will be entirely my own fault if I do not make the subject an interesting one. To those present who knew him not—there are not many present who do not know his worth—it is an absolute pleasure to me to be the imperfect medium of an introduction. My hero is John Hilton, and my principle is *rest as a therapeutic agent in the cure of surgical ailments*.

I estimate, year by year, more highly, the mental aspects of rest. The late Mr. Goodsir divided physiology into two divisions, anatomical and physiological, and in his graduation address in 1859 he laid down this axiom, "that the greater liability of man to disease is intimately related to his higher conscious intelligence"; he also says "that in the treatment of disease the adjustment may require to be, and in general must be, directed more or less to the psychical as well as to the physical conditions of the case."

We all know it is not work, but worry—mental unrest—which

kills, so a person will bear much physical discomfort in order that he may be relieved of the mental discomfort of his condition. I take into consideration in my practice and in my operations the effect that my decision in recommending any special treatment will have on the mind of my patient. In operations for cancer we all know how frequently they are unsatisfactory, but I think we hardly estimate the great mental depression which often follows on our refusal to attempt to give relief, more especially after the recurrence of the disease—after the primary operation has taken place. An attempt—even if unsuccessful—to remove a tumour will often give the patient a feeling of mental rest in the very thought that no stone has been left unturned in the endeavour to give relief. I desire as far as I can to give my patient mental rest, and for this reason I am often impelled to make the endeavour by operative means to give that relief which, looked on simply from the physical side, it may be impossible to underestimate, but, looked at from the psychical side, it may be impossible to overestimate.

I need not dwell on anæsthesia as a cause of rest in our patients, except to say that I still adhere to the views I expressed in a paper on Chloroform, read at the Cardiff meeting in 1885. I still hold that chloroform is the best anæsthetic; and I cannot help, as a pupil of Syme, feeling pride that the decision of the Hyderabad Commission, presided over by Dr. Lauder Brunton, so fully bears out the views held by that far-seeing man. Cocaine as a local anæsthetic is, in my opinion, of great value in adults. I have never seen any of the evil results, local or general, which have been described. We must take care to use a pure solution, and see that we do not inject it directly into a vein. These are the precautions which I have taken; and I use it either as a solution of salicylate of cocaine, or kept in pellets, and dissolved when required in camphor water or distilled water. I never inject more than half a grain. In the passage of bougies, in phymosis, in tracheotomy, in fissure, and in simple cases of fistula-in-ano, in excision of tonsils, before injecting iodine into a hydrocele, in small wounds before stitching, I have found the drug valuable. I allow four minutes to

elapse after injection before performing the operation. To prevent urethral fever—a purely nervous lesion—before passing an instrument I have used it in the form of a cocaine bougie. It is right to say that the use of local anæsthetics, such as cocaine, ether, or chloride of ethyl, may be overdone. The work of the surgeon may require to be done in too hurried a manner, not altogether satisfactory either to the patient or to the surgeon. Mental unrest, arising from a feeling of work imperfectly done, worries the surgeon; and in any operation requiring time, chloroform is to be preferred to the local anæsthetic.

Pain given to a patient, whether in the dressing of a wound or in the examination necessary to make a diagnosis, is a most fertile cause of unrest. Confidence is lost between patient and surgeon; this is more especially true in children. When I hurt a patient I always feel I am doing or have done wrong. Healthy wounds are not painful: the healing of a wound is a physiological process closely allied to—in fact, it is—growth. Inflammation in our wounds can be avoided, and, if avoided, then pain as a cause of unrest is unknown. Pain is to be avoided by every means in our power. Any movement of the patient is apt to cause pain, and every endeavour should be made, in the examination of the patient, to avoid pain. Also in the dressing of the wound the avoidance of movement is all-important, and in this connection I can speak very confidently of the value of the many-tailed bandage; the wound can be exposed without moving the limb. It is sometimes used to take the place of an ascending spiral; it can, however, be arranged as a spica or figure-of-8 bandage; any portion of the body can be covered with a many-tailed bandage. It always reminds me of the main characteristic of the British army. Each turn working well in unison with the neighbouring turns, and each turn having an independent power in itself—for turn read soldier. In fracture of the pelvis it is infinitely preferable to a roller bandage; it can be tightened and loosened without moving the patient.

One of the most frequent causes of local unrest in wounds and the free serous oozing which accompanies it is the use of unnecessarily strong antiseptics. We cannot avoid them altogether.

We must use them in a thorough manner for the purification of our hands, of the skin of our patient, and for our instruments if we have not a sterilising apparatus; but as regards the wound itself, given an aseptic wound to begin with, the less of the antiseptic the better; it is an irritant. A good many years ago a smart writer in a medical journal said, "Lister's arguments are getting stronger, his solutions are getting weaker." If he had said, "his arguments are getting stronger because his solutions are getting weaker," he would have been nearer the truth. Asepticism is taking the place of antisepticism. The extent to which this can be carried out will depend on the security we feel when we operate on unbroken skin that we have not introduced any causes of fermentation.

In all cases in which complete rest of the trunk is called for, use a thick and firm mattress made in three pieces, the central portion of which can be withdrawn for the performance of the acts of defæcation in both sexes, and the act of urination in the female. The prevention of bedsores by the facility with which the sacrum and buttocks can be examined, and the dressing of these sores, when they do occur, is greatly facilitated by the triple mattress. In the diagnosis of injuries in the region of the hip, the use of Nélaton's line has been given up in my practice, because in order to reach the ischial tuberosity necessary for estimating the line the patient has to be moved. Its place is taken by noting the want of parallelism between two tapes, one passing through the anterior superior spinous processes, and the other through the tips of the great trochanters of the femur.

I might multiply examples, but I have given enough to illustrate my subject. I have endeavoured to expound the healing doctrine of rest. It has been my privilege to point to John Hilton as one of its great expounders, who has, more than any one else, impressed me with its value in surgery. I am anxious that anything I may have said will in no way interfere with the necessity, for those who have not done so, of a careful perusal of his work. You will not agree with many things he says. Take comfort in the thought that it must be a poor book with which you are entirely in agreement; its stimulating effect on

you will be absent. After you have read the book you will grant that in him we have a careful observer and a conscientious worker, and one whose methods we will do well to imitate.

Before I conclude I would wish it to be understood that there is another side to this picture, or perhaps it may be the same picture looked at from a different standpoint. It is that much harm may be done by too excessive attention to rest. Evil may result from too prolonged rest. Mechanical rest may, in one sense, be antagonistic to physiological rest. Mechanical rest, in many cases, must be interfered with in order to attain physiological rest. An example will best show my meaning. Immediately after an injury the effusions into the tissues may, by their presence, interfere with the normal blood current through the part. At a later date these effusions are replaced by organised material which will also act in the same way. The nerve equilibrium will also be altered. The part will then be, from the vascular and nervous side, in a state of physiological unrest, and this unrest will be intensified by prolonged mechanical rest, because, unless there is a normal blood current, the effusions and fibrous material will not be removed. It is therefore necessary that, while we maintain mechanical rest after a part is injured, we should at the same time adopt some means to remove these products. It is here that massage is so valuable; lightly applied it has a marked soothing influence on the nerve disturbance; more strongly, though still gently applied, it will get rid of the effusions by causing a temporary congestion and free flow of blood through the part; still more strongly applied, it breaks down fibrous adhesions and gets rid of the pain felt in certain movements of the limb. While the massage interferes with the mechanical rest, it acts directly in relieving the physiological unrest. Experience alone will tell how far we can go with massage in order to attain the one object—the physiological rest—while at the same time we avoid doing harm by its over-use by interfering with the mechanical rest. In acute sprains and strains it may be begun at once, gently night and morning, using elastic pressure with wadding and a flannel bandage in the intervals of the massage. In subacute cases it may be used

more freely, wearing an elastic bandage in the intervals, along with limited use of the injured limb. In chronic cases, which are non-tuberculous, adhesions may be freely broken down, often giving immediate relief after months of partial impairment of usefulness.

I am also strongly of opinion that in fractures near joints, as in Colles' and Pott's fracture, massage may with advantage be begun within a week, with the result that while the repair of the broken bone is in no way interfered with (I rather think it is aided), the limb is a useful one at a much earlier period than is the case if, as in the orthodox treatment, the limb is kept absolutely quiet for three or four weeks. If we think only of the broken bone and forgot the injury to the surrounding soft parts, the result is a stiff and useless limb, which will for a long time be a source of discomfort and helplessness to the individual. It is a question exercising my mind whether we should not apply gentle massage in all fractures, as a matter of routine practice, so long as we can do so without displacing or causing movement between the broken fragments of the bone. The use of extension during the massage applied to the limb beyond renders this method much more feasible than it formerly was when we depended entirely on splints applied at the seat of fracture commanding the joints above and below. It is interesting to note in this connection that no fractures heal more kindly and quickly than broken ribs, in which it may truly be said that during the whole process of cure the act of breathing is keeping up a constant gentle movement, a nature's massage, which in no way interferes with the union of the broken bone.

In breaking down adhesions in old standing cases of fracture, sprain, or strain, one must act in a decided manner. Their presence is associated with limited movement, pain on movement, or pain on pressure, and the use of firmly applied rotatory massage, or the sudden stretching of the tissues which are matted together, often gives immediate and lasting relief.

In the case of nerve stretching in sciatica, the cases which are benefited are, in my opinion, those which may be called trade sciaticas, due to some special position adopted in the special trade

pressing on and irritating the sciatic nerve. You freely stretch the nerve, but do not interfere in any way with the sensory and motor functions, and the pain is relieved by breaking down the fibrous adhesions in the nerve sheath and among the nerve fibrils. May I say in passing that the operation is sometimes a source of psychical unrest to the operating surgeon if he does not easily find the nerve; this unrest is avoided if, in operating, the patient lying on his face, the surgeon will stand on the opposite side to the limb to be operated upon. If he then makes an incision over the nerve at the lower border of the gluteus maximus large enough to enable him to introduce his forefinger, which, using as a hook, he draws towards the middle line of the patient, he will at once find the nerve lying external to the muscles arising from the tuber ischii.

New lamps may have been expected of me to-day; if so, my hearers have been disappointed. "Let us make a stand on the ancient ways, and then look about us and discover what is the right and straight way, and so walk in it." Bacon was fond of quoting this passage, and it has been my motto. I have taken my stand on an ancient way; I have tried to polish and refill an old lamp.

James Hinton, another of my heroes, in one of his letters, writes: "Let me advise just once. I don't like an adviser much; but just this one thing—be reverent where you are ignorant, and attach no weight at all to your naturally feeling sure. We almost always feel sure wrongly—it is our own fate, it is our very being." The speaker to-day may be too sure, and may place too much reliance on rest as the most powerful therapeutic agent in surgical practice, but he can assure you that he has had Hinton's words constantly in his mind as he spoke, and what he has said is offered to this audience in the same spirit in which they were written by that philosophic surgeon. I began with a sentence from Hilton; I end with one from Hinton. These men had something in common. Hilton taught rest; Hinton sought it. In one of his last letters he writes these sad words: "I have tried for too much, and failed; but yet, perhaps, in that my failure God is giving me more than even I tried for. He has opened

my eyes, at least a little, though I am blind and foolish still, no doubt. I will try and be wiser and look more, and care more what others feel." Strange words from one who spent his whole life for the good of others.

At a time fertile in unrest in religion, politics, and surgery, in the county in which Gilbert White spent his days, in the county in which he wrote one of the most restful—I had almost said *the* most restful—book I know, rest as a thesis is perhaps not altogether out of place, especially when I remember that to many of us this meeting is our annual holiday, our resting stage, and still more especially when I remember that we are enjoying the generous hospitality of the inhabitants of one of the main resting-places in this country, where so many get that rest which enables them to go back to work with energies renewed and restored by the fresh air and restfulness of one of the most attractive rest resorts in Great Britain.

Selections.

The Influence of Diet on the Growth of Hair.—(By E. D. Mapother, M.D.)—Several cases of shedding of hair after influenza have confirmed my opinion that diet has much to do with the production and with the cure of symptomatic alopecia. Hair contains 5 per cent. of sulphur, and its ash 20 per cent. of silicon and 10 per cent. of iron and manganese. Solutions of beef, or, rather, of part of it, starchy mixtures, and even milk, which constitute the diet of patients with influenza and other fevers, cannot supply these elements, and atrophy at the root and falling of hair result. The colour and strength of hair in young mammals is not attained so long as milk is their sole food. As to drugs, iron has prompt influence. The foods which most abundantly contain the above-named elements are the various albuminoids and the oat, the ash of that grain yielding 22 per cent. of silicon. With care these foods are admissible in the course of febrile diseases, when albumen is the constituent suffering most by the increased metabolism. I have often found a dietary largely composed of oatmeal and brown

bread greatly promote the growth of hair, especially when the baldness was preceded by constipation and sluggish capillary circulation. Those races of men who consume most meat are the most hirsute. Again, it is well known in the Zoological Gardens that carnivorous mammals, birds, and serpents keep their hair, feathers, or cuticle in bad condition unless fed with whole animals and the egesta contain the cuticular appendages of their prey in a digested or partly digested state. It is also an old well proven fact that a closely restricted diet, cheese for example, soon produces in dogs a loss of hair. In treating fevers, a long course of non-nitrogenous diet may promote seborrhœa, which is so often a concomitant of the alopecia. When the special nutritive supply is secure, the depressed condition of the vasomotor and trophic nerves proceeding from the cervical ganglia to the scalp may be stimulated by blisters and liniments at the back of the neck. I have always found that friction of the scalp with pomades and lotions dislodges many hairs which might otherwise remain, and that cold or tepid baths with salt added and rough rubbing of the rest of the body will flush the capillaries of the affected part more effectually. Besides, when pomades are used, frequent washing becomes necessary, and this is conducive to baldness.—*Brit. Med. Journal.*

Recent Deaths under Chloroform.—In the course of some remarks made during the holding of a coroner's inquest, attention was drawn to what appeared to be a large number of deaths attributable to chloroform occurring at one institution during the present year. The institution is the Manchester Royal Infirmary, and the number of reputed deaths from chloroform since January last is five. We have, through the courtesy of a correspondent, been placed in possession of facts which show that the mortality stated cannot in justice be attributed directly to the administration of chloroform. Two cases out of the five are put down as being due to chloroform "pure and simple"; but beyond the remark that the persons "were bad subjects for the anæsthetic," no particulars are given. In the case of two other fatalities the particulars are given as

follows. In both instances they were emergency operations, and the patients had food in their stomachs—the vomiting of which and its being drawn back into the air passages were the determining causes of death. In Case 1 the patient suffered from a strangulated hernia with stercoraceous vomiting. As we are informed, "tracheotomy and herniotomy" were performed. It would appear that the vomit entered the trachea, and that this was the actual cause of the death, which took place upon the operating table. In the second case the patient, a railway shunter, was, whilst engaged in his duties, so injured that amputation through the forearm was rendered necessary. Recurrent hæmorrhage obliged the performance of reamputation, and while under the chloroform the patient vomited, and a portion of the vomit (the pulp of an orange) entered the windpipe, and necessitated tracheotomy and removal from the trachea of masses of pulp. The patient, however, survived this, and was able to converse with his friends, dying suddenly from syncope some few hours subsequently. In the fifth case the patient was a girl aged 14, upon whom osteotomy was to be performed. She had successfully undergone the operation for straightening one leg. The chloroform was administered by a skilful person, and, the osteotomy being completed, the patient was resuming consciousness. The dangerous symptoms were observed to occur just at the time that the knee, left stiff after the preceding operation, was being forcibly moved. The symptoms, we are informed, resembled those of severe shock. An additional point connected with these deaths is that a preparation of that substance now in common use—the Warrington chloroform—was employed, and some comment was made upon the fact that that preparation was under trial at the infirmary. The above narrative, and the evidence of chemical experts, proved beyond cavil that no blame could be imputed to the particular chloroform used. Another death in London is also reported in the practice of a surgeon of large experience, and while an expert was administering chloroform. The patient, a lady aged 25, was to be operated upon, and chloroform was selected as the anæsthetic; but the report before us does not state the particular reason for this choice.

The patient is said to have fainted during the administration, and, although measures were promptly adopted to restore animation, they proved futile, and death resulted, according to the lady's personal medical attendant, from cardiac syncope. To whatever cause it may be attributed, it would seem that the mortality under this anæsthetic is increasing, in spite of the fact that, as a rule, students have more careful instruction in the administration of anæsthetics than they formerly received.—*Lancet.*

The Prophylaxis of Diphtheria.—One of the results of recent bacteriological researches is the tenacity of life which the Klebs-Lœffler bacillus presents. Roux and Yersin have kept for six months a culture in broth in a tube tightly sealed; this, when sown anew, gave strong colonies, and proved to be very virulent in the guinea-pig and hare. Clinical experience has confirmed the experience of the laboratory.

In diphtheria the substratum of the contagion is solid; the virus resides in the false membrane. If the liquids of the mouth are vehicles of the poison, it is through the fragments of false membrane which they contain. This contagion, deposited on cradles, furniture, the walls of the room, tapestry, has been known to be active after months and even years. Cadet de Gassicourt gives instances where the disease was contracted in a virulent form by sojourn in a room where months before a child had died of diphtheria. Darolles gives a "history of a cradle," which is instructive in this respect. In the course of an epidemic in the country, an infant died in a wicker-cradle of diphtheria. Darolles urged the parents to destroy the cradle, but they refused. Eighteen months afterwards another infant contracted diphtheria in the same place at a time when the disease was unknown in the village and died. Two years afterwards, a third infant contracted diphtheria in the same cradle and got well. The parents consented to destroy the cradle, and there were no more cases of diphtheria in that family. Sevestre, in his *Études de Clinique Infantile*, gives examples of the same sort. The contagion is exceedingly prone to cling to clothing, and the

disease has in many instances been traced to this source. In one case, a scarf worn around the neck of a child that had died of diphtheria seems to have been the means of communicating the infection to a sister of the deceased.

Fortunately, the contagion is of a heavy nature, and is but little diffusible ; the disease may attack a family and spare the neighbouring families, and thorough disinfection seems markedly to limit its spread. There is some evidence that the disease has been communicated by fowls sick with a kindred affection, and that it has been conveyed in milk sold from dairies attached to houses where there are cases of diphtheria.

In the prophylaxis of this disease, the first requisite is thorough isolation of the patient. The same isolation should, as far as possible, be made to extend to other members of the family. Physicians attending the sick child should scrupulously disinfect their persons and their clothing. All clothing that has been worn by the patient should be subjected to prolonged boiling, or to a dry heat of 240°F., before being again used. Thorough antisepsis of the sick-room should be practised, by sublimate washings and by burning sulphur. Children that have become convalescent should be disinfected by baths of weak sublimate water. There should be suppression of suspected milk, and an inquiry into all other possible sources of contagion, with a view to removing them. Maurice Nicolle makes a good hint in reference to physicians attending diphtheritic patients; they should put on a blouse before entering the sick-room, and remove it on leaving. Dr. Wm. H. Welch commends the prophylactic value, in persons liable to exposure to diphtheria, of cleanliness of the teeth and mouth, and of the frequent use of weak antiseptic mouth washes, nasal douches, and gargles. Lœffler recommends for this purpose aromatic waters, weak sublimate solutions (1 to 10,000), chlorine-water (1 to 1000), and thymol (1 to 500 parts of 25 per cent. alcohol).—*Therapeutic Gazette.*

The Treatment of Diphtheria.—Dr. Guntz of Dresden has had great success in the treatment of diphtheria with bichromate of potassium in water containing carbonic acid,

which he has found by numerous experiments on animals, as well as in the course of extensive clinical observations, to be entirely harmless. For an adult 600 grammes (about a pint) are ordered per diem, in which are dissolved three centigrammes (about half a grain) of potassium bichromate. The whole quantity is directed to be taken in about half a dozen doses, regarding which it is important to observe that they must not be taken on an empty stomach; a little milk or gruel should, therefore, be swollowed before each dose. Children, of course, take smaller quantities, according to age. They can be given the medicine in a tumbler, mixed with some fruit syrup, and they do not generally object to it. At the commencement of the disease, Dr. Guntz washes the mouth out with a one per cent. solution of permanganate of potassium containing one per cent. of thymol, or with a corrosive sublimate solution of the strength of 1 in 3000, taking care, in the latter case, that none is swallowed, and that the mouth is well rinsed with water afterwards. In the case of young children, the pharynx must be brushed out with the solution. Sometimes iodoform is employed, being applied on the tip of the finger to the affected spots. Dr. Guntz specially remarks that potassium bichromate, though harmless in the way described, is by no means so when in pills, powders, or in solution in non-carbonated water.—*Lancet*, March 28, 1891.

The Management of Lithæmia.—At the meeting of the Post-Graduate Clinical Society, held March 28, 1891, Dr. Andrew H. Smith read a paper on the "Management of Lithæmia" (*Post-Graduate*, July, '91), in which he said that he did not think we could assume that there was such a thing as lithuria without lithæmia, although we may have lithæmia without lithuria, in the sense of a deposit of lithic acid or of lithates in the urine. Lithæmia might be a condition and not a disease. Thus, we might have an excess of lithic acid in the blood without any symptoms of disease accompanying it. and, if we considered this a morbid condition of the blood, it might come within the definition of a disease; but there are many people who constantly exhibit deposits of lithic acid or urates,

and yet they are in perfect health; and, again, the condition is frequently temporary and dependent upon exhaustion from severe muscular effort or upon a transient indigestion. If a disease, there should be associated with the cases of lithic acid in the blood some symptoms. It was probable that so long as the uric acid was freely eliminated it might be formed in considerable excess without disturbing the system; but if, for instance, there were an acidity of the blood brought about by an imperfect digestion or assimilation, it would be possible for the acid to be precipitated in any part of the body, thus giving rise to disturbance of function of those parts. Where lithic acid was deposited in the tissues in combination with bases, we had the symptoms familiar to us in gout.

As to the diagnosis, Dr. Smith said we were apt to find a symptom group made up about as follows: The patient, without being positively ill, did not feel well, and suffered either from mental hebetude or from irritability; or there might be insomnia, digestive disturbances, increased after eating; generally there was constipation, frequently hemorrhoids, and often certain affections of the skin, such as lichen or eczema. Such patients frequently complain of giddiness and of specks before the eyes; but irritability of temper was a very prominent symptom; neuralgic pains, and aching and weariness of the limbs, are common. There is usually a deposit in the urine, either brownish or pinkish, consisting of crystals of uric acid, stained by certain colouring matters in the urine, or of lithic acid in combination with sodium, ammonium, or magnesium. This deposit occurs when the urine cools, and redissolves on heating. It is not soluble in the acids, except sulphuric acid, but is readily soluble in alkalies; the urine is always acid, and it is this acidity which throws down the crystals of uric acid. From a clinical standpoint it was interesting to determine how far the uric acid was responsible for the symptoms which are associated with this condition. He thought we could hardly consider it settled whether the uric acid itself was the formation or the result. The determination of this question would probably involve the determination of whether uric acid was formed in excess, or whether, when in

normal quantity, it is deposited under certain abnormal conditions. For instance, if there were imperfect digestion and malassimilation, with consequent throwing into the blood of the products of fermentation, the acids produced might cause the deposition of the uric acid. It was certain that these symptoms were not uncommonly met with without any marked deposit of uric acid or lithates in the urine. However, if this condition be attacked by remedies upon the supposition that uric acid is the foundation of the trouble, the treatment is usually successful. Besides the formation of bile, the liver has the glycogenic function, and functions connected with retrograde metamorphosis, and probably the failure of lithic acid to be oxidized into urea is due in part to the defective action of the liver. This conclusion would seem to be a fair one from a clinical standpoint, for mercurials and also nitric acid have a peculiar action on the liver, and are peculiarly efficacious in lithæmia.

Clinically, this condition is presented to us, first, among people who do not take enough exercise in proportion to their eating; and, secondly, in a class of persons who are moderate eaters, but are of a highly nervous organization, and in this class the symptoms usually develop as the result of nervous strain, long-continued anxiety, or mental labour. The importance of bearing in mind these two classes is evident in the management of these cases. In the first class we would employ vigorous purgation, whereas in the second class the treatment would be rather of a tonic nature.

Management.—First, as to the matter of diet. As uric acid is a nitrogenous substance, we would naturally think that it would be sufficient to deprive the patient of nitrogenous material; but the habit of excreting such material still continues, even though it be withheld from the dietary. It is like a spendthrift, who cannot be cured by withholding money from him; he must be educated to better habits. Just as the spendthrift will pawn his clothes to get money, so the system will pawn the tissues, so to speak, to obtain nitrogen. Formerly, it was supposed to be essential to withhold nitrogenous food, but few insist upon this point now. The great point is to secure a diet which will be

readily assimilated, no matter what its composition; for any other diet will inevitably result in the production of various fermentative products, acids, etc., which will derange the metabolic processes more than would result from a little, more or less, of some one constituent in the food. If the food occasions the patient distress soon after its ingestion, it can be assumed that the trouble is in the digestion of the albuminous materials. On the contrary, if the disturbance occurs later,—in other words, if the indigestion be intestinal,—we may say in a general way that the difficulty is with the carbohydrates and the hydrocarbons—the starches, sugars, and fats. The diet should be regulated tentatively, and then the further management of the case will depend upon which of the two classes the case belongs to. If the patient be plethoric, saline purgatives are valuable. Sir Henry Thompson considers the sulphate of soda particularly valuable, and he bases this view upon the fact that it purges by exciting elimination from the glandular structures, rather than by increasing peristalsis or osmosis, as is the case with the other saline cathartics; and, in addition to this, it acts decidedly upon the liver. A course of purgations with salines, or with Friedrichshall, Hunyadi, or similar waters, is appropriate for the first few days. After this nitric acid should be administered for a week or two, and then a persistent course of alkalies should be given. Alkaline waters present the alkali in an agreeable form, and they insure the patient's taking a large quantity of fluid, which is necessary in these cases in order to secure a thorough action of the kidneys and bowels. In this country the most decidedly alkaline is the Saratoga Vichy. Waters containing lithia are especially valuable, for the reason that a smaller quantity of lithium will neutralize a given quantity of acid than almost any other alkali or alkaline earth; thus, seven grains of lithium will neutralize as much acid as twenty-three grains of sodium or forty grains of potassium. The three prominent lithia springs are the Buffalo Lithia, Farmville, and Londonderry, the latter being the strongest. The waters should be taken for a long time, and in sufficient quantity to keep the urine very feebly acid.

Where the nervous symptoms predominate largely over the digestive disturbances, active purgation is not desirable; the object of treatment should be to conserve the deteriorated forces, and in some cases it has even been suggested that the patients should be kept in bed. Appropriate tonics are indicated. Lithæmia being a condition of imperfect oxidation, it may be said that free exercise in the open air is a *sine qua non* of treatment. Neurasthenic patients, however, will need the open air without muscular exercise, and, therefore, carriage riding is appropriate.

One manifestation of lithæmia had come under the speaker's notice in which there were digestive disturbances, palpitation of the heart, and insomnia. This combination was most commonly found in the neurasthenic cases, and if their common origin is not recognized the patient is apt to be treated for each condition separately. The speaker referred to a severe case of this kind in which, after long symptomatic treatment, the patient was much worse and contemplated suicide. In that case the speaker employed lavage with the happiest results. The digestive disturbance was at the foundation of the difficulty, probably owing to fermentation in the intestinal canal. The cardiac palpitation arose from the same cause, and it was this that prevented sleep. With the relief of the dyspepsia all the symptoms quickly disappeared. In this class of cases, he believed lavage very useful, not only because of the local effect of the water upon the stomach, but the flushing of the stomach with large quantities of warm water provided for a very rapid absorption of this water and its speedy conveyance to the portal circulation. In some peculiarly obstinate cases it might be well to employ the iodide of potassium, and occasionally colchicum might be useful, but he would not give it in any case where there was irritability of the stomach, and it should be given cautiously. Any kind of treatment which will facilitate digestion will be beneficial in lithæmia,—any one of the recognized digestive agents may prove beneficial.

The Action of Common Salt on Pathogenic Organisms.—This question, which, apart from its more purely scientific aspect, has a very practical interest in its bearing on the extent to which the salting or "pickling" of pork and other provisions may be relied on for the destruction of the germs of disease, was taken up about a year ago by Dr. C. J. Freytag (*Zeitschr. f. Hygiene*, 1890), at the instance of Professor Förster. Dr. Fretag determined to carry out his investigation exhaustively, beginning with the pathogenic bacteria of diseases proper to domestic animals, but possibly communicable to man in the consumption of their flesh. He made use not only of pure cultures of the bacteria, but of the tissues of diseased animals—*e.g.*, the tubercular nodules found in the bodies of cattle suffering from "Perlsucht." To imitate the conditions presented by the process of pickling, he used so much salt that a portion always remained undissolved; in gelatin cultures this had the effect of liquefying the medium, when the bacteria and the undissolved particles of salt sank to the bottom of the tube, but with those in agar the colonies were simply covered by the finely-powdered salt. At regular intervals of time fresh sowings were made from the salted cultures, and animals, kept in clean and airy cages, were inoculated from each. He insists on the fact that for many years no case of natural tuberculosis had occurred among the guinea-pigs, and only a couple of cases, more than two years ago, among the rabbits kept in the laboratory for experimental purposes. The results in each disease were as follows:—

Anthrax.—The spores, raised on sliced potatoes, were, as Koch had already shown, in no way affected by continuous exposure to the action of concentrated solution of salt for six months. Not so the vegetative forms, which were invariably killed after two hours' steeping of the organs containing them in a concentrated solution. Although even a saturated solution failed to kill the spores, the limits under which their germination and further development were possible were prevented by 7 per cent. to 10 per cent. of salt in Löffler's bouillon.

Typhoid.—Koch-Ebert's bacilli, obtained from the spleen of

a man who had died from enteric fever, and grown on sliced potato and on Koch's gelatin, retained their vitality and power of development in fresh media after six months' exposure to a concentrated solution of salt.

Rothlauf, or pig scarlatina.—These bacilli, provided by Pasteur, remained unaffected after two months.

Cholera (Koch's comma-bacillus).—The growth of these was luxuriant, liquefying the entire mass of the gelatin; and the salt, when added in excess, was deposited. Sowings made from these tubes after four, six, twelve and twenty-four hours were all alike without result. Another series of experiments showed that eight hours' exposure to a saturated solution was invariably fatal to these bacilli, and that the highest concentration in which they could live was 7 per cent., but that 5 per cent. (not 2 per cent., as Uffelmann had asserted,) was required to check their growth in any perceptible degree.

Erysipelas.—No effect was produced on the cocci of this disease by an exposure to a saturated solution for two and a half months.

Staphylococci of pus resisted a like solution for five months.

Diphtheria.—The Klebs-Löffler bacillus in pure culture made from a virulent and fatal case were unaffected after three weeks in a saturated solution.

Tubercle.—Portions of the organs of a guinea-pig that had died of tubercular peritonitis, and the sputa of the same animal, were, after two or three weeks' exposure to a concentrated solution, inoculated into the abdomen of a healthy guinea-pig, which died of tuberculosis a month later. But lest this one might have been infected by the diffusion in the air of the room of the dried sputa of the other, Dr. Freytag made a fresh series of the experiments precluding such an accidental source of fallacy, and found that gelatin cultures of the bacillus were not injuriously affected by the action of concentrated solutions for three months.

Nodules of "Perlsucht," after eighteen days' immersion in brine, were used for the inoculation of rabbits with invariable success; in fact, three months' steeping, a far longer period

than is ever employed in pickling meat for human food, in no way lessened the infective power of the bacilli.

Galtier's experiments, which gave a different result, were made with the expressed juices, not with the organs or tissues themselves.

In conclusion, Dr. Freytag observes that though it might be urged that, the bacilli of anthrax being killed and the toxines assumed to be dissolved out into the brine, such flesh, if free from spores, might be eaten with safety, it would be in practice impossible to ascertain or to guarantee the absence of the spores. The question of tuberculosis is, however, of greater practical importance, on account of the frequency of the disease and the fact that much meat from animals suffering from it in different degrees finds its way into the market. Since boiling alone suffices to kill the bacilli—*i.e.*, provided the interior of the meat be raised to that temperature—the previous pickling, as suggested by the authorities at Lyons, is superfluous, and, indeed, by inducing a false security, would be worse than useless. These experiments possess a peculiar interest for a country where the pickling of meats constitutes an important industry.—*American Journal of Medical Sciences.*

On the Local Treatment of Strangulated Hernia by Ether.—In 1882, in the *Berliner klin. Woch.*, No. 30, Dr. Finkelstein gives, from his own practice, sixty-three cases of strangulated hernia. Of these five yielded to taxis. In fifty-eight he employed "local etherization," taxis having failed, and of these fifty-four proved successful. Of the four unsuccessful cases two underwent surgical operations and two died refusing operative treatment. Since then (*Berliner klin. Woch.*, May 18, 1891), he has had numerous successful cases reported from others and six in his own practice. As he remarks himself, the number of cases is sufficiently great, and the successful results speak plainly enough to give his method a status in the practice of medicine—or, at all events, a more extended trial. The method is simplicity itself. The patient is placed on his back, with the hips slightly

raised and legs flexed, and then every ten minutes or a quarter of an hour a tablespoonful of sulphuric ether is poured on the hernia-ring and tumor. The application of ether is carried on for, as a rule, from three-quarters to three hours (or even four hours) until the tense tumor relaxes and lessens a little. As soon as this occurs, and if the strangulated bowel does not reduce itself, several slight efforts are made to reduce it, and almost "always" it slips with a gurgle and amazing ease into the belly cavity. If the omentum alone be strangulated, the ether method is absolutely useless. As the ether causes an after feeling of heat and burning on the penis, labia, etc., Dr. Koch (America) protects these and other sensitive parts by previously smearing them with olive oil, and in addition covering them with pledgets of cotton wadding. The ether seems to act thus: Richter, Velpean and others, hold that strangulation may in some cases be caused by spasm of the abdominal orifice. In these cases the ether may act by relaxing the spasm and thus rendering the bowel movable. That may be so, our author remarks, but he himself lays most stress on the property ether has of producing intense cold by rapid evaporation. The intense cold condenses the gas in the bowel, and by so doing diminishes its calibre. Possibly, also, the cold stimulates the peripheric nerves in the bowel sheath, and excites it to natural peristaltic action, which is more likely to empty it of gas, fluid, and semifluid contents than the rude manipulations in taxis. Hence it follows the less the vitality of the bowel is impaired by taxis, the more successful will be the etherization process. The method certainly deserves a trial.—*Med. Chronicle*, July, 1891.

Atropine in Enuresis.—The following is a brief account of a trial with atropia in 12 chronic bed-wetters in the New York Infant Asylum, Mt. Vernon, N.Y.: Nine boys and three girls, the ages ranging from 4 to 10 years, were selected for treatment. It is a custom in the institution to put the children to bed at 6 o'clock and to take them up at 10 to urinate. Being desirous of testing the value of atropia, the habits of life were not changed. The plan of treatment was

that used by Dr. Wm. Perry Watson. A solution, consisting of 1 gr. sulphate atropia to 1 oz. distilled water; of this one drop was given for every year of age of the patient, at 4 and 7 p.m.; one-half of this quantity was given, however, in each case for the first few days; no unpleasant symptoms followed, and the full amount was given. Physiological symptoms were produced in three, but were unimportant. After six weeks slight improvement was noticed in four; at the end of the third month these four wet but once or twice a week. Seven were well at the end of the fifth month, rarely wetting. Treatment continued two months longer, when the dose was reduced one-half; this was given two months and stopped. It is nine months since treatment was stopped, and there has been no return of the trouble. The other five, which includes the girls, showed but slight improvement at the end of the fifth month of treatment, wetting nearly every night. During the next three months improvement was gradual, and at the end of the eighth month they wet not oftener than twice a week. During the tenth month there was only an occasional wetting. The dose was reduced one-half, and after one year of continuous treatment there was no wetting. The atropia was stopped, and there has been no return of the enuresis in six months. Eighteen months ago we had 12 chronic bed-wetters of the worst order; to-day they are well—the only medicine used was atropia, given as above.—*Archives Pediatrics.*

Indications for Intubation in Diphtheria.—Escherich (*Wiener Klin. Woch.; Jour. Gynæcol.*) says the value of the method cannot be judged of by the percentage of cures obtained by the exclusive application of intubation or tracheotomy. The method must individually be selected for every case, and according to eventualities changed for another. Intubation can cure diphtheritic dyspnœa in a similar manner to tracheotomy. It will not do away with tracheotomy, but only replace it in a few cases. The advantages of the method are the easy *technique*, the avoidance of narcosis and wound. Its dangers consist in decubitus, "schluck pneumonie,"

cough from difficulty in the expectoration, irritation of membranes and secretion, and relatively insufficient æration of the lungs. Therefore, if the lungs and bronchial tubes are already affected, if the patients are weak naturally or from prolonged illness, or if there is sepsis, tracheotomy must be performed. The best cases for intubation are primary diphtherias of the larynx, without sepsis or collapse. In these cases, also, tracheotomy must follow as soon as the disease becomes more severe and respiration insufficient. Intubation also can be applied provisionally in case of need.

Fistula of the Duct of Steno.—Fistula of the duct of Steno may result from a variety of causes, as wounds, abscesses, calculus, and sloughing of the cheek from salivation, and other destructive forms of ulceration. After a fistula is once established, it is exceedingly difficult to cure by any of the measures ordinarily recommended in surgical works. The difficulty arises from the fact that the precedent inflammation destroys the distinctive tissue-planes of the cheek, blending them together in a continuous bond of connective tissue, in consequence of which the saliva finds its way between the edges of any approximation ordinarily practiced for closing the opening. It is this unifying of the anatomical elements of the cheek which makes the difference in the treatment of recent wounds of the duct and fistula. In the former, a neat apposition of the edges of the cut, maintained by the necessary number of interrupted sutures and the ordinary dressings, secures union, as readily as in wounds in other parts of the body. For the treatment of this form of salivary fistula, the different works on surgery repeat, for the most part, the same methods. These methods consist in paring the sides of the fistula and bringing them together by sutures; by cutting out all the tissues of the cheek, around the fistulous orifice, by an instrument closely resembling a punch, and then closing the opening by stitches; by introducing a probe, armed with a silk thread, into the duct, one end of which is to be brought out through the mouth, and the other through the cheek; again, by inserting into the duct a

grooved probe, in order that the former may be slit up, and finally by plastic operations and by cauterization. I have seen and done most of these operations without any satisfactory result, and, after failure, have succeeded in effecting a cure by a method which, as far as I know, is new, and is as effective as it is simple. Everting the cheek with the thumb on the inside and the fingers on the outside, a curved needle armed with a silk thread is carried beneath and around the duct, a short distance posterior to where it opens into the mouth, both the entrance and the exit of the needle being on the mucous surface of the mouth, and not deep enough to reach the integument of the cheek. The needle is now detached from the thread, and the ends of the latter, after being tied together, are brought out of the corner of the mouth and secured to the outside of the face by a strip of adhesive plaster. As the thread ulcerates its way through the included tissues, the duct is separated from the cheek, causing the saliva to flow into the mouth, and is quickly followed by closure of the fistulous orifice on the cheek.—D. HAYES AGNEW, *University Medical Magazine*, July, 1891.

A Cheap Disinfectant.—At this season of the year, and during the summer and autumnal months, disinfectants should be kept ready at hand for needed use, but not in any measure to take the place of cleanliness. The nitrate of lead is the cheapest disinfectant known that fulfils its intent. It does not, however, prevent putrefaction. The chloride of lead is much more effective in all directions. It is made by dissolving a small teaspoonful of nitrate of lead in a pint of boiling water; then dissolve two full teaspoonfuls of common salt in eight quarts of water. When both are thoroughly dissolved, pour the two mixtures together, and when the sediment has settled you have two gallons of clear fluid, which is the saturated solution of the chloride of lead. A pound of nitrate will make several barrels of the liquid. The nitrate of lead costs from eighteen to twenty-five cents a pound at retail.—*Monthly Bulletin*, June, 1891.

Painful Sensations in Heart Disease.—Professor Nothnagel discusses this subject in a short paper, containing in a tabulated form the results of his investigations as recorded in his hospital case-books. He says that it is not uncommon to meet with patients complaining of painful and various unpleasant sensations in the region of the heart. If the thoracic organs are found healthy, these symptoms are usually looked upon as due to dry pleurisy, rheumatism, or intercostal neuralgia. Increased experience suggests the question, however, Why, if such is their nature, should these affections be limited to the left side, and not localized in the right half of the chest and back as well? A close relationship to the heart is indeed indicated. In some patients, markedly neurotic, subjective sensations are referred to the region of the heart, when this organ is perfectly normal. Professor Nothnagel tabulates 483 cases of valvular disease observed in six years. Here the frequency of cardiac pain differs very much with the valve affected. In disease of the aortic orifice it is much more frequent than in mitral affections, being met with most often in aortic regurgitation with stenosis of the same valve, most seldom in insufficieney of the mitral. Thus, in aortic insufficiency, painful sensations were recorded in 68 per cent. out of a total of 114 cases; in insufficiency and stenosis of the same valve in 68 per cent. On the other hand, only $7\frac{2}{3}$ per cent. of a total of 183 with regurgitation at the mitral valve had these sensations. It is interesting to observe that a combination of aortic and mitral leakage produced the symptoms in only 18 per cent. This result confirms those of other authors who have generally limited themselves to recording the so-called steno-cardial (anginose) attacks with pain usually radiating down the left arm. These statistics include, besides, less definite painful disturbances. Most authors mention the steno cardial attack only in aortic disease, and Germain Sée states they are limited to this form of valve affection. This Nothnagel confirms generally; but he gives a case, on account of the rarity of such attacks, where the lesion was a pronounced stenosis of the mitral orifice. Other forms of painful sensation complained of are sticking,

tearing, burning, boring pain in the præcordia, which is almost continuous. Sometimes the feeling is as if the heart would be plucked out. Or paroxysms of violent pain together with sudden and severe palpitation may occur. In both cases the pain may radiate into the left side or back. Still further, there may be a feeling of a foreign body in the left chest. It is noteworthy that objective alterations of sensation may frequently be present on the skin, and not only with steno-cardial attacks but likewise in the other forms. The skin over the præcordia may be more sensitive than that of the right side, or there may be a feeling of "pins and needles," and this may extend to the left side of the thorax and back, close to the vertebral column. Firm pressure against the intercostal spaces in the cardiac region produces tenderness there, or even actual pain, and this tenderness may often be observed in the whole region of the third to the seventh intercostal nerves.—(*Zeitsch. f. klin. Medicin*, vol. xix., part 3, 1891.)

The Treatment of Severe Vomiting of Pregnancy.—Dr. Amand Routh, after alluding to the difference between the vomiting *of* pregnancy and the vomiting *in* pregnancy, noted the anxiety occasioned by severe forms of this condition, and the advantage of having an easy and efficacious mode of treatment in itself free from risk. Although it was now generally held to be reflex, and due to some local irritation at or near the os uteri internum, great difference of opinion existed as to the exact pathology and to how it was produced. The author did not think the vomiting was often secondary to displacement or incarceration, and showed that it occurred where no malposition existed, and that, even when vomiting occurred with displacement, replacement did not cure it. The treatment by drugs, accessory measures, replacement, Copeman's dilatation, local applications of cocaine, counter-irritation, etc., was reviewed, and it was shown by several cases that painting the cervix and the end of its canal with iodine paint (equal parts of iodine, iodide of potassium, spirits of wine, and water) had, in the author's hands, never once failed in the last seven years,

at once to stop the sickness, which might, however, begin to return from the fifth to the fifteenth day, when it was almost certainly permanently arrested by a second application. A prompt use of this remedy in cases threatening to become urgent would prevent the occurrence of the so-called "uncontrollable" or pernicious vomiting, which differed only in degree, and not in kind, from the milder forms. Induction of abortion would still be required when the vomiting was due to the presence *in utero* of a foreign body, such as a dead fœtus or a hydatid or fleshy mole, but might otherwise, by this proposed remedy, be avoided.

Permanent Antiseptic Irrigation.—Dr. E. von Meyer recommends this method of treating septic wounds, which he has successfully practised in Czerny's clinic during the last two years. It consists in placing the affected part in the metal tub, and keeping up constant irrigation by means of an irrigator provided with a spiral coil of perforated metallic tubing which acts as a "sprinkler." The limb is lightly covered with gauze, and suspended in the tub by broad bandages attached to hooks at the sides. The bottom of the tub is sloping so that the fluid can flow off readily through an opening connecting with a tube, which terminates in a vessel placed under the bed. The cases in which this method has been employed comprise: (1) Cases of general sepsis arising from subfascial phlegmons and septic conditions after fractures. (*a*) Cases of progressive gangrenous phlegmons, of spontaneous origin or developed after compound fractures; (*b*) septic amputation stumps after intermediate amputations and rections.

(2) Extensive lacerated and contused wounds, with marked gangrene and sepsis of the soft parts.

On the ground of the results obtained in these cases, the author presents the following indications for the employment of permanent antiseptic irrigation:

(1) In all cases of fractures and luxations attended with suppuration, especially when the surrounding parts are phlegmonous and distinct signs of commencing sepsis are present.

(2) In all cases of deeply-seated progressive phlegmons in which gangrene is likely to occur.

(3) In all cases mentioned above in which resection or amputation has to be performed, owing to pronounced general septic infection, or for the treatment of septic amputation stumps.

(4) In severe contused wounds in which a conservative method of treatment is selected, as soon as the integrity of the soft parts is threatened by gangrene, and the danger of a general septic intoxication is present.

For irrigation a number of antiseptic fluids have been proposed, but the best, in the author's opinion, is a one per cent. solution of aluminium acetate. In cases of septic and phlegmonous wounds the author also makes a liberal use of iodoform, to which he assigns an important part in the disinfection of septic wounds. The gauze layer should be changed twice every day, the wound carefully inspected, and all gangrenous fragments of tissue removed, so that the antiseptic solution comes in contact with a clean surface, washes away all pus, and penetrates the tissues. The drainage tubes in the wound must be carefully watched, for they become easily plugged with fragments of necrotic tissue. Unless all these details are attended to, no success can be expected from permanent irrigation; for the fluid then flows over firmly adherent necrotic portions, beneath which abundant pus stagnates. Permanent irrigation should only be discontinued when all signs of sepsis have completely disappeared, and the wound appears perfectly cleansed.—*Deut. Zeit. für Chir.*

Influence of Bitter and Aromatic Substances on Gastric Secretion and on Digestion —The action of bitter and aromatic substances on gastric digestion has been a subject of much controversy, although their use in therapeutics has long been established. Some believe that bitters stimulate the stomach to greater secretion of albuminoids; but consider that any increase in the secretion of gastric juice resulting from their use is a pure supposition. Others, again, consider that bitters excite the function not only of the gastric glands, but also of the muscular walls of

the stomach. Prof. G. Marcone (*Riforma Medica*, June 8th, 1891) has endeavoured to settle the question on a sound physiological basis. He has studied the action of sixteen drugs belonging to the various groups of bitters, aromatics, and stimulants, and finds that all, without exception, cause increase of the secretion of gastric juice.

(1) Mixing the drug with food, prepared always in the same manner—(*a*) the period of digestion is shortened, (*b*) the quantity of gastric juice is increased, (*c*) the movements of the stomach are more active and more efficient, and (*d*) the gastric juice, increased in amount, retains its full digestive power.

(2) Introducing the drug into the empty stomach—(*a*) the quantity of gastric juice is increased, and (*b*) the juice retains undoubted digestive power. The above results were verified by control observations made with distilled water in place of drugs.

(3) In order to ascertain, if possible, whether the action above observed was of local or reflex origin, the vagi was divided in the neck previous to the introduction of the bitter substances. Under these circumstances (*a*) the contents of the stomach did not increase, and (*b*) notwithstanding an increase of acidity the digestive power of the juice was much diminished.

Marcone therefore concludes that the greater part of the effect of bitters is due to stimulation of the vagus endings in the stomach, whence by a reflex action are produced both the increased secretion and the increased peristalsis.—*Supplement British Medical Journal.*

The Gibbes-Shurley Treatment of Phthisis.—We may receive the advent of any new therapeutical system with a sceptical smile. There is certainly no branch of the healing art in which it is more easy to envelop so-called "research" with a pseudo-scientific glamour than therapeutics, to talk "physiology," which may be, and very probably is, all wrong, but which has an erudite sound, and deeply affects the ignorant by its appearance of learning, to fix up a theory with a little physiology which will fit in—and there is always

plenty to be dug up out of "Archives," "Annals," etc., which can be manipulated easily to suit either the one side or the other of an argument—to support it with a little research—often a few ill-conducted and worse-observed "experiments"—to throw in a few bibliographical references to show that you at least appear to respect the other great luminaries who have preceded you, and then write, write, write! and never to lose an opportunity of keeping your theory before the public—in print, at societies, everywhere. True, some people will think you an unmitigated nuisance, and will even scoff at your theories and your pretensions, but others who never read your theories will keep encountering your name, and that is fame now-a-days. But "theories" fail and "systems" are found wanting, and if the feeling of scepticism in modern therapeutics has been strengthened, we have largely those to thank who should have known better than to have encouraged this by their want of judgment.

When, therefore, we read of "the value of the inhalation of chlorine gas, and the use of iodine and chloride of gold and sodium hypodermically in the treatment of pulmonary consumption," we cannot but think of the goats' blood system, the sulphuretted hydrogen system, the tuberculin and cantharidinate of potash systems, and all the rest, and we may be excused if we do not exhibit any eagerness to accept any further "systems." The originators of this line of treatment, however, both being men "above reproach," we cannot afford to dismiss any work of theirs without paying it at least the compliment of examining it.

The authors have a theory, namely, that general tuberculosis and pulmonary phthisis differ considerably, the former being a general disease in which the anatomical lésions may be found in all organs of the body, the latter with anatomical lesions principally and primarily in the respiratory apparatus. The final course of tuberculosis depends upon a destructive metabolism in which toxalbumoses are formed. The tubercle bacillus may pervade the system, but cannot germinate unless it finds suitable pabulum, and this is caseous matter only.

Phthisis pulmonalis is located in the lungs, and is an inflammatory process, ending in permanent or destructive changes of

the tissues, accompanied by deleterious chemical substances. The authors have been working with the endeavour to find something which would combine with and neutralize these toxalbumoses and arrest the disease. Chlorine gas, iodine, ammonium iodide, potassium iodide, the double salt of chloride of gold and sodium, liquor potassæ, potassium permanganate, iron arseniate, the mercurial salts, etc., will do good service in this respect. Of these, chlorine gas, iodine, and the double salt of gold and sodium chloride chemically pure and in glycerine, are by far the most efficacious.

The chlorine gas is obtained from chlorinated lime by the addition of diluted hydrochloric acid (℥ss—℥vi of the former to ℥i—iii of the latter added slowly in a saucer and stirred). Before the gas is evolved the atmosphere should be well charged with a spray of saturated sodium chloride (about two ounces in a small compartment of 550 cubic feet). The patient should breathe through the nose and with the mouth closed, and the sittings should commence with two minutes, and be gradually increased to twenty to thirty minutes. One or two, and exceptionally three or four sittings, will be required daily.

In laryngeal and mild cases the chlorine water (U.S.P.), mixed with a saturated solution of salt ($\frac{1}{2}$, $\frac{3}{4}$, $\frac{1}{4}$) should be vaporized in from ℥ss to ℥ii at a sitting. In laryngeal phthisis even weaker solutions and more frequent sittings may be used with a face inhaler. These chlorine inhalations are said to prevent further caseation, and it is irrespirable unless diffused in vapour of chloride of sodium. Hypodermic injections are also made in the gluteal region, beginning with iodine, 1-12th grain daily, gradually increasing until $\frac{1}{2}$ to 1 grain is reached, then the gold and sodium may be injected daily, beginning with 1-30 to 1-20th grain, and gradually increasing to 1-5th to 1-3rd grain daily. It will be better to alternate the gold and iodine injections daily. The iodine must be discontinued if albumen appears in the urine. At first, loss of weight and increase of temperature, with excessive sweating, occur. The expectoration soon lessens and becomes watery. Asthma and anorexia may supervene, diarrhœa and dryness of the throat, and listlessness and quickening of the

pulse, when the patient is saturated. Then follows tonic reaction with disappearance of the symptoms, except anorexia. Vertigo and nausea may sometimes appear with large doses of the gold. Most patients do better on small doses. One constant feature in cases showing rapid improvement is the supervention of asthmatic symptoms. After two or three weeks these chemicals ought to be used alternately every day or every other day; finally once or twice a week. Iodine cannot be used alone for any length of time, but the gold and sodium can.

This is the method of application of twenty-seven cases of which complete details are given. A marked retrogression of the physical signs in the chest appears to be the rule, with a diminution or absolute disappearance of the tubercle bacilli from the sputum, and a return to comparative health of the patient. To take one case, a patient with harassing cough, chest pains, debility, night sweating, and the following physical signs, "dulness over the whole of the left side, bronchial respiration, bronchophony over upper right front and back, with a small cavity in the lower portion of the left infra-clavicular region, showing cavernous respiration with gargling râles and tubercle bacilli in his sputum, right side appeared emphysematous and the percussion resonance high-pitched over the right back, with moist crackling in the right and left inter-scapular region," improved finally so as to seem "perfectly well, seldom coughs, and has no expectoration," from which we are led to infer that the physical signs in the chest had actually cleared up and the process was arrested. When we read, as we constantly do in these recorded cases, that dulness, bronchial respiration, moist crackling, etc., have entirely or almost completely disappeared under these injections, we are forced to the conclusion that the treatment is as good, and presents as great possibilities at least, as the tuberculin treatment. We also find that the laryngeal signs of tuberculosis of that organ disappear more or less completely. If we do not meet with the expression "cured" in the authors' reports, we must attribute this caution to the authors' modesty. At the same time we must always guard against "improvements," for we know full well that under every new

system, and with every new drug, it is common to find "improvement" in the condition of the patients. But it is hard to explain the retrocession of well-marked physical signs so constantly without coming to the conclusion that the injections and inhalations must exercise some obscure but favourable influence upon the local process. The authors do not append any conclusions to make any review of their work, in the report as published by them, but leave their cases to the judgment of the reader; and taking the report as it stands, there certainly seems to be something favourable to be said for it, and at least as much as can be said for any other "system" of treatment yet devised for the "cure" of consumption. Being apparently free from the risks that attend the tuberculin experiments, it seems to us that the treatment may safely be recommended for trial. It must never be forgotten that so long as the patient's general condition keeps favourable, or improves, we may always look for cases of "cure" of laryngeal tuberculosis in a certain small proportion of cases under any treatment, or even without special treatment at all. —*Journal of Laryngology and Rhinology.*

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THE BRITISH MEDICAL ASSOCIATION MEETING.

The recent meeting of the British Medical Association, held in Bournemouth, was in every respect a marked success. The attendance was good. The general discussions were of more than ordinary interest. The discussion on the effects of alcohol, introduced by the veteran physician, Dr. Wilks, of Guy's Hospital, proved to be of more than ordinary interest. Dr. Wilks is a thorough believer in the great therapeutic power of alcohol in certain acute diseases, and from the vast fund of his experience he was able to bring forward many convincing proofs of its usefulness. Drs. Drysdale and Norman Kerr, and others, took part in the discussion. Another very important discussion was that on Anæsthetics. It was opened by Dr. Lauder Brunton, who gave a resumé of the work performed by the Hyderabad Commission. One of the ablest speeches on the subject was delivered by Mr. Teale, who travelled all the way from Leeds to take a part in the discussion and to advocate the great advantages possessed by ether over chloroform as a general anæsthetic. He certainly advanced what appeared to us the most convincing proofs of this. Chloroform dies hard in England, but there can be no doubt that die it must. It is unfortunate that one of the results of the Hyderabad Commission will be the prolongation of the struggle between the two anæsthetics.

In our columns will be found full abstracts of the admirable addresses on Surgery and Medicine.

CANADIAN MEDICAL ASSOCIATION.

The next meeting of the Canadian Medical Association, which will be held in Montreal on the 16th, 17th and 18th September, 1891, promises to be of more than usual interest. Many prominent members of the profession have promised to be present and contribute papers, and although the number is by no means complete, yet, from the following appended list, the scientific interest of the next meeting is well assured :—

The Address on Surgery—Dr. Praeger, Nanaimo, B.C.

The Address on Medicine: "Malaria, its Relations to and Influence over other Diseases"—Dr. Bray, Chatham, Ont.

Address on Therapeutics: "Water, Some of its Therapeutic Uses"—Dr. Spencer, Brandon, Man.

Dr. V. P. Gibney (New York)—"Early Diagnosis, the most important factor in the Treatment of Pott's Disease of the Spine."

Dr. John Ridlon (New York)—"Spondylitis."

Dr. John Price (Philadelphia)—"A Plea for Early Hysterectomy."

Dr. A. M. Phelps (New York)—"The Mechanical Treatment of Hip-joint Disease."

Dr. A. B. Macallum (Toronto)—"The Pathology of Anæmia."

Dr. F. Buller (Montreal)—"Functional Abnormalities of the Ocular Muscles." This paper is expected to be discussed by Drs. Stevens, Roosa and Webster (New York).

Dr. Mullin (Hamilton, Ont.)—"Some Notes on Cases of Post-partum Hæmorrhage."

Dr. Cotton (Cowansville, Que.)—"Appendicitis."

Dr. Slack (Farnham, Que.)—"Surgical Cases occurring in Country Practice."

Dr. Small (Ottawa)—"Malignant Disease of the Cervix Complicating Labour."

Dr. W. S. Muir (Truro, N.S.)—"Graves' Disease."

Dr. Geo. Fenwick (Montreal)—"Calculous Pyelitis."

Dr. Shepherd (Montreal)—"Case of Strangulated Cæcal Hernia."

Dr. Buller (Montreal)—"Conservative Surgery of the Eye."

Dr. Jas. Bell (Montreal)—"The Local Treatment of Tuberculosis of the Bladder through a Suprapubic Incision."

Dr. R. F. Ruttan (Montreal)—"Lead and Drinking Water."

J. W. Stirling, M.B. (Edin.), &c., Montreal—Case: "Cerebral Abscess following Mastoiditis; Operation and Recovery."

Dr. J. Bradford McConnell (Montreal)—Case of Suppurative Hepatitis with Jaundice from Obstruction of the Common Duct by impacted Gall-stones.

Papers have also been promised by Drs. T. Johnson-Alloway, Major, G. E. Armstrong, H. Lafleur and L. Smith (Montreal).

An entirely new, and doubtless to many, an interesting, feature of this year's meeting will be the devoting of an hour and a half each day to visiting the city hospitals. These hospitals are—Hotel Dieu, Montreal General, and Notre Dame. Members of the staff attached to these institutions have kindly undertaken to exhibit cases and present other matters of interest in connection with hospital work.

The delegates and visiting members will be tendered a dinner by the profession of Montreal, to be held in the Windsor Hotel, and arrangements are being made for an excursion should time and weather permit.

A CANADIAN MEDICAL TEMPERANCE ASSOCIATION.

It has been decided to organize a Canadian Medical Temperance Association during the month of September, while the Canadian Medical Association is holding its annual meeting in Montreal, probably the second day of the latter meeting. This Association will have no organic connection with the general Medical Association. Its objects will be to advance the practice of total abstinence in and through the medical profession, and to promote investigation as to the action of alcohol in health and disease. The liberty of members in prescribing alcohol will be entirely uncontrolled. It is hoped that all medical men who would be willing to join such an association will send at once their name and address to Dr. Evans, Montreal General Hospital, whether they are able to be present at the opening meeting or not. Similar associations already exist in the United States and Great Britain.

—At a special meeting of the Medical Board of the Montreal General Hospital, held on the 19th ult., the following resolutions were passed :—

" That this Board records with profound sorrow the death of one of its members, Dr. Richard L. MacDonnell, and in doing so, wishes to express its deep sense of the worth and many good

qualities of their late friend and colleague, and to bear witness that this Hospital was never served by a more zealous, more conscientious, and more painstaking medical officer. His interest in his work went far beyond that of the perfunctory attendant, and showed itself in the ungrudging way in which his time was freely given both in professional attendance on the sick and also in careful attention to the hygienic condition of the Hospital and its residents. Dr. MacDonnell was both respected and beloved by the students of this Hospital, and to him the new training school for nurses owes much of its success. The members of the Board have lost an esteemed and honored *confrère*, and the Hospital a worthy officer, at an age when his useful and honorable career was only fairly entered upon.

"That the above resolution be sent, with the deepest sympathy of the Board, to the relatives of Dr. MacDonnell."

"That this Board desires to place on record its great sorrow at the unexpected death of Dr. T. A. Rodger, one of the assistant surgeons of the Hospital. Of him, indeed, as truly as of any soldier on the field of battle, it may be said, he died in the performance of his duty. The sound knowledge and the surgical skill of Dr. Rodger made him a highly valued officer, whilst his many social qualities gave him a high place in the affections of all.

"That the respectful sympathy of this Board be hereby tendered to the family of Dr. Rodger."

Obituary.

DR. THOMAS A. RODGER.

With renewed regret we are called upon to chronicle the death of another of our *confrères*, Dr. Thomas Anderson Rodger, well-known throughout the length and breadth of this Dominion. Dr. Rodger, in May last, contracted erysipelas through a trifling abrasion whilst attending cases in the Montreal General Hospital, of which he was one of the Assistant Surgeons. A most severe phlegmon of the neck and cheek developed in consequence, and from the latter, spite of the most assiduous care of his medical friends, came a slow pyæmia with suppurating joints, and finally pneumonia. Under this formidable malady the doctor, a very powerful man, sank and died on the 6th ultimo —a victim who perished prematurely in the performance of his duty.

Dr. Rodger was born at Beith, Scotland, in 1847, and came to Canada at 9 years of age. When quite young he was employed as clerk by Mr. J. A. Harte, the chemist and druggist, and thus acquired a desire to enter upon the study of medicine. He subsequently matriculated at McGill and graduated with much success in 1869. He was then appointed Resident Medical Officer of the Montreal General Hospital, his seniors in that position at the time being Dr. Geo. Ross and Dr. T. G. Roddick. After serving two years he established himself in Montreal, his first location being Point St. Charles, just then beginning to become populous. He soon acquired a very large practice in this busy suburb, and was looked upon as an uncommonly skilful surgeon and accoucheur. Upon the death of Dr. Scott, about seven years ago, the choice of the G. T. R. most naturally fell upon Dr. Rodger, who thus became the chief medical officer of this great corporation. Having thus close business and personal relations over the whole of Canada, Dr. Rodger was soon recognized as a fair, straight-minded, honorable man, and enjoyed a well-deserved popularity. He occupied many posts of honor and distinction in the profession; he was one of the assistant surgeons of the M. G. H., one of the representative fellows of

the University, was past-president of the Medico-Chirurgical Society of Montreal, and a member of the Medical Board of the Province of Quebec. In the latter, his sterling integrity and honesty of purpose, combined with rare social qualities, made him respected and liked by all, both French and English.

To his personal friends, the removal of "Tom" is a grievous loss. Some men belong to a type, and there seems not much difficulty in replacing them: but there has been only one "Tom Rodger."

DR. R. T. GODFREY.

It is with deep regret that we have to record the death of Dr. R. T. Godfrey of this city, at the age of seventy-two years. Dr. Godfrey was for upwards of forty years one of the leading family physicians in Montreal. His kind and genial manner endeared him to many thousands, and few deaths among the profession in this city have caused a more widespread and keener regret. For many years he occupied the position of Surgeon to the Montreal General Hospital, and for some time he was Professor of Hygiene in McGill University. For upwards of two years he has been in failing health, and recently was compelled to give up all professional work.

Medical Items.

—D. Appleton & Co., of New York, announce a Practice of Medicine by Dr. Osler as in the press.

Dr. James Stewart has been appointed Physician to the Montreal General Hospital, *vice* Dr. R. L. MacDonnell, deceased.

—Dr. Hutchinson, of Point St. Charles, Montreal, has been appointed Assistant Surgeon to the Montreal General Hospital, *vice* Dr. T. A. Rodger, deceased.

—Dr. F. G. Finley has been appointed Assistant Physician to the Montreal General Hospital.

—We are pleased to hear of the success attending the first meeting of the Maritime Medical Association, which was held in St. John, N.B., on the 22nd and 23rd of July last. The following were appointed officers: President, Hon. Dr. Parker of Halifax; Vice-Presidents, Drs. Brown of Fredericton, Farrel of Halifax, and McLeod of Charlottetown; Treasurer, Dr. De Witt, Halifax; Secretary, Dr. Morrow, Halifax.

—The Congress of American Physicians and Surgeons will meet in Washington on the 22nd, 23rd, 24th and 25th of the present month, under the presidency of Dr. S. Weir Mitchell. All physicians are invited to attend the meetings of the Congress. A large number of distinguished members of the profession from the other side of the Atlantic have accepted invitations to be present, among the number being Drs. Gairdner (Glasgow) and Ord of London, Krause of Berlin, Curschmann of Leipzig, Bryant, Durham, Harrison, and Sir William MacCormac. Other eminent London surgeons will also be present.