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SCARLET FEVER: SOME OBSERVATIONS UPON THREE  
HUNDRED AND TWENTY-FIVE CASES.

BY

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*Mr. President and Gentlemen,—*

I need scarcely say how much honoured I feel in being asked to deliver to you the Address in Medicine, because to do so generally falls to someone more advanced than I in the profession; but in view of your extending to me the courtesy, the least I can do is to reduce to the briefest my apologies and explanations, and proceed at once to justify you, and myself. I have chosen a subject that is thoroughly well known, and I cannot hope to add anything material to it, yet the observation of a goodly number of cases must carry with it some knowledge that is usefully transmissible. Unfortunately for me, Dr. John H. McCollom, of Boston, overshadows us all in the matter of scarlet fever, and it is a species of impertinence to produce three hundred cases within a radius of a few hundred miles of his five thousand, but it is a kind of assumption that he will be the first to forgive.

These cases form the first series in the wards of the Alexandra Hospital for Infectious Diseases, Montreal, and are taken exactly as they come. They represent no special epidemic, although the winter of 1907-1908 is considered to have suffered a more than usual prevalence of the disease. I have heard it said that there is a regular recurrence curve of scarlet fever, and that 1908 is a "scarlet year," but I have not been able to find anything definite upon this supposition. Females were more numerous than males in the percentage of 54 to 46, and the ages at which patients were attacked fall exactly into the average order, viz., that the fourth year of life has the most cases. The numbers of cases rose

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The Address in Medicine to the Maritime Medical Association, Halifax, July 2nd, 1908.

rapidly, as we had only three in the first year, and the liability declined rapidly after the ninth year; nearly 10 per cent. of all our cases were in children who were three years of age; the youngest was three months, and the oldest forty-two years; 58 per cent. of the cases were between the third and tenth years. In 325 cases we had 23 deaths, that is 7 per cent. This is a fair, even a good hospital death rate, but on its behalf I make no claims. The hospital series of Philadelphia and Boston give 9.72 and 9.23 respectively. Statistics of cities and countries at large are generally considerably higher, and of private practice among the better classes much lower.

#### THE MODE OF INFECTION.

It is a matter of popular knowledge that the first attack generally confers immunity: in this series there are but two cases of a reputed second attack, one child having previously been treated for scarlet fever in an infectious hospital. In one case, if the symptoms may be trusted, a relapse occurred on the thirty-first day; the primary symptoms were complete and the disease was definitely determinable; with the relapse the rash reappeared typically, on the face, neck and body, deeper over the folds, there was vomiting, headache, a fever of 103, and desquamation after both attacks. A recurrence of the rash happened in four patients, in one of them twice. The onset after a few days of well marked symptoms in patients who had been admitted with ill-defined symptoms, occurred four times, and these cases I think must have been cases wrongly diagnosed, who contracted the disease after admission to the wards. I admit no blame to the staff, nor to myself, because in a doubtful case it is a grave responsibility to take if one says that a case is not scarlet fever and sends it home; like the archer whose grandsire drew a good bow at Hastings, a man can do but his best. Where our responsibility does come home, however, is in the matter of so-called "return cases"—that is, where children contract the disease from patients discharged from the hospital; there are ten cases (3 per cent.) in which we lie open to this charge—an unusually high percentage. One to two per cent. is the figure in many hospitals. It must be admitted in fairness, however, that oftentimes clothes are packed away after a perfunctory disinfection, to be opened when the child returns from the hospital, and it is notorious that in clothes folded away the infection can linger for a long time. Leaving this possible excuse aside, cases yet remain. The discharges from the ear or from the nose or mouth probably are liable to cause infections, because the cases are always kept till desquamation is quite complete. It is hard to understand that a discharge from the ear (with staphylococcus, for example),

that recurs but faintly at intervals, can be infective three months after the disease, but I am afraid that in our present knowledge, the safest procedure is to admit it, and be governed accordingly.

In view of return cases, we have gone very thoroughly into final disinfection of the patients from the time at which the hospital was opened; the fact remains—and I have heard the statement from practitioners also—that if a child be discharged at the completion of desquamation, and live intimately with other children without the lapse of an interval of a couple of weeks, some of those children are sure to contract scarlet fever. We embody this belief in a printed form which goes with every case discharged. To guarantee the disinfection is an absolute impossibility.

Of the onset of the disease the common symptoms are sore throat, headache and vomiting; of 210 cases in which history of the onset is obtainable I find sore throat in 170 (81 per cent.), headache in 113 (54 per cent.), nausea and vomiting, nearly always the latter in 112 (54 per cent.), and all three together in 53, or 25 per cent. Indefinite symptoms, such as malaise, are not often volunteered by children; malaise was noted in 9 per cent. of cases, chills in 3½ per cent., convulsions only twice, *i.e.*, less than 1 per cent; coryza, pains in the back, ears, eyes, abdomen, and in the glands of the neck were all occasionally noted.

I have said nothing of the infection of the conjunctiva, a symptom which is often observed, but which is quite untrustworthy as a sign of the disease; it has been observed in about 10 per cent. of the cases (28, to be exact), and occasionally there has actually been a purulent conjunctivitis, but this must be a complicating disease rather than a state dependent on the scarlet fever. Photophobia is a rare complaint.

The symptoms which one is in the habit of impressing upon students are the rash, the sore throat, the appearance of the tongue, and the glandular enlargement. The most important of these are the rash and the tongue; although the throat is a feature that is practically ever present, yet there are so many circumstances that interfere with the throat presenting a characteristic appearance that its real diagnostic assistance takes a place third to the two others. Of 218 cases in which I have notes of the date of appearance of the rash it was most often seen on the second day of the disease, the first symptom marking the first day of the malady. In 45 per cent. it was the second day, in 24 per cent. the first, in 22 per cent. the third, in 5 per cent. the fourth, and rarely on the fifth and even the sixth day. In more than 92 per cent. of the cases, the rash appeared in the first 72 hours. The extent

and site of the rash is very variable, and the face is not generally affected; in my own series there is a definite rash noted on the face only thrice in 279 cases, a figure which is due to the deficiency of the notes, although my own idea is that the face escapes in a large majority of cases. The flushed cheeks are doubtless due to fever, but the forehead can usually be relied upon to show it if it be present. The neck is frequently affected, but I am afraid is also apt to escape mention in case reports.

The rash was noted as being on the body and limbs, oftenest the legs, in 64 per cent. of all the cases, and on the body alone in 8 per cent. When it lies over a fold of the body or a limb, it is apt to be intensified, and on the other hand, its total absence from the lips has given rise to the characteristic "circumoral" pallor, which is often very marked.

Six times the rash was hæmorrhagic and three of these died. A light rash is desirable rather than otherwise as indicating a slight attack of the disease, although very severe attacks are sometimes fatal before the rash shows. It may be said that the popular superstition of the "rash going in," or "striking in" is a fallacy, but it has this degree of reason with it. The rash depends upon the activity of the superficial circulation; when the heart is failing it is at times to be observed that the rash fades, so that the disappearance of the rash may be a prognostic sign of the gravest moment.

As to the diagnosis of the rash, I am not fitted to speak from my own experience, and I will not burden you with the dicta of others. We have had exact simulation of the scarlet fever rash by the ingestion of turpentine twice, and by the so-called toxic erythema, at least once; the erythema following diphtheria antitoxin has closely simulated it many times, and one is, perhaps, too prone to dismiss as antitoxic any rash that appears in a case where serum has been administered. Though I have not knowingly seen them myself, I may remind you that quinine, strychnine, corrosive sublimate and iodoform may be accountable in this way. One case has never been cleared up in my mind: it was either scarlet fever followed immediately by typhoid, or typhoid fever with a toxic eruption, in which the reddening of the throat was merely a pharyngitis. At any rate, the tongue was not definite, and he went through his course with a slight subsequent desquamation.

The sore throat, a kind of interior manifestation of the external erythema, may be in less severe cases a useful guide: the bright reddening of the pillars and of the tonsils is useful, but less so than the punctate reddening of the soft palate or even of the posterior part of the hard palate: and a routine examination of Canadian throats makes one a

little sceptical of the accuracy of the sign on the tonsils and pillars save in well marked cases. Dr. McCollom's experience has led him to lay great stress upon the punctate eruption of the palate.

Of 255 cases with notes on the appearance of the throat, one showed no change; 80 per cent. showed a diffuse reddening, often with the special peculiarity of the palate noted above, and 20 per cent. showed membrane or fibrin in addition: in six of these diphtheria was actually present, but it leaves 44 scarlatinal throats (17 per cent. of all the cases), in which membrane, not diphtheria, was present. I cannot say that there seemed to be much danger of confusing these cases with diphtheria; those whose sense of smell is very acute believe that they can distinguish diphtheria by the odour, but for my own part, the odour has very often led me to call for bacterial examination which has failed to establish the existence of diphtheria. Therefore, I cannot dogmatize in this matter.

The tongue is, perhaps, the most trustworthy of all the signs of scarlet fever. Strangely enough, no one can tell just what was originally meant by a "strawberry tongue." Authors are at variance upon the subject, for some describe the strawberry tongue as white, others as red; the commonest form is that in which there is a white coating on the dorsum, which contrasts strongly with the bright red edges and tip; standing out in the fur are the more than usually prominent papillæ which are yellow or yellowish red: this appearance may well be called the strawberry tongue from its resemblance to an *unripe* strawberry. Next to this, the most frequently found appearance is the bright red glazed tongue, without coating, with the prominent papillæ which is not unlike a ripe strawberry, or better, a raspberry. The main character that concerns us is that the papillæ on the tip and for the anterior half-inch or inch of the edges are markedly enlarged and prominent, and this characteristic is not readily or rapidly lost; so that in a doubtful case, after eruption has disappeared, this character may enable one to determine the nature of the disease. Of 235 cases with notes upon the tongue, I find two in which the tongue was unchanged; 165 (70 per cent.) showed the coated tongue, and 68 (29 per cent.) the red tongue, papillæ in both being enlarged and prominent.

The glandular enlargement seems to me to be a weak point for diagnosis; there is little difficulty in any case in determining the enlargement of the cervical and submaxillary glands; the lymph nodes throughout the body elsewhere, stand on a different footing and they are enlarged in the same sense in which they are in typhoid fever, that is, but slightly; to so small an extent, indeed, that I have never suc-

ceeded in persuading myself that the point is a very useful one. In 251 cases of this series, a general glandular enlargement was reported in 183 (73 per cent.); a partial enlargement, that is, the cervical groups, in 53 (21 per cent.), and it was stated that no enlargement was present in 15 (6 per cent.). I give these data for what they are worth, which I am afraid, is very little. The spleen has been palpated very rarely indeed; I find it noted in but two cases, and it is examined in every case.

It may be well to digress here, to say a word as to the responsibility of the physician in the recognition of scarlet fever; it must be recognized every time it is humanly possible to do so, not because the law says it, but for the patient's sake. I think my earliest medical recollection is of a girl, a relative of my own, falling over in a convulsion after a trifling attack of scarlet fever; the days in which her life hung in the balance are yet vividly in my mind. There lies the risk. Many times a difficult case appears in your practice; do not wait a minute longer than you can help in making up your mind; it is easy to say, "The symptoms are obscure to-day; the rash may be brighter to-morrow"; and to-morrow, if it is not so, to say, "I probably over-estimated the rash yesterday." Remember that you can but do your best, and this is so dangerous a disease that a few weeks of quarantine is a little thing compared with a short life, full of albumen and casts. If your mind is made up now, do not in the future let yourself reconsider the evidence; obstinacy of purpose in this thing is a virtue.

The course of the disease in 128 uncomplicated cases averaged seven days; this is not much shorter than the average duration of fever in all cases, complicated and otherwise, which was but 8.76 days in 298 cases; the uncomplicated cases averaged 50½ days until desquamation was complete, although this is calculated upon the basis that desquamation was completed two days before discharge, which is not very accurate, but the only means at my disposal.

The degree of fever, too, is a comparatively low one, as in the majority of cases it has its maximum below 103°. In only 6 per cent. of our series did it reach or surpass 105°, and it is a significant fact that of 17 cases in which the fever reached 105° or over, 10 died.

The maximum of fever was as follows:—

106° or over. . . . .	2 cases
105°—106° . . . . .	15 cases
104°—105° . . . . .	43 cases
103°—104° . . . . .	43 cases
102°—103° . . . . .	67 cases

101°—102° . . . . .	69 cases
100°—101° . . . . .	42 cases
99°—100° . . . . .	6 cases

The general rule in a hospital chart is that the admission fever is the maximum, and it gradually descends with morning remissions until the normal is reached. With this, however, we are not yet finished with the thermometer, for 78 cases showed a subsequent noteworthy fever. This was attributed 14 times to the ears, 13 times to the glands, 7 times to albuminuria, 4 times to exacerbation of the inflammation of the throat, thrice to the joints, and 10 times to evident inflammation elsewhere, but 27 times, or in more than one-third of all the cases, no adequate cause could be found. I feel sure that there is an inflammation somewhere to account for these, but one is often unable to find it. These figures do not take into consideration at all the cases in which the fever of the attack does not subside, but remains on account of the persistence of some complication after the rise of temperature due to scarlet fever might reasonably be supposed to be past. It is to be remarked here that one becomes accustomed to finding a very inconsiderable glandular swelling, apparently the only cause for a considerable rise of temperature; on the one hand the fever of children is easily excited, and on the other, it may be that the palpable gland is the only outward manifestation of a much greater lymphoid reaction than we expect.

#### COMPLICATING DISEASES.

Favouring the belief in a personal devil, one child of three and a half years came in with diphtheria, caught scarlet fever, had chicken-pox, got œdema of the glottis, was intubated a number of times, coughed up the tube one night, it rolled under the bed and could not be found; it was supposed she had swallowed it, tracheotomy saved her life; she developed bilateral otitis and mastoiditis, had her mastoids trephined, and finally departed on the 116th day cured, but disconsolately wailing. The hospital staff bore the separation well.

*Diphtheria.*—Nineteen cases had diphtheria with scarlet fever, of whom four died; of the nineteen I can be certain only with regard to two that they contracted the disease in the hospital, and for our peace of mind these recovered.

*Measles.*—Measles complicated the disease but twice in the series, breaking out on the eighth and twelfth days, when the scarlet fever rash had disappeared.

*Erysipelas.*—Occurred thrice in the series, but there was no suspicion in any case that it was a hospital cross-infection.

It is timely here to refer to the question of hospital "cross infections"; the above cases include all in my series in which the staff could carry the disease from one ward to another, as we admit in the Alexandra Hospital only the four diseases, and the erysipelas ward is small and often closed. While these cases are few in number, I am well aware that the greatest danger is not of other diseases being carried to the scarlet fever wards, but of scarlet fever being carried to the other wards. Of the occurrence of this I have no figures, but it has not at any time become a serious defect. The only persons who are exposed to the possibility of carrying infection from ward to ward are the medical superintendent, and the day and night superintendents of the nurses; they wear caps and long gowns which cover them completely, and wash the hands and face on leaving the ward, putting on a fresh gown and cap every time they enter the ward. For a time we adopted the wearing of an overshoe in the scarlet fever ward, but this is not at present observed.

*Chicken-pox.*—We had a small epidemic of seven cases of chicken-pox, which necessitated a rapid removal from and sterilization of the ward concerned.

Other complicating diseases were tuberculosis (2), typhoid fever (1), and cerebral tumour (1). Again, 6 cases were suffering from burns of the skin, 5 had had recent operations, and 3 had been vaccinated, a total of 14 which came under the heading, not of surgical scarlet fever, but of "scarlet fever in the wounded," as it is termed.

*Complications.*—The most important of these is nephritis, the most common otitis media and adenitis; tracheitis, alone or combined with bronchitis is common, but frequently of so slight importance as to be negligible.

*Otitis media.*—Including cases of all degrees of severity we have had 83, a percentage of 25½. Of these, however, no discharge occurred in 26, leaving an actual occurrence of 57 suppurative cases (17½ per cent.). These cases appear to group themselves, so that at times it would seem as if a ward were "all ears." It is generally communicated directly from the mouth cavity by the Eustachian tubes, though occasionally it may be a blood infection. Is there any way by which the prevalence of this infection can be lessened? We have most strenuously sought to keep the naso-pharynx clean by many different means, including sprays, gargles and irrigations. "Irrigation of the nose," says McCollom, referring to young children, "on account of the danger of causing middle ear disease, cannot be too strongly deprecated." If an irrigation can be used at all, the mouth and nose are not closed, and in

the absence of any heightened intra-buccal pressure, the tube, if closed, will protect itself. Young children, however, cannot be got to understand the process as a rule; they struggle and gasp, and whenever the act of swallowing is induced, the Eustachian tube opens. At such a moment there is, of course, danger that the solution may carry infection into the tube. Nevertheless, wherever there is a good chance of the proper behaviour being learned by the child it ought to be carried out. The form of medication used matters scarcely at all, for the water and its mechanical effect is the principal thing. In view of the amount of mucous often present, salt solution is useful.

Of the subsequent results as to the hearing of these 57 cases I know nothing.

Our routine in the wards is to examine the ears very frequently by means of the speculum; it is surprising how often the eye of one who is not a specialist fails to receive warning of an impending perforation. The onset of otitis may be very variable; the danger exists from the outset.

The time at which the otitis began in 67 of these cases is to hand; 24 times it was in the first week, twenty times in the second, and from the third to the seventh week, the figures were 6, 7, 4, 3 and 2 respectively; one case occurred on the 100th day. Of the 24 cases in the first week, they are very evenly divided among the seven days; 3 cases seemed to happen with the very onset of the disease, and are counted as on the first day. These figures give a greater liability in the first week of the disease than any of the series I have seen published.

Of the 83 cases, both ears were affected in 25, the right alone in 30, the left alone in 28.

*Adenitis*.—Adenitis, as a complication, refers to those inflammations of the cervical and submaxillary glands which occur either after the acute throat symptoms have subsided, or which persist after the time that the angina might reasonably be expected to subside. As would be expected, the appearance of a swollen node is not necessarily attended with an exacerbation of the inflammation in the throat; the glands become large, generally firm, smooth, and tender. Those at the angle of the jaw are the most often affected.

Our series shows 69 cases (21 per cent.), of which I can find but three which required incision and drainage. My memory would have inclined me to say more than three, but such at least is the statement of the figures; the glandular inflammation is practically always accompanied by fever.

*Rhinitis*.—This is a very troublesome accompaniment of many cases,

and it is noticed in this series 33 times, *i.e.*, about 10 per cent. In the cases in which it is severe, the secretion is free and purulent, and the result is excoriation of the nostril-edge and often a kind of impetigo on the upper lip and the adjoining parts, as well as infection of the nail edges of the fingers.

*Tonsillitis*.—It happens often that, after the throat has begun to get better, and the attack to disappear, an exacerbation of the infection occurs, which may partake of many of the characters of tonsillitis or which may be merely pharyngitis. I have seven such cases, to which I add eight others that I have called stomatitis. This infection of the entire mouth is one of the most dreadful complications of the disease; the throat becomes dirty, the tonsils ulcerated, muco-pus streams down from the nasal vault, the lips are eroded and fissured, the mouth can be but slightly opened on account of the lips, which bleed, and may be herpetic or impetiginous as well; the tongue is coated, the breath foul, and, in my experience Klebs-Loeffler bacilli are not present. Five minutes after washing the mouth, the child is once more drooling thin bloody slime from the half shut lips. The systemic disturbance is great and the toxic state of the patient extreme. One of these cases became a real noma in its clinical features; and yet another made a tragic end by erosion of the tonsillar artery. This unusual accident occurred in a boy of six years, on the 20th day after the onset of scarlet fever; the attack had really appeared to pass off, but about the end of the second week, secondary infection of the mouth and throat appeared, grew bad, then better. The day before death, and the third day before, cultures failed to find diphtheria bacilli; the child was apparently getting well, when hæmorrhage began from the nose and mouth; death occurred in about two minutes, without much external bleeding. At autopsy the stomach was full of blood, and the cause was determined as above. What bacterial examinations we have made generally show streptococci among other forms, and in all the severe cases, I have tried antistreptococcus serum; I am afraid I have not given it a fair trial, because too often it is not administered till the case is desperate, or at least well advanced. Peritonsillar abscess occurred once.

*Tracheitis* occurs frequently, no doubt often allied with a slight degree of bronchitis; it will be evidenced by cough and expectoration; as an exception, thoracic examination may disclose crepitations. Seventy-eight cases (24 per cent.) fall in this category. Aphonia occurred thrice, once after diphtheria, and twice in neurotic girls.

*Pneumonia*.—Four cases showed this, one of them having appeared to catch scarlet fever while suffering an attack of lobar pneumonia; though

very ill, he recovered; the three others, in which broncho-pneumonia was a true complication, died. Pleurisy was found twice, both times without effusion, and empyema, though at times suspected, has never eventuated.

*Alimentary tract.*—Vomiting is noted as a frequent sign of onset, but it was further noted during the course to an extent sufficient to deserve comment in 35 cases (10 per cent.). In the severely toxic cases, it is a most intractable symptom.

The bowels in general suffer little from this disease; the rule is constipation, but I think this is due to the confinement to bed; it has been my own rule to treat the bowels as one would in a case where no other disease existed; purgatives can be freely administered, if it is thought necessary. As exception to the above statement a bad attack of scarlet fever in the very young is sure to be attended by an enterocolitis, with green stools, frequently with mucus and occasionally with blood; bowel irrigation is suitable for its treatment. 36 cases (11 per cent.) occurred in this series.

*The Nervous System.*—Convulsions have been present in but two cases; delirium in but twelve; doubtless slight degrees of mental wandering at night are not reported, but it certainly is not very marked, even in moderately severe cases.

*Meningitis.*—This happened but once, although one other case gave the symptoms pretty completely. Recovery was so rapid that we were probably dealing with the condition aptly called "toxic meningism," so well seen at times in typhoid fever. The undoubted case lived three weeks, under daily lumbar punctures; on the 15th day there were several convulsions, and I blame myself that I did not urge a decompressive operation, as when the final convulsions occurred on the 21st day the only notable feature remaining was the hydrocephalus.

*Cardio-vascular system.*—The effect of scarlet fever toxin or of the toxins of the secondary infection upon the heart is of considerable importance; endocarditis as a direct result of the secondary infections is reported to be fairly common, but I cannot say that I have been certain of it more than once; myocardial degeneration, as evidenced by dilatation and irregularity of the pulse, is, in my experience, far more frequent. Some degree of a noticeable murmur has been noted in 32 cases at entry; these I shall not deal with, and I have no doubt they were not, as a general thing, indicative of organic change. But 12 cases gave undoubted evidence of a dilatation during the course of the disease, and in 11 other cases irregularity of the pulse was noted, but without any apparent enlargement; 6 other cases gave very definitely

the signs of a sudden partial collapse, 3 with marked cyanosis. To sum up, there was in nearly 9 per cent. of all cases, some evidence of disturbance of cardiac mechanism, which, as far as I can recollect, appeared to be the cause of death in two or three, and disappeared totally in the others. I am not able to state how far a secondary infection was responsible for these, but I suspect quite largely. Osler states that the myocardial changes are less common than the endocardial ones; it seems fair enough to estimate that the cases of dilatation, at least, were connected with weakening of the muscle, but, of course, it must be allowed that the irregular pulse and the cyanosis may quite well be associated with some effect produced upon the nerves of the heart by the scarlatinal toxin. The treatment of the cardiac weakness and irregularity is of the usual kind; strychnine and whiskey are the agents most commonly used by us.

*Arthritis.*—This is an interesting complication, which happened in 17 of our cases (5.2 per cent.). Once a real acute rheumatism was present (a recurrence). The joint disturbance may be but slight and transitory but at other times the joints are swollen, red, painful and tender just as in rheumatism. It is likely that there is a secondary infection of the joints in these cases, but luckily few of them go to suppuration. Many joints tend to be involved at the same time; the order of frequency with us is knee, shoulder, wrist, ankles, elbows, fingers. The vertebral joints of the neck were affected twice, and of the back once. Fixation of the joints and cold applications are generally the only treatment required.

Among other complications, we have found orchitis, vaginitis (5), jaundice, herpes, purpura, eczema and in four cases, abscesses of different parts, often the fingers.

*Nephritis.*—From this most important of complications we have been very free, and upon this hangs my story—at least the part of it that is most important. Ordinarily, the urinary changes to be expected are a febrile albuminuria: McCollom states that in 1,000 cases but 28 per cent. were found free from albumen during the febrile stage—that is, what we call the “febrile albuminuria”; our own findings are at wide variance with this, and the urinary examinations have throughout this series been slavishly made: in 312 cases, only 56 (18 per cent.) showed albumen at any time, blood was found 39 times, and casts 21 times; these phenomena were spread over the urines of 76 patients, so that only 24 per cent. of our cases showed any departure at any time from the urinary normal. Routine examination, twice a week, is kept up till the patient is discharged, and during the febrile period the urine is examined daily or every second day. The presence

of blood, nearly always microscopic, was noted in however slight quantity, and only rarely over a number of days in succession; casts occurred generally in concert with albuminuria, twice as isolated instances, and five times in cases which died; this leaves but fourteen instances of their being found, generally in connection with albuminuria. Two of these were previous cases of nephritis, so we have the appearance of casts in a dozen instances as being due to scarlet fever. It will, however, be less confusing if I deal only with the albuminuria. First of all, no case died of nephritis, and 7 of the 56 observations were in patients who died, and two others were in cases who were chronic nephritis at entry, which leaves 47. In 32 of these, albuminuria was found on one, at most on two occasions; of two others I have neglected the particulars, but there are 13 cases left with what may be called nephritis, of which 5 cases lasted from three to ten days; of the remaining 8, 3 cleared up entirely before leaving the hospital; 2 others were slight in degree, but even without cutting out the last 5, we have at most 8 cases (2.5 per cent.) in which nephritis can be said to have happened as a result of scarlet fever. In 7 cases, a late occurrence of albuminuria was attended by a sudden rise in temperature to a considerable height. Four times a very considerable degree of puffiness of the face occurred without any albuminuria; one case, a small child, presented a remarkable recurring puffiness of the hands, which came on suddenly and disappeared quickly, reappeared and again disappeared; this was thought at the time to be a phenomenon related to angio-neurotic cedema.

We have no instance of a nephritic convulsion. Oliguria has been observed but rarely—22 times on various occasions. Let it be replied to this, that we have been exceptionally favoured with a light class of case; for our purposes, it does not matter. What I wish to come to is treatment.

I have found it an excellent working rule that every case is kept upon milk diet for three weeks from the day of onset, and in bed for the same length of time. This is quite irrespective of the severity of the case; I explain to adults in many cases, the reason, and we have no complaints upon this score. It is the ward rule, and since there are no exceptions, there are no objections. Milk diet, too, means milk diet; this includes only junket and whey and ice cream, when procurable; fruit juices are allowed.

My reasons for this are that the kidney is to be relieved of every possible strain; take the substances that are supposed to entail work upon the kidneys—urea, hippuric acid, phosphates, alloxuric bodies,

and so on; the end-products of nitrogenous metabolism are considered to be the most important irritants; meats, eggs, fruits of some kinds, and so on, contain one or the other; water, milk and sugars are almost the only things left to us; the carbohydrates, flour, meals, etc., do not contain much, but some; a milk gruel contains much more than does milk. Therefore, for my part, I keep to the ones of which I am sure; it may perfectly well be conceded that the risk in a slight case is almost nil, but it is the exceptional case of nephritis one is most anxious to prevent. The hardship to the patient is but slight, and it is no exaggeration to say that our youngsters on discharge are generally very fat. You have all probably at some time or other, echoed the remark, that "we all eat too much"; for once, be brave enough to put the cure into practice. If the reasons appear good to you, practice the method; if not, leave it alone. For my own part, at present, I fully believe in it, and without making any claim as to the results, there is in them nothing to make me desirous of change. The end of the second week is the time at which nephritis most often makes its appearance; it seems to me highly reasonable that at this time, more or less critical, the patient's chances are greatly bettered if he be in bed. During convalescence, too, as the patient's time is not valuable, we are hard-hearted enough to put them back to bed upon any alarm, a rise of temperature, or a threatening complication.

These two, *i.e.*, rest and milk diet, are the main points in our treatment. Cold applications are usually made to the neck in anginose and glandular inflammations of any severity; local applications of antiseptics to the throat internally and washings of the nasopharynx with Dobell's solution are used when the patients are sufficiently old or sufficiently tractable. The patients are encouraged to drink water as often and in as great quantity as they will, and it is with difficulty that this is carried out to a sufficient degree to be satisfactory to myself. Do not be misled by von Noorden's very sensible teachings with regard to water-restriction; the competent kidney fairly revels in water. With the onset of nephritic anuria we are dealing with a condition of affairs widely different.

For fever, and for the patient's comfort, sponges are in most frequent use and packs, cold or tepid. The observation that cold bathing tends to cause albuminuria in the healthy, and to increase it in the albuminuric, need not be taken into consideration. Nor am I accustomed to measure the good effects of sponges or packs by the effect upon the temperature; in fact, I regard the taking of temperature for the purpose of seeing the effect of a bath or a pack as a waste of time. Perhaps it comforts the nurse, but she has generally other distractions.

During desquamation we are not in the habit of using any inunction on the skin; probably its only efficacy is that it prevents a widespread diffusion of the particles of skin, which in a scarlet fever ward is of little consequence, in comparison with the saving of time and work and the increase of cleanliness.

A procedure that we followed at first, but have given up, is the administration of a prophylactic dose of anti-diphtheritic serum; this is the routine practice of the Boston City Hospital in the Infectious Department; we found the cost heavy in return for an advantage that was but doubtful. Of the 121 cases in which it was used, a serum rash was observed in 11, on an average on the tenth day.

It was an observation of much interest to me that this spring, by reason of the large number of patients in the department, we "over-worked" one of our two main wards. It had not been disinfected nor completely cleaned for several months; infection after infection of a secondary kind, sprang up, many of them very severe, and it finally was forced upon us that the ward was in all probability to blame, for it had, of necessity, good opportunities to acquire a thorough stock of pathogenic germs. With the moving, the run of infection certainly ceased.

Have I succeeded in making clear to you some of my convictions, let me call them, with regard to scarlet fever? The important things are these:—Make the diagnosis at the earliest possible moment. Look at the skin, all of it, with the patient completely stripped, if a child; look at the throat, especially the palate, and the tongue, especially the papillæ. If you have made the diagnosis, do not later, for a moment, even mentally go back upon it. Lay down the law as to treatment. If I seem to speak true things, lay down twenty-one days milk diet and twenty-one days bed. When you are tempted to weaken or recede from this position, just think how, when the patient dies of nephritis, they will say, "Dr. Blank was not very strict when he had the scarlet fever."

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## THE SURGICAL RIGHTS OF THE PUBLIC.

BY

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In accepting the courteous invitation to address your Association to-day, I realize deeply the compliment that you bestow not only upon myself, but upon the great number of American surgeons that are your

friends and neighbours. A political boundary divides your people from my people, but in our profession there is no dividing line, for the medical and surgical property of one people is, or ought to be, that of the other. The customs and the methods of education of the Canadian differ in minor details from those of my own countryman, but there are grievances, slight wrongs, and evil tendencies that crop up equally in both our peoples, and it is to call your attention to and to enlist your sympathy in some of these that I venture to express the results of observation extending over a period of twenty years.

While listening some time ago to an interesting address by Prof. Müller of Munich, on the German system of insurance of the labouring classes against sickness and death, I was impressed by the fact that the insurance was established not as a charity, but because the poor have the right to be protected against the various accidents and illnesses incident to our complex modern life. At that time it occurred to me that against unnecessary suffering, disease and death, the public, both rich and poor, has an equal right to be protected by means other than that of insurance. In other words, if modern surgery can lengthen life, can protect against malignancy, can nullify suffering better than can be accomplished by other therapeutic measures, the public has the right to know accurately when and to what extent this is possible.

It is not assumed for an instant that protection and alleviation in the case of many diseases cannot be obtained by means that are not surgical. We have merely to witness the results of vaccination, serum inoculation in diphtheria, and a host of similar remedies. As a matter of fact, it is interesting to note that the public has practically asserted its right to be protected against smallpox, diphtheria, malaria, yellow fever and other well-known diseases.

During the extraordinary surgical advances that have been made in the last decade our profession has been so busily engrossed in grasping the new developments that come crowding one upon another that it has rather lost sight of the poor public and its right to a share in the general progress. We have been inclined to let the people discover for themselves the immense amount of time, money and suffering that can be saved to them, and yet we are in the position of placing before them a host of well-established facts on which we base our advice as regards surgical treatment. More and more have surgery and medicine grown to be scientific and accurate. To a greater and greater extent can surgeons promise definite results. The changes in technique and operative principles that are constantly taking place lead steadily to better results because they tend ever to greater simplicity.

Is it not a good time to stop and view ourselves from the stand-point of the lay public—a public that in the main is intelligent, progressive and full of common sense?

However much we may deplore the fact that surgery is necessary, that it may be an opprobrium—which I doubt very much—we must be willing to admit that, given ideal conditions, enormous temporary and permanent benefit can in numerous instances be vouchsafed by operations, and by operations alone. Surgery has its own field. It readily yields to other and simpler therapeutic measures when satisfied that it itself is without avail. At the same time it is keenly alert to invade the vast field of internal medicine when the latter fails to accomplish the ideal; ready to retire at once if some new discovery demonstrates that disease can be conquered by means other than surgical. What surgeon is there who would not gladly throw down the knife if a serum or any simple remedy were discovered that would definitely cure malignant disease? Some such remedy is bound to come in the course of time; slowly, it may be, but none the less surely. In the meantime innumerable types of disease are safely and happily treated by the mechanics of surgery, and it ill becomes us as surgeons to belittle the aid that we can give, for the mere reason that at some future time surgery may become obsolete.

Every year I am told that we have attained the highest limit in technique. This is far from the truth, because hardly a week passes without a surgeon somewhere in the world demonstrating a discovery or reviving some long-forgotten fact that reduces mortality, shortens convalescence, or aids in the restoration of normal functions.

It should be made clear at the outset that the public must expect of surgeons not absolute efficiency, but a reasonable degree of it. Such a degree can be acquired by any surgeon who has aptitude, a love for constant self-improvement, and a readiness to make sacrifices to his ideals. Of this type there are many in your country as well as mine. The masters of surgery, on the other hand, are few in number. It is to them that we of the rank and file must look for the instruction and inspiration which should constitute a large and by no means unimportant part of their work. It is only a relatively small proportion of the people that can have the direct benefit of their skill. To their teachings the medical as well as the surgical practitioner must listen, and in the light of the accomplishments of the advanced surgical clinics of the world it is not an exaggeration to assert that diagnoses, especially of abdominal and cerebral diseases, are more accurately made by the surgeon or by his medical *confrère* who follows his own cases to the operating table than by the internist who limits his observations to laboratory, personal

and post-mortem examinations. The failure of the public to realize this fact accounts in great measure for the many sometime curable diseases that are brought to the surgeon after they have reached the incurable stage. The co-operation of the internist and the surgeon in all cases potentially surgical is something that can be demanded consistently by the people. Each one is a healthy check on the other; their combined judgment is safest for the patient.

With the emergency operations and the problems suddenly forced upon the doctor far from surgical centres this paper has nothing to do. Every surgeon admires and respects the men who meet the difficult problems of this kind, alone, ingeniously and fearlessly. The history of medicine is full of heroes of this class, and no one has greater appreciation of their work than the active surgeon in the large city.

I would deal here rather with the question of elective major surgery as attempted in our large and small surgical centres by men without surgical skill or training, by amateurs, and by the nondescript commercial type of doctor that operates for the fee and not for the benefit of the patient.

The internist and the family doctor, assuming that he is a general practitioner, cannot keep pace with the constant advance made along surgical lines. It is physically impossible for him to keep in touch with the best surgical literature and progress. If, therefore, a patient comes for advice concerning a disease that theoretically or practically can be classed as surgical, the patient has a right to the opinion of a practical surgeon for or against intervention. This applies not only to the commoner diseases, like gall-stones, appendicitis, cancer etc., but to the less common border-line diseases in which both medical and surgical treatment are of value. The internist, prejudiced at the start against surgery, or slow to follow the best advances in the world's clinics, may presume to decide a question that is or ought to be purely surgical. Such a decision may be as much beyond his province as it would be were a surgeon to attempt to decide as to the nature of an anæmia without a blood examination. This breach of faith with the public—for it can hardly be called anything else—is in my experience one of the most common factors that leads eventually to incomplete operative success. The public, slow to grasp the full significance of such conditions, is, nevertheless, gradually awakening to its rights in this respect.

The remedy is simple. No doctor need be so narrow or prejudiced that he cannot seek counsel in doubtful cases. To ask for surgical advice does not imply any necessity for accepting its verdict. That lies with the patient. Let him be given the facts according to the best

modern lights, and the decision will rest with him whether to accept an operative risk or not.

Worse than this is the hesitation, narrowness or ignorance—call it what you will—that allows the internist to deal with a surgical lesion until forced to advise surgery, not as a preventive or as a curative measure, but as a last resort. Every experienced surgeon will agree with me that with all his so-called boldness in operating he has never had the courage to assume the responsibilities endangering the lives of his patients that the indifferent or ignorant practitioner assumes at times in advising against surgical intervention or in withholding operative relief. The surgeon with his knife in the presence of appendicitis, gall-stones, cancer of the stomach or intestines, empyema and a host of similar diseases is the embodiment of conservatism when compared with the practitioner who elects to treat such diseases medically.

After a patient has decided upon operative treatment he has the right to demand, first of all, asepsis, proper anæsthesia and intelligent after-care. He should realize, however, that, although absolute asepsis is the ideal to which all surgeons aspire, practical asepsis alone can be guaranteed in the light of our knowledge at the present time. We should teach the public that the highest degree of asepsis is best attained by a permanent corps of surgical workers trained under responsible heads; that a properly equipped hospital with such trained assistants entails less risk to the patient than the haphazard equipment of the private house or the irresponsible *régime* of many of the private hospitals which are open indiscriminately to operators, each with his own methods of operative technique.

I think it can be safely said, indeed, that a morning's work at a private hospital, with its multifarious and changing authorities, is rarely carried through without many lapses in asepsis, for the most part harmless, but occasionally calamitous in result.

Breaks in asepsis are the result of some sin of omission or commission on the part of the operating staff, including the surgeon, his assistants and operation nurses. Too often is the blame for septic calamities ascribed to the sponges, the suture material or the dressings. That any one of these may be at fault is possible, but in the well-conducted operating room proper examinations and control of the material should prevent such accidents save in very rare instances. Too many times have I seen a sterile catgut blamed for the result of a slovenly, dirty surgeon or assistant. So long as surgery is an art and not a mechanical trade lapses in asepsis are occasionally bound to occur, even in the best clinics, in spite of all reasonable precautions. The important point for

the surgeon, and for the public as well, is to recognize and make use of the means best fitted to reduce these chances to a minimum. We must all recognize that there is some risk attending any and every operation; a risk that often is so small that it may be practically disregarded.

Under the immeasurably diverse conditions of heritage, environment and physical and mental defects, it is out of the question to allow for every possible accident, and this fact the patient as well as the surgeon must recognize where an operation is undertaken. Provided the surgeon uses precautions that are reasonable in the light of modern scientific knowledge, he can be assured that he has done all that should be expected of him. The patient, on his side, must be willing to take certain chances provided the result sought by operation is going to lessen the sufferings and dangers that are inherent in the existing lesion or disease.

The public should realize that the dangers, immediate and remote, from anæsthesia are very small. Such dangers do exist, however, and it is the surgeon's duty to minimize them in every possible way. A skilled anæsthetist, preferably a permanent member of the surgical corps, will cause far less damage than the student or the friendly family practitioner who etherizes occasionally, and who is more interested in the operation than in giving the anæsthetic. In my own experience the worst and most dangerous etherizers are the unskilled pupil house officers. To the credit of certain individuals of this class, however, it must be said that after a month's training some of them develop into first-class anæsthetists, generally at about the time they are ready to graduate to a higher grade. These show their ability early, and exhibit, as it were, an inborn talent in this line; others never learn to be satisfactory etherizers, no matter what or how long their experience.

Another class that rivals the student in dangerous etherizing is the graduate with long experience in general practice. He rarely gives ether safely or in a way that aids the operator. His experience has been won mainly at the bedside of the lying-in patient, and in anæsthetizing a patient for a major surgical operation he applies methods similar to those which he uses in his obstetrical work.

An unskilled etherizer will make certain of the difficult operations impossible; he will prolong beyond safety an operation that should be short, and he will increase in any case the chances of a post-operative pneumonia. These facts are not generally known by the laity, but that does not warrant neglect on the surgeon's part in this particular. The public has just as much right to demand a skilled anæsthetist as to demand a skilled surgeon.

Much the same could be said of the unskilled assistant, the ever-changing house surgeon, and the general practitioner who assists in

major operations at rare intervals. It is difficult for the latter to realize the essential points in aseptic technique; not being accustomed to the ways of the surgeon, he modestly hesitates to give what assistance he would like to give, and often, being ignorant of the consecutive steps of an operation, he delays and hampers the surgeon to a degree that he little realizes. I believe that every surgeon who has had much experience in this line will confess that in not a few cases he has been obliged to substitute a partial or a less difficult operation because he was unwilling to expose his patient to the added risks that would come with the unskilled helper.

As soon as the public appreciates that the after-care of major surgical cases, especially of those in which the abdomen has been opened, is just as important as the operation itself, it will insist that the immediate convalescence be guided by the surgeon himself or his capable assistant. To operate from choice in a serious case far away in the country, placing the responsibility of the after-care upon the family doctor, who at the same time is in charge of patients with all types of disease, is unjust to the doctor and to the patient, and it leaves a loophole for divided responsibility in case of calamity.

No surgeon can safely outline the treatment of any abdominal case if he allows for the innumerable contingencies that he knows to be possible. If every patient passed through the stage of convalescence in a routine way the problem would be easy, but, as a matter of fact, such is far from the truth.

Another demand that the public can and should insist upon with the surgeon that is attached to a public hospital is that any and every major operation, especially if it involves the abdomen, should be performed by the surgeon himself or under his direct supervision. He is appointed to the hospital staff presumably for his special surgical fitness. His position presupposes long training in anatomy, pathology and assistance at surgical operations. The public seeks the services of a hospital because of the skill of its staff, and it has the right to demand that the full responsibility of all major operations should be taken directly by the staff. In order to attract students, to become popular, or to shirk labor, the surgeons of many hospitals delegate more or less operative work to immature and irresponsible house pupils; because of this the public suffers. Many times have I seen a young, inexperienced house surgeon struggling with some difficult problem at the operating table, a problem that has arisen suddenly and unexpectedly, and I have wondered if the complacent surgeon who has deserted his post would be willing to subject one of his own family to this amateur surgery. Much in the way of minor surgery can be properly delegated to one's assistants,

but to place the responsibility that attends major operations upon a young surgeon with the experience of a few months is fundamentally wrong, while occasionally it is criminal.

Granting the fact that a hospital staff is or should be selected because of its capability, both collectively and individually, it behooves those of us who are responsible for the selection of our co-workers to be both catholic and discriminating in our choosings. We must acknowledge that it is through the work and enthusiasm of the individual that surgical progress is maintained, and if we are to exact the respect of the public for our hospitals each individual member of the staff must in some one or more respects live up to the highest surgical standard, while at the same time his general qualifications are those of the broad general surgeon. This significance of the individual was aptly expressed as follows at a dinner recently given to Cardinal Logue: "The potency of the individual is greater and nobler than the influence of class, or organization, or even institution." To no type of man does this apply better than to the surgeon of our large hospital. How frequently do we see the progress and advancement of the entire institution dependent on the activity, breadth and scientific enthusiasm of a few, often against or in spite of the narrow opposition of the many.

To some extent the criticism as regards the house pupil pertains to the amateur surgeon who operates now and then for the excitement or for the fee, without pretending to be reasonably skilled in technique or reasonably posted in surgical progress. The smaller hospitals that are luxuriantly cropping up throughout the country are in this respect not only capable of doing much harm, but they are actually guilty thereof. The large and promiscuous staffs in control of these hospitals always include a few ambitious men eager to attempt surgery beyond their ability. The term of service of the staff constantly shifting, allows but a limited experience to any one member, and divides the interest and responsibility of the staff as a whole. It would be far better, as I pointed out some years ago, if such a hospital should select two of its younger members to train themselves for the necessary surgical work by acquiring thorough anatomical, pathological and technical foundations, and should compel them to keep in line with modern surgical advance year in and year out. Two well-trained men of this sort should be able to take proper care of the surgery of a large district, and take care of it well, whereas at present much of the work is badly done by innumerable half-trained general practitioners, who, while doing the best that they can, are not giving the public what it has the right to demand.

This would also do away to a great extent with the present system of

calling upon the consulting surgeon from the large centres, who only too often operates hurriedly and on insufficient examination and knowledge of the patient, because he relies upon the data furnished by the family physician. In other words, too many major operations are done under these circumstances without satisfactory study of the patient and his disease, and the after-care is delegated to practitioners without the surgical training and experience that the public can justly demand. This system trains the consulting surgeon into hasty and snap diagnoses, and he necessarily gambles now and then on the chances that he can pull out of a difficult situation if he happens to be caught. But what of the patient under these circumstances? He rarely loses his life, to be sure, but I believe that any experienced surgeon will agree with me that at times an operation is not complete or satisfactory, or that a secondary operation is required later, because of the insufficient data, the inadequate assistance, or the imperfect operating-room equipment.

That the small hospital is invaluable to the town in which it is situated no one can deny, but, under the conditions under which most of these hospitals are conducted at the present time, that such an institution should undertake, except in case of necessity, the serious surgical problems, I believe to be ill-judged at least. It is only a question of time before surgeons will demand that no doctor assume the responsibilities of major surgery without required special courses of training and apprenticeship. If surgeons do not demand it the public will.

Furthermore, a patient who supports himself and his family by his daily wage should insist that he be kept in the hospital for as short a time as possible consistent with good surgery. He should not be allowed to lie around the ward waiting for the surgeon, engrossed in outside affairs or indifferent to his responsibilities, to make up his mind to operate. Neither should he be kept for an undue length of time for the purpose of teaching students. In the large clinics a decision for or against operation can be made within forty-eight hours in most cases. The necessity imposed upon the surgeon of earning his living away from his charity clinic is responsible for much of this form of neglect, and the blame, therefore, really rests on the public itself, badly educated in such matters and encouraged by an indifferent profession.

Could our hospital trustees but see the wisdom of encouraging the surgeon to earn his living in the same building in which he devotes so much time to the pauper sick, both classes of patients would be benefited. This fact is so obvious to anyone who has carefully considered the subject that it is unnecessary to enlarge upon it here.

The public has certain rights in the question of surgical fees. The surgeon has equal rights, but he seldom obtains them. To take up the abuse of medical charity would lead me too far from my subject; that such an abuse exists, especially in the eastern part of the States, is too flagrantly evident to need any confirmation here. To some extent the existence of this abuse is responsible for the overcharges to which surgeons are occasionally driven. All patients except paupers and some wage-earners should be compelled to pay a fee for medical and surgical care commensurate with their earning capacity, just as they are obliged to pay for their provisions, their luxuries or their dissipations. The wealthy should pay liberally for major operations; they should not be robbed. The self-respecting wage-earner, whether on daily wages, a salary or in independent business, should not be treated as a pauper. He should be compelled to pay some fee in proportion to his earnings, the number dependent on his income, etc. The public has abused over and over again the medical charity that flourishes to such a degree in our large cities. May it not be because of this abuse that the struggling surgeon is guilty at times of squeezing all that he can from his wealthy client? Our practices need reforming without doubt, but the abuse in this respect is infinitely less than that practised by the public which is competent to pay.

That surgeons divide fees with the family doctor bringing them surgical cases is a well-recognized evil. Fortunately it exists to a much smaller extent in the East than in the West. That it is fundamentally wrong and pernicious goes without saying. It is based on commercialism alone. As soon as the public realizes that it is deliberately sold by its family doctor—in whom it has full confidence—to the surgeon that allows the largest graft, and that it is not sent to the surgeon best equipped for taking charge of the case, the public itself will stop the practice at once and emphatically. It seems inconsistent with American character that a patient should be bartered voluntarily.

To enter upon the relation of animal experimentation as applied to the development of surgery is very tempting. Its bearing on the principles of surgery and on surgical technique is of tremendous import, so far as the great mass of the people is concerned. The latter has learned to trust in the unselfish honesty of the medical profession, and the responsibility is far more serious than the anti-vivisectionists can realize if humane surgical advance is checked by the indiscriminating and narrow bigotry of ignorant partisans. I believe that if a deliberate and thoughtful expression of views of the practical surgeons of the world were taken to-day, an overwhelming majority would gratefully acknowledge its obligations to animal experimentation, as instanced in the daily

relief of suffering and prevention of disease. It is almost pathetically comical that we should be confronted time and again by the ignorant and probably thoughtless views of two defunct and famous surgeons upon this subject. Both men lived at the very dawn of modern scientific surgery; neither was young enough to grasp the significance of the new surgical discoveries, while each one had been a too-dominating power in certain narrow lines of surgical advance to be willing to accept the broader teachings of others. One directed his genius to mechanical problems; the other demonstrated advancement by means of human experimentation, all of which had to be worked out at a later period by laborious scientific research. The thoughtless and possibly hasty views of these men have been hurled at the thousands of modern surgeons by the opponents of animal experimentation, but I am confident that if Bigelow and Tait were alive to-day their dominating geniuses and grasp of the truth would enrol them as most enthusiastic and powerful allies in the struggle against the anti-vivisectionists. The layman, as a potential surgical patient, is more keenly interested in this controversy than he realizes. When the surgical thunderbolt strikes him or his family, he wants and demands as his right the use of every nicety that will diminish risk and lead to recovery. I know, and you know as practical surgeons, that we daily use the results of laboratory research, and that if we were deprived of all that has been handed down to us as a result of animal experimentation our surgery would lapse back to a degree frightful to contemplate. This is the side that the layman must seriously consider when he is urged to oppose the profession that has always worked and struggled on behalf of suffering mankind, and that will fight for the principle of animal experimentation because it knows it is just, humane and merciful.

There is one more protest that may be made in behalf of the public. We hear much loose talk about the direful nervous shock that follows operation, and the public is well trained to expect a long and tedious convalescence on that score. With certain ill-balanced, badly-trained people this may be the case, especially if the patients are cared for by over-fussy or unscrupulous physicians, but as a general rule in my experience the post-operative effects are grossly exaggerated. Most patients can be trained out of such calamities as easily as they can be trained into them. With all the traumatic neuroses that have cropped up since suits for personal damages have become so frequent, it is incumbent on our profession to avoid augmenting this class of patients by ill-timed and ill-judged encouragement. In my own experience the patients that suffer most from post-operative neuroses are those that were allowed to become septic by culpable delay in submitting to operation. The bad result can be traced to the sepsis and not to the operation. The contrast is

so marked in what might be termed control operations in non-septic cases that one who has observed it readily recognizes the difference. When we consider that a generation ago most operations and accidents were serious because of the septic complications, it is not difficult to understand why the laity at the present time has a such a dread of anything associated with surgery. It can be stated conservatively that the lay public is about a generation behind in its realization of the advances accomplished in the science and art of surgery. I believe that I am not unduly severe if I accuse our medical brethren of being about five years behind.

Criticism and censure of existing conditions is not a difficult task. Of one, however, who condemns so freely you have the right to demand some suggestions for reform or reconstruction. In a short general address like this I can enter upon this phase only to a superficial extent.

Fundamentally the great and important factor in remedying many of the evils to which I have called attention is a higher uniform standard of general and medical education. This in the States is being pushed forward most ably and energetically by the Council on Medical Education of the American Medical Association, and we all owe our most loyal fealty to its endeavors. In addition to this general groundwork, I believe that so far as the making of surgeons is concerned, who shall be entitled to stand before the public as capable of dealing with the larger problems of surgery, much can be done even at the present time in the way of special training and special licensing. With regard to the latter, it may be best to adopt some form of approval by a recognized examining board somewhat similar to that which obtains in England. Thus, a candidate for the position of surgeonship in a responsible hospital or in a rural community would be obliged to prove his fitness for the work, his knowledge of anatomy, pathology and the science and technique of surgery.

A reform in the construction of our hospital staffs I believe to be equally important. Some such system as that in vogue in Germany should be adopted by our hospitals in the larger cities where there is opportunity for teaching. As constituted at present many of our public hospitals are overweighted by cumbersome surgical staffs that could easily be reduced to a third or a sixth of their present number. A chief of staff should be placed in full control of fifty to one hundred beds. If in charge of a larger number his assistants or colleagues should be as capable of assuming full control as the chief himself. The latter should be allowed very great power in the selection of his assistants from among those who have demonstrated their fitness and ability while in subordinate

positions. Thus permanent or temporary vacancies would be properly filled, and responsible positions in distant hospitals would be open as prizes to tried, capable candidates. This would do away with the present system of graded rank, which, however efficient it may be in the army or in the commercial world, is poorly adapted to the profession of surgery and to surgical hospitals. Because a surgeon has performed his work regularly and perfunctorily while in a subordinate position, without advancing himself or his art, is no reason that he should be elevated to the head of a division when a vacancy occurs. As a result of this misapplication of civil service rules one such chief of service can and will block the progress of his division in a way little realized by the general public, or even by the practising physician. Let every man aspiring to become a chief of staff make good; do not hand him a gift with so great responsibilities just because he happens to be older than his colleagues. Have we not all seen certain surgeons, originally appointed by political favor, nearly paralyze the active service of a large hospital when placed in a position of responsibility? Has such a man the right to trade on his assumed ability at the expense of a public which cannot easily comprehend the exact state of affairs?

The same principle which applies to the visiting staff of a hospital applies to the student assistants. As I have indicated elsewhere, uniformity and permanency in the operating and ward staff is of the utmost importance in obtaining uniform and satisfactory surgical results. The routine, inexpert work in the wards, the laboratory and the operating room should be done by students, delegated by the schools and accepted without competitive examinations, because such work should be a part of the student's curriculum. For more responsible positions the selection should be by a process of elimination, dependent on the demonstrated ability and aptitude of the student assistants. The highest positions should be allotted for a term of years to selected candidates who are planning to enter upon a surgical career. These should be salaried, and they should be encouraged or compelled to undertake original work. When at last these men are graduated from their assistantships they will be in a position to offer themselves as candidates for junior positions on the staff, or they may emigrate to other cities or towns, where they will be entitled to undertake the surgery of their district, building up a surgical nucleus that is capable of developing indefinitely, varying only with the ability of the individual surgeon.

To elaborate this scheme is unnecessary. It is essentially that which exists in Germany. When we consider the splendid surgery that the Americans have shown themselves capable of developing in the face of

our clumsy and restraining systems, one grows enthusiastic at the possibilities that lie before us, provided we could develop the art along better, safer and more liberal lines.

In dealing with the private hospital problem I can easily be misinterpreted, but I believe that much can be accomplished by which the public will be dealt with more fairly. It seems only right that the well-to-do patient should be treated as carefully and as efficiently as the pauper, but such is far from the fact in some of our large centres. Many of our private hospitals are run as money-making schemes. It is a great temptation to keep our patient in the hospital longer than necessary. It is easy to encourage the neurasthenic to waste weeks in an institution when we know that he or she would be far better off in the woods or at work. Without responsible residents in these hospitals emergencies endangering the life of the patient arise occasionally that cannot be dealt with properly. The same holds true, as I remarked earlier, with regard to the operating room equipment. If we are to have private hospitals the administration can and should be brought as near to that which exists in our best public hospitals as is possible, and until that is attained we are not dealing quite squarely with our patients, from whom we derive our incomes.

To kill the growing tendency towards a division of fees, it is necessary to keep the public informed as to the facts. Whether this should be done through our local or our national societies is not yet clear, but I believe that it is best undertaken by the larger body of men. A curious and annoying type of graft that is not infrequently worked upon the surgeon is that in which the family physician, who presumably knows the financial status of his patient, makes one price for operation to the patient and another (much smaller) price to the surgeon. To expose this it is necessary that the surgeon have his business dealings directly with the patient, thereby losing, of course, all future work that might otherwise come to him from the family doctor whom he has exposed. The public has a right to know how much it pays for surgical care and to whom the amount is paid. The moment we begin to juggle with it in this respect we lose the right to pose as a profession the first object of which is not to make money.

In conclusion, I would not have you infer that there is no other side to surgery than that of criticism and fault-finding. No profession is without flaws. Every profession reaches a higher plane with each decade, and it is mainly by the elimination of the petty obstacles that our profession is destined to attain a level that can never be reached by others.

As a matter of fact, the public can feel that, taking American surgery as a whole, both that done by the masters and that done by the rank and file scattered over the length and breadth of this continent, there is no surgery in the world more intelligent, more skilful, and more considerate of the rights and feelings of the patient. The rate of advance is almost phenomenal. We in the States are wont to boast of our commercial progress, which is apparent to everybody. Few beyond those working in hospitals, laboratories and medical libraries realize that the advance in our profession is parallel with that in our commerce. The advance in the one, however, is for the most part financial and scientific as applied to finance, while the advance in the other is scientific, humane, educational and life-saving.

A significant quality that belongs to our profession is the generosity of the surgeons of one locality towards those of another in freely giving and receiving the good things that spring up in our art. It is a most refreshing sign of broad culture, and it does much to destroy the petty jealousies that are a heritage of past generations.

More and more do we see the internist and the surgeon working side by side; more and more do they appeal to the authority of the laboratory, and, finally, with all the petty bickerings and inconsistencies that are to some extent inevitable in all professions, any one of us when his name is called in the ranks of the American surgeon should be proud to answer "adsum."

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## THE TREATMENT OF CEREBRO-SPINAL MENINGITIS BY FLEXNER'S SERUM.\*

BY

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Epidemic meningitis is attended by such a high mortality, and is so often followed by disastrous effects, that any plan of treatment attended by promising results in experimental work is well worth an extended trial in man. We venture to bring the subject before this Association in order to direct attention to the experimental work which has been carried on during the past few years, and to point out the lessened mortality which has resulted from the application of these methods in man. Evidence is rapidly accumulating to show that good results are obtained by the use of an anti-serum injected directly into the spinal

canal, and if the morbid processes can be controlled, it seems probable that the senses of sight and particularly of hearing may suffer with decreasing frequency.

Kölle and Wassermann (*Deut. Med. Woch.*, 16, 1906) produced a serum by inoculating horses with both dead and living cultures of meningococci and with extracts obtained by shaking the cocci with water. Much difficulty was experienced in the experimental work owing to the rapid change of virulence in the cultures and to the varying susceptibility to meningococci in animals of the same species. It appeared, however, that protective substances were formed in the serum of injected horses and that it was more efficacious than normal serum. Experiments carried on *in vitro* satisfied those observers that anti-bodies were formed and that they were more powerful in horses treated by living cultures of meningococci.

Jochmann (*Deut. Med. Woch.*, 1906), after experiencing the same difficulties of Kölle and Wassermann, succeeded in obtaining a number of virulent cultures, of which one loopful killed mice in twelve to fourteen hours. A serum prepared by inoculating horses, first with a dead and later with living cultures, has given fairly good results in man. Kromer treated 17 cases, giving 20 to 30 c.c. hypodermically, and repeated this on the second and third days. In 11 cases the second injection was given directly into the spinal canal. Of the 17 cases only 5 died; in 9 the temperature fell rapidly and lessening of the headache and of the rigidity of the neck were also noticed.

Schone (*Therapie der Gegenwart*, 1907) treated a series of 30 cases with this serum with a death rate of 28 per cent., as against 53 per cent. in untreated cases. Thirteen cases required only one injection, but often several were required before the temperature fell, and as much as 180 c.c. was administered.

Flexner's work on meningitis is by far the most valuable contribution we possess on the experimental pathology of the disease, and he has also obtained a serum from horses which is of a high value in producing immunity and in preventing a fatal result after lethal doses of meningococcus. Choosing monkeys as most nearly resembling man, he was the first to produce meningitis by injection of cultures of meningococci through a lumbar puncture. The animals for the most part died rapidly and the lesions were similar to those found in man.

The pathological results are outside the subject of this paper, and the details need not detain us now, but they are of importance in connexion with the remarkably successful results obtained by treating these animals with serum, and form an important link in the chain of evidence bearing on the value of serum treatment.

Flexner's first experiments were made on guinea pigs with serum from a goat, previously inoculated with cultures of diplococci, and it was found to have a slight protective influence. Other substances, such as bouillon subcutaneously, were also found to confer increased resisting power upon guinea pigs. Subsequent experiments were carried on with horses' serum, prepared by inoculating the animal, at first subcutaneously and later intravenously with living cultures. After four or five months of intermittent injections the protective power of the serum was tested on guinea pigs. The results, although not striking, were rather better than in animals treated with normal horses' serum or bouillon.

In monkeys much more promising results were obtained by using an homologous anti-serum. Simultaneous injections of diplococci and serum prevented the development of severe symptoms, and by injecting the serum six hours after the cultures the animals could be saved from almost certain death.

Turning to the results obtained clinically from the anti-serum obtained from the horse, Flexner and Jobling (*Journal of Experimental Medicine*, January, 1908) have recorded the histories of 47 cases treated in different localities. Of these 34 recovered and 13 died, a percentage of 72.3 recoveries and 27.6 deaths. Of the fatal cases 4 were fulminating, *in extremis*, and died within a few hours of the injection. These results reverse the usual outcome of the disease when treated on a symptomatic plan, the mortality in these being about 70 to 80 per cent.

The results obtained by Robb are equally encouraging (*British Medical Journal*, February 15th, 1908). Of the 30 cases treated to a conclusion, 22 recovered and 8 died, a mortality of 26.8 per cent. About an equal number of cases were treated in Belfast at home without serum, and of 34 treated to a conclusion 29 died, a mortality of 85.2 per cent., practically the same mortality as occurred, 82 per cent., in the hospital previous to the introduction of serum treatment. From these figures it would appear that the type and mortality of the disease was almost uniform, and the improved results must, therefore, be attributed to the serum.

Our own cases are too few to be of any statistical value, but we venture to report them, as they appear to support the claims made by those whose experience has been larger.

*Case I.*—No. 102, 1908. Linda B., 26 months, admitted to the Montreal General Hospital, January 29th, 1908. With the exception of a fortnight's diarrhoea, beginning six weeks ago, has always been healthy.

On January 25th the child began to vomit and became very peevish; the temperature rose to 101°. Vomiting has occurred on several occa-

sions since, and there has been much restlessness and peevishness. On admission she is well nourished and well developed. The fontanelles are closed. There is marked restlessness, the arms and legs being thrown about, and there are sudden, sharp cries. The head is retracted and the neck muscles are rigid, so that the chin cannot touch the sternum. There is slight nystagmus, the pupils are equal and active to light. Both legs are markedly spastic; no Kernig; knee jerks are diminished; Babinski on right side; no clonus; abdominal reflexes absent. The other organs are normal. Pulse 148 to 168, respirations 48 to 50, and temperature  $102\frac{1}{2}$  to  $104\frac{1}{2}$ ; leucocyte count 13,810.

Lumbar puncture under chloroform was made and 30 c.c. of very turbid fluid, containing numerous flocculi, withdrawn, and 30 c.c. of serum injected. Smears of the fluid showed numerous polynuclear leucocytes and very numerous Gram-negative diplococci, both within and outside the cells. The growth on blood agar is abundant and confluent.

At 8.30 p.m., two hours after the puncture, retraction of the head was much more marked and she was very restless and noisy, tossing about and occasionally having spasms of general rigidity accompanied by marked tremor, lasting from five to fifteen seconds. The pulse was thready and could not be counted at the wrist.

January 30th: Restless the previous night until a hot pack was given. The retraction of the head and rigidity of the neck is now only very slight; spasm of the legs slight, sleeps most of the time, occasionally uttering a loud cry and tossing about for a few minutes; a few rhonchi over lungs. Temperature  $100\frac{1}{2}$  to  $103\frac{1}{2}$ ; respirations 48; pulse 140, good volume; leucocytes 5,600 (two counts). Lumbar puncture, 20 c.c. very turbid fluid removed, and 10 c.c. serum injected. The cultures showed a much lighter growth, the colonies being discrete, but numerous.

January 31st: Child much quieter, crying only when handled. Pulse 128 to 140. Head is rather more retracted; no Kernig sign and legs no longer rigid; leucocyte count 8,720. Lumbar puncture and 47 c.c. of opalescent fluid, not nearly so turbid as yesterday, withdrawn; there are no flakes of lymph. 13 c.c. of serum was injected, 1 c.c. per minute. The cultures from this fluid showed twelve discrete colonies, the same amount of fluid being used each time. After the injection the child was somewhat restless for two or three hours.

February 1st: Temperature rose from 101 to  $104\frac{1}{4}$ ° after the inoculation yesterday—the usual afternoon rise seen in this case. This morning it was 100°, pulse 132. Lumbar puncture and 46 c.c. withdrawn, 10 c.c. of the serum injected. Only eight colonies grew from the culture. Leucocytes, 14,080.

February 2nd: Temperature  $99\frac{3}{4}$  to  $100\frac{1}{4}$ °. The child notices everything, turns its head and there is only slight retraction.

From February 2nd to February 14th there was a continuance of the intermittent temperature, rising from normal or subnormal to 103—105.

February 4th: 2 c.c. of fluid obtained by lumbar puncture, showing no growth after forty-eight hours. Leucocytes 23,200.

February 7th: A serum eruption consisting of red erythematous blotches appeared. February 10th, lumbar puncture showed a heavy growth of the meningococcus. 11th, the child had been peevish for some days, but in spite of the high temperatures appears bright; leucocytes, 24,200; 35 c.c. withdrawn by lumbar puncture and 10 c.c. serum injected. Growth of meningococcus.

February 12th: More restless, very dull and pale; at lumbar puncture 75 c.c. fluid withdrawn and 20 c.c. serum injected; a profuse growth was obtained from the fluid. Leucocytes 15,800.

February 15th: It was decided to open and drain the spinal canal, but owing to a misunderstanding the surgeon punctured and washed out with normal saline solution. The fluid yielded a growth. The child was very restless and irritable after coming out of the anæsthetic. The temperature on this and the following days moderated, only occasionally reaching 102.

February 16th: Only 2 c.c. of fluid obtained by puncture, 10 c.c. serum given. Retraction of the head more marked.

In the later days of the illness the child was quiet and conscious; she vomited a good deal and died in convulsions on March 10th.

Autopsy performed by Dr. Lyman.

*Brain.*—Weight 930 grammes. On removing the calvarium the cerebral hemisphere gave a distinct feeling of fluctuation. On stripping back the dura mater the convolutions are greatly flattened, slightly sticky, dry and pale. The sulci contain no inflammatory exudate. The vessels in the pia show no engorgement. No fluid escapes until the tentorium is cut, when a considerable quantity of slightly turbid fluid flows out. On removing the brain the whole base is seen to be covered with a thick, white fibrinous exudate. All the cranial nerves are covered with it and it extends down over the medulla and spinal cord. The lateral ventricles are distended with a large quantity of pale fluid; the cerebral hemispheres are flattened. There is not complete obstruction of the aqueduct of Sylvius, but a few flakes of fibrin are adherent to its walls. The middle ears are normal.

*Spinal Cord.*—The spinal cord is covered from the medulla to the cauda equina with a thick, sticky, yellow exudate. The dura mater is

bound down to the pia arachnoid by many fibrinous adhesions (not normal trabeculæ).

*Bacteriology.*—*Brain.*—Meningococcus in pure culture, in membranes and in hydrocephalic fluid.

*Heart blood, Spleen and Liver.*—Negative.

*Anatomical Diagnosis.*—Epidemic cerebro-spinal meningitis, chronic hydrocephalus.

*Remarks.*—This case was the only fatal one, and no definite effect was obtained on the temperature and pulse by the serum. A rapidly decreasing number of bacteria were found in the spinal fluid on four successive days after daily injections of serum, and sterile fluid was present at the fifth puncture. Unfortunately, however, cocci again appeared in the spinal fluid after nine days. In the light of the post-mortem examination it appears probable that the cocci remained active in the hydrocephalic fluid and this probably proved the focus from which reinfection of the membranes took place.

It is impossible to draw conclusions from the effects of irrigation of the spinal canal with saline fluid in a single case. After this procedure the temperature no longer showed the great daily rises and the one subsequent puncture yielded only 2 c.c. of fluid, which was not examined bacteriologically. The condition of the child, however, failed to improve.

In a subsequent case, and inspired by Cushing's example, the advisability of injecting the ventricles with serum was considered, but improvement began about the time it was contemplated. Had this procedure been carried out on this case it is possible the bacteria might have been destroyed in their last stronghold.

After the first injection there was a notable fall in the leucocyte count, from 13,810 to 5,600; on the third and fourth days, however, they again rose to 8,720 and 14,080, and later on to as high as 23,200 at a time when the lumbar puncture showed a sterile fluid.

*Case II.*—(M. 219, 1908). M. F., a girl, aged six years, admitted on March 10th, 1908, with extreme restlessness, fever, headache and hæmorrhagic spots.

She was perfectly well until Monday morning, March 9th, when she awoke at 7 a.m. with severe headache and nausea, and remained in bed. She was drowsy and extremely peevish all day, and although nauseated did not vomit. On the 10th small hæmorrhagic spots appeared on the trunk and limbs, and she was admitted to the hospital at noon.

*Present condition.*—Fairly well nourished child of fair complexion and delicate features. The head is slightly retracted and the muscles of the back of the neck are rigid. The child is restless, extremely

irritable and peevish when handled, crying out and begging to be left alone. There is some photophobia, and a hæmorrhagic rash over the body, particularly on the limbs and buttock.

The knee jerks are increased; plantar flexion; no ankle clonus; superficial reflexes present; no Kernig's sign. The pulse regular, 112, of low tension. The heart and lungs are normal; temperature 101 on admission. Urine acid 1029, no albumin; sugar is present with Fehling and phenyl-hydrazin tests; no casts. The leucocyte count is 21,800.

Under general anæsthesia (C. E. 1 to 2) lumbar puncture was performed, and 21 c.c. of very turbid fluid, which was under considerable pressure, removed. 24 c.c. of Flexner's serum was given at the rate of 2 c.c. per minute. A hypodermic of  $\frac{1}{12}$  gr. morphia was given and she slept all afternoon, being very irritable when roused. The pulse after the lumbar puncture was very small and weak, and improved after camphor oil. The fluid showed a profuse growth of meningococci on blood agar.

March 11th: Very restless during the night and was given a hot bath which quieted her for one hour, and then  $\frac{1}{12}$  gr. morphia was given with good effect. This morning the head is a little more retracted and the neck is very rigid. The eruption is fading. Leucocyte count has fallen to 13,350. The temperature which fell to normal after the injection yesterday has not risen over  $99\frac{2}{3}$ , and the pulse 104. Herpes has developed.

A second lumbar puncture was performed and 21 c.c. drawn off, and 22 c.c. of serum injected, and a hypodermic of morphia  $\frac{1}{10}$  gr. was given afterwards and nourishment by the stomach tube. The fluid was slightly turbid and meningococci were absent in smears and cultures (in numerous subsequent examinations of fluid obtained by puncture made by smears and cultures on blood agar, meningococci were absent). Dr. Mathewson reported a single small hæmorrhage in each retina.

March 12th: Still very irritable and peevish; headache every three or four hours for fifteen or twenty minutes; pulse 100; temperature  $98\frac{2}{3}$  to  $99\frac{2}{3}$ ; leucocytes 12,500. Urine 1016, sugar has disappeared. Lumbar puncture and 15 c.c. of turbid fluid removed, and 12 c.c. anti-serum injected; 1-12th morphia administered before puncture, which was done with a general anæsthetic.

March 13th: Head less retracted; is brighter and less irritable; pulse good volume, 100; temperature 98 to  $100\frac{1}{2}$ . The hæmorrhagic eruption has almost disappeared. Knee jerks present, but not increased.

No pathological reflexes. Leucocytes 11,800. 29 c.c. of fluid withdrawn by lumbar puncture, and 17 c.c. of anti-serum injected.

March 14th: Child bright in morning, became peevish and irritable later; temperature 98 to 100 $\frac{1}{2}$ ; pulse 84 to 120. Leucocytes 11,000. Lumbar puncture and 32 c.c. of fluid withdrawn, and 11 c.c. anti-serum given. The fluid withdrawn is stained yellow from the serum and there is a very slight sediment. During anaesthesia respiration stopped and artificial respiration had to be resorted to. Headache and restlessness came on, requiring morphia.

March 15th: Temperature 99 $\frac{2}{3}$  to 97 $\frac{2}{3}$ ; pulse 84 to 92. Is bright and has no rigidity of the neck.

March 16th: Is bright and well. Temperature 98 to 100; pulse 84 to 108, 120 at time of puncture. Lumbar puncture 39 c.c., yellow stained, almost clear fluid and 8 c.c. serum injected. Irritable for a short time afterwards. Leucocytes 11,200.

March 18th: An urticarial eruption appeared to-day, and is slightly itchy; temperature 98 to 99; pulse 84 to 108.

March 19th: Temperature 98 $\frac{1}{2}$  to 100; pulse 92 to 108. 37 c.c. clear yellowish fluid withdrawn with only an occasional leucocyte; 12 c.c. serum injected. Irritable, with bad headache after recovery from anaesthetic; leucocytes 12,800.

March 20th: Is dull and lies quietly in bed; head slightly retracted and a Kernig sign present for the first time. Temperature 98 $\frac{1}{2}$  to 101. On lumbar puncture 67 c.c. of very slightly turbid fluid present; 30 c.c. serum injected.

March 22nd: Temperature 97 $\frac{3}{8}$ , rising to 101 eight hours after the serum. The head is retracted and the child lies quietly and is only irritable when turned on her back. Kernig's sign more marked. Leucocytes 10,300; 61 c.c. clear yellowish serum withdrawn, and 20 c.c. of serum injected.

March 25th: Gradual improvement has gone on and the child is bright and comfortable. There is slight rigidity of the neck; Kernig sign on left side only; temperature 97 $\frac{3}{8}$  to 99.

April 19th: Discharged perfectly well.

*Remarks.*—This case is an example of a mild type of the disease, and would probably have recovered without serum. The remedy was, however, begun on the second day of the disease and may have checked severe developments. Following the first injection the cocci disappeared completely from the spinal fluid, a feature noticed in our subsequent cases. The leucocyte count also fell markedly from 23,000 to 12,800 after the first injection.

Owing to our first case having proved fatal, larger and more frequent doses of serum were administered. Eight punctures were made, and 121 c.c. of anti-serum were given. In spite of these considerable doses a slight relapse occurred, as is so frequent in the untreated disease. The temperature fell from 101 to normal after the first injection. No marked improvement in the general condition was noticed after any single dose of serum, and, in fact, the child was often noticed to be more irritable and to have headache.

In the light of subsequent experience it would appear that the doses were unnecessarily frequent, and following some of them there was a rise of temperature on the same or following days (March 12th, 13th, 19th and 22nd). In guinea pigs Flexner noted that too large doses of serum prejudiced the result by reason of its own toxicity, and it seems not improbable that a similar result may occur in man.

*Case III.*—(No. 265, 1908). Annic M., aged six years: admitted March 30th for headache, fever and vomiting.

A brother died of cerebro-spinal meningitis three months ago, and a sister, *Case IV*, is now suffering from the disease. She was perfectly well until Saturday, March 28th, when she complained of severe headache in the afternoon and vomited several times. On Monday afternoon the headache was worse, the head retracted and the neck stiff.

*On examination* she is well developed and well nourished. The face is dull; she is rather restless but not peevish, and answers questions readily. There are six or seven small hæmorrhages on the back and buttocks. Temperature on admission  $104\frac{1}{2}$ ; pulse 144. The head is not retracted and the chin can be brought almost to the sternum. The pupils are equal, 3 mm., and active. Knee jerk is just present on the right, absent on the left; Achilles sign absent; no clonus or Babinski sign. There is slight rigidity of the right leg, but no Kernig. Leucocytes 25,600.

Lumbar puncture and 41.5 c.c. of moderately turbid fluid removed and 28 c.c. serum injected at the rate of 1 c.c. per half minute. After coming out of the anæsthetic the child was restless for an hour or two and then slept. Meningococci were found in cultures but not in smears.

March 31st: Temperature 103 and  $98\frac{1}{2}$  in the evening. The head is decidedly retracted and the neck rigid. A well marked Kernig on both sides and knee jerks are absent. Lumbar puncture and injection of 24 c.c. serum; cultures of fluid negative. Leucocytes 21,800.

April 2nd: Temperature  $99\frac{1}{2}$ , pulse 100. There is no headache, but still some rigidity of the neck; the Kernig is less marked and the hæmorrhagic spots have almost disappeared.

April 3rd: Rigidity has almost disappeared and the chin can be brought forward to the sternum. Temperature not over 99 $\frac{2}{5}$ . Lumbar puncture, fluid withdrawn was stained yellow by the serum, but clear; 23 c.c. of serum injected.

April 5th: Temperature rose to 100 $\frac{3}{5}$ , but no rigidity of neck; vomited twice after food.

April 6th: Temperature 99 $\frac{3}{5}$ ; 32 c.c. given. In the evening the temperature rose to 102 six hours after the puncture. Leucocytes 11,800.

April 7th: Temperature rose to 103 and fell to 99 in the evening. Some rigidity of muscles of neck and Kernig is more marked.

April 8th: An urticarial serum rash is present, the child is not so bright and the neck is a little more rigid than before. Lumbar puncture and 15 c.c. of blood stained fluid withdrawn, and 14 c.c. of serum injected. No growth from the fluid. The temperature rose from 99 to 101 eight hours after the injection.

April 9th: Serum rash is more profuse, involving all limbs, trunk, buttocks, and face. The neck is decidedly rigid. On lumbar puncture 40 c.c. of clear fluid withdrawn, and 25 c.c. serum injected. The temperature rose from 100 to 102 $\frac{4}{5}$ . No growth from fluid.

April 10th: Vomited during the night. Is decidedly worse and complains of some headache. There is slight retraction and marked rigidity of the neck. Kernig's sign marked. It was decided to stop administration of serum.

April 12th: Improved yesterday and to-day is bright and well. No rigidity of neck; Kernig present; temperature normal. The subsequent course was uneventful; the temperature did not rise again above 99 $\frac{2}{5}$ , and she was discharged on May 10th. The fundi were normal on April 14th.

*Remarks.*—In this case there was a prompt fall of temperature after the first dose of serum and bacteria were only found at the first puncture and not subsequently. The use of the serum was continued owing to slight elevation of temperature, and on several occasions there was a rise of temperature amounting to three or four degrees a few hours after its use. Vomiting and increased retraction and rigidity of the neck also appeared and these symptoms passed off in two days after ceasing its administration. Apart from the high temperature at the outset, the symptoms were comparatively mild, and although a favourable result might have been anticipated, yet such a prompt defervescence may fairly be attributed to the first dose of serum.

*Case IV.*—(M., 264, 1908). Edith M., aged nine years, admitted on March 30th, for headache, fever and vomiting.

Patient, a sister of *Case II.*, is a well developed and well nourished child. She complains of severe headache and pain in the back of the neck. The head is retracted and the muscles of the back of the neck are rigid. The mind is clear. She is rather peevish if moved and occasionally moans with pain. The pupils are equal and active. Temperature 102 on admission, pulse 140. A well marked Kernig and knee jerks present; no pathological reflexes. Leucocyte count 30,200. On lumbar puncture 45 c.c. of very turbid fluid were removed under great pressure, squirting at least 15 inches, 28 c.c. of serum was injected, 1 c.c. per half minute. Smears from the spinal fluid show no organisms, but there is a growth of meningococci on blood agar.

March 31st: Temperature fell gradually from 102 $\frac{2}{3}$  to 100 during the day, and the pulse from 148 to 120. Still has severe headache and pain in the neck. Head is markedly retracted and Kernig is more marked. Leucocytes 31,000. Lumbar puncture and 55 c.c. of moderately turbid fluid removed and 28 c.c. of serum injected. There were no cocci in smears or in culture.

April 1st: The temperature ranged from 101 to 99, the pulse from 92 to 120. The child is brighter and the head less retracted.

April 2nd: Temperature 98 to 99 $\frac{1}{2}$ ; pulse 120 to 96. Head only slightly retracted. Herpes on lips and chin; leucocytes 10,600. Lumbar puncture and no fluid obtained.

April 3rd: Temperature 99 $\frac{2}{3}$  to 101 $\frac{1}{2}$ ; 15 c.c. of slightly turbid blood-stained fluid, yielding no growth; 12 c.c. of serum injected. After puncture the temperature rose in eight hours to 103 $\frac{1}{2}$ ; she was very restless and complained of severe headache, backache and pain in the legs.

April 4th: The temperature fell from 102 $\frac{2}{3}$  to 97 $\frac{2}{3}$ ; leucocytes 21,000. Lumbar puncture and 30 c.c. of serum injected.

April 6th: Leucocytes 22,900; puncture and injection of 32 c.c. was again followed by a rise of 2°, to 102. On April 8th and 9th, 23 and 28 c.c. of serum injected, and on each occasion the temperature rose. The child was very restless, the neck rigid and headache present. No organisms were found in the fluid after centrifugalizing and washing with sterile water, cultures being made on blood agar. An urticarial serum rash appeared on the 9th.

April 22nd: Improvement began twenty-four hours after last injection, rigidity lessening and headache disappearing. The temperature varied from subnormal to 100 $\frac{2}{3}$ ; it rose to 103 $\frac{1}{2}$  in the evening, and 50 c.c. of fluid removed, and 24 c.c. of serum injected; leucocytes 14,200.

April 23rd: Neck rigid; vomited three or four times: Kernig more

marked; leucocytes 9,320; temperature 102 to 103, falling to 100½ in evening.

April 24th: Temperature, morning 100½, evening 98½; very little rigidity, no headache or vomiting. Following this the temperature did not rise above 99½, and the child made a good recovery and was discharged on May 10th. A distinct optic neuritis was found on April 14th, which had completely disappeared on May 1st.

*Remarks.*—This case was an example of a moderately severe infection. The first injection of serum was followed by a fall in temperature and pulse and improvement in the other symptoms after forty-eight hours. The meningococci completely disappeared from the fluid after the first injection.

On reviewing the case there seems to be no doubt that the serum was given more frequently than necessary and toxic symptoms resulted from its use. These consisted in a rise of temperature of 1 to 3 degrees, headache, increased rigidity of the neck, retraction of the head and sometimes vomiting. It is probable that simple puncture to relieve pressure would have proved more beneficial than the repeated doses of serum. A slight rise in the leucocyte count was noted after the first injection instead of the usual fall.

In this case the temperature fell gradually to normal; the pulse from 140 to 92 after two doses of serum; the retraction of the head also lessened greatly. Five subsequent injections were given and all were followed in a few hours by elevation of temperature of from one to three degrees with increased restlessness and rigidity of the neck and occasionally vomiting. This case illustrates well the toxic action of excessive doses. A fall in leucocytes did not occur after the first injection, but was found after the second.

*Case V.*—James L., aged nine years, admitted under Dr. Lafleur, April 22nd, 1908.

The child was unconscious on admission. Early in the morning he vomited and complained of headache, and at 2 p.m. became unconscious.

*Present condition.*—A well developed and well nourished boy, unconscious but not insensitive. There is dorsal decubitus and some restless movements of the limbs, and he resists attempts at opening the eyes. There is photophobia and external squint of the left eye. Temperature 99½ at 10 p.m., 100½ at midnight; pulse at same hours 88 and 120. There is a small patch of herpes on the skin and a single small hæmorrhagic spot in the groin. The pupils are equal and active. The head is not retracted, but the neck is rigid, and attempts to bend the head

forward are resisted and cause groaning. Knee jerks cannot be elicited, the abdominal and epigastric and McCarthy reflexes are absent. Kernig's sign well marked; leucocytes 30,280.

Lumbar puncture and 20 c.c. of very turbid fluid obtained, which gave a profuse growth of a pure culture of meningococci. 22 c.c. of serum injected at 10.30 p.m.

April 23rd: At 2 a.m. the child regained consciousness, vomited and complained of pain in the head and neck; 10 a.m., quite conscious, temperature 100; strabismus and photophobia have disappeared. Kernig and rigidity of neck are unchanged. At 6 p.m. temperature 102½, falling to normal two hours later; leucocytes 28,960.

Lumbar puncture at 11 p.m. and 12 c.c. of turbid fluid removed, and 12 c.c. serum injected. He was restless on coming out of the chloroform, but slept five hours after ½ gr. morphia. The fluid withdrawn was sterile and also upon all subsequent occasions.

April 24th: Slight headache, rigidity of neck and Kernig's sign less marked; temperature not over 99½.

April 25th: Marked herpes of lower lip and chin.

April 28th: Temperature ranges from 99½ to 100½; pulse 64 to 80. There is very slight rigidity about the neck, but no pain on bending the head forward; leucocytes 11,460. Lumbar puncture and 32 c.c. of fluid withdrawn, and 20 c.c. of serum injected last night.

April 29th: Twelve hours after the injection temperature gradually rose to 102½, with headache, rigidity of neck and retraction of head.

May 5th: Temperature has been elevated daily, but fell this evening to 99½. Three further doses of serum were given.

Convalescence was satisfactory and he is, early in June, ready to leave the hospital.

*Remarks.*—In this case the serum was used on the first day of the disease and improvement apparently followed rapidly, consciousness returning in a few hours, the temperature falling to normal on the evening of the second day and the bacteria disappearing after the first injection. A relapse occurred, following a third dose of serum, but this feature is so frequently seen in untreated cases that it may have been a coincidence.

#### SUMMARY.

Summarizing the five cases we find that four made an excellent recovery and one only was fatal. Rapid improvement followed the use of serum in four of the cases, the temperature and pulse falling and the other symptoms gradually lessening in severity. The bacteria rapidly diminished and disappeared after the injections. In four instances

bacteria were never found after the first dose of serum, although repeated examinations by cultures and smears were made. In the fatal case, complicated by hydrocephalus, the fluid from the first four punctures, taken on consecutive days, showed a rapidly decreasing number of bacteria, as shown by the growths of a constant quantity of spinal fluid on blood agar. Later, a reinfection of the membranes occurred, perhaps from the bacteria present in the hydrocephalic fluid.

Harvey Cushing records a case which dragged on for a couple of months with periods of fever (103 to 104°), during which there was stupor, severe headache and cervical retraction. Puncture revealed a large number of micrococci. After three injections of 15 c.c. each of serum the bacteria practically disappeared and rapid convalescence ensued. Flexner also records two cases in which the diplococci rapidly diminished and disappeared after the use of serum. This suppression of the diplococci corresponds with Flexner's experimental results. In guinea pigs and monkeys a rapid disappearance of the diplococci took place when they were brought into contact with the serum, and, as Flexner states: "While it is undoubtedly important to secure neutralization of the endo-toxin yielded by the diplococcus on disintegration, the effects of restraint of growth and multiplication of the diplococcus may, at some period of the disease, be of even greater significance."

The leucocyte count of the blood in our cases showed in several instances a remarkable fall after the injection, particularly the first. In *Case I.* they fell from 13,810 to 5,600 on the day following 30 c.c. of serum. They rose to 8,720 on the third day, twenty-four hours after 10 c.c. of serum, and 14,080 were present the day after the third dose; the number of colonies from the spinal fluid at the same time showed marked daily diminution. The leucocytes subsequently rose to 23,000 and 24,000, but as the condition was accompanied by a large collection of hydrocephalic fluid charged with diplococci this may have been responsible for the rise in the leucocyte count. In *Case II.* there was a similar but less marked relative fall from 21,800 to 13,350 on the day following the first injection and subsequently a slow diminution. In *Case IV.* the count was practically identical before, and twenty-four hours after, the first injection, but in another forty-eight hours they fell from 30,000 to 10,600. The fifth case also showed a fall, but, unfortunately, a daily count was not made.

It would thus appear that the use of the serum tends to lessen the number of leucocytes in the circulating blood, and we may therefore, perhaps, infer that the migration of leucocytes into the membranes is diminished.

In making the injection it is advisable to use a general anæsthetic. The fluid is warmed and injected slowly at the rate of 1 c.c. per half

minute. Following the operation shock was sometimes present, and it was considered advisable to use camphor or strychnine hypodermically. In addition to the serum the usual measures of treatment were adopted, and symptomatically considerable benefit was obtained by small doses of morphine and by warm baths.

Although the temperature usually falls after the first two or three doses of serum, yet its use, if persisted in, frequently produces some unfavourable symptom. After repeated doses there is frequently a rise of temperature in six to twelve hours amounting to two or three degrees, sometimes accompanied by increase of headache, greater rigidity of the neck and vomiting. In the fifth case a relapse came on the day following the use of the serum after it had been discontinued for four days, marked by a rise of temperature lasting for seven days, headache and retraction of the head. This may, of course, have been a coincidence, as this event is so frequently seen in the untreated disease.

It is not easy to lay down definite rules as to dosage. Flexner advises daily injections of serum for three or four days, in doses of not more than 30 c.c., and considers it advisable, but not essential, to withdraw at least this amount of fluid before injection. The early use of serum is more likely to be attended by success. Of our cases, one, in whom treatment was commenced on the first day, showed a remarkably rapid improvement, regaining consciousness in a few hours and the temperature falling to normal in twenty-four hours. In the other successful cases treatment was begun on or before the third day, whilst in the only fatal case the injection was given on the fifth day.

A single injection, according to some of the reported cases, seems to have been sufficient to control the disease, and in view of the toxic manifestations which appeared after repeated injections in some of our cases, we believe it is wise not to use the serum more frequently than necessary.

Besides the indications derived from temperature and pulse, daily bacteriological examinations are most helpful, and the presence of bacteria in the fluid would certainly appear to be an indication for the continuance of treatment.

Where mild symptoms persist, such as slight elevation of temperature, retraction of the head or Kernig's sign, we consider it safer to perform a simple puncture to relieve pressure rather than to continue the use of the serum with the risk of producing toxic symptoms.

In conclusion, we wish to express our obligation to Dr. Flexner for supplying the serum, and to Dr. Duval and his assistants, Drs. Lyman and Hillman, for carrying out the bacteriological work.

## A CASE OF TUBAL PREGNANCY.

BY

A. LAPTHORN SMITH, B.A., M.D.,

Surgeon-in-Chief of the Samaritan Hospital; Gynæcologist to the Western Hospital; Gynæcologist to the Montreal Dispensary; Consulting Gynæcologist to the Women's Hospital; Fellow of the Munich Gynæcological Society.

While preparing a paper of forty operations for tubal pregnancy, with two deaths, I quoted a case, reported by the well known author, Dr. Henry C. Coe, of New York, of a woman whom he was called to curette for supposed miscarriage, and who, when he was in the middle of the operation, suddenly collapsed. He recognized that it was a tubal pregnancy, called the ambulance, went over to the large hospital on the next street, and had her abdomen opened and the artery tied within a quarter of an hour, and saved the woman's life. While I was writing this little story down from memory, my telephone rang, and one of my former pupils, Dr. Christie, asked me to curette a patient of his who had had a miscarriage a few days before, and who suffered a good deal from bearing down pains, which made him think that the placenta had not all come away. With Dr. Coe's case at the end of my pen it was quite natural that I should ask him if he was sure that it was not a tubal pregnancy. He thought not, but said I could make a good examination under ether before curetting, as she was so tender that he had not been able to examine her as well as he would like. Next morning I met Dr. Christie at her home, and when she was anaesthetized I was able to make a very thorough examination by the vagina and rectum. A mass could be felt very distinctly surrounding the uterus and pushing the latter over to the right. The rectum was quite empty and clean, so that the finger could be passed all around the boggy mass in Douglas' cul de sac. The uterus was not fixed as in pelvic peritonitis but was fairly movable.

I had no hesitation in making a diagnosis of tubal pregnancy and, instead of curetting, I called the ambulance and sent her to the hospital. The doctor gave me the following history: She had been married exactly one year, and had always been regular, the last period being on the 25th March, 1908. The period due on the 25th April did not come on; one week later, (2nd May) she began taking pennyroyal pills to bring on her periods. One week later, 9th May, she was flowing a good deal and had the bearing down feeling, but had never had any fainting spells. She was not pale, but was distended; her temperature was subnormal and her pulse was not over 90. She had never had any pain in the right side as long as she could remember, so that there was

very little to go upon, to say that she had either appendicitis or tubal pregnancy, and yet she had both. For on opening up at the Samaritan Hospital three hours later, and detaching the omentum and a few coils of adherent intestine, I came upon a quart of black clot in the midst of which a round mass was found as large as a walnut, which proved to be the ovum. After cleaning out the clot as much as possible without unduly prolonging the operation, the left tube and ovary were removed. The bleeding still being very free, a further search for its source proved it to be coming from a knuckle of small intestine at the bottom of Douglas cul de sac. This was carefully detached and brought out of the wound and found to be eaten more than half through over an area of two square inches. This came about in the following manner: the ovum was impregnated the day and the hour and the minute that it came out of the Graafian follicle on the 25th of April, but a kink in the tube prevented it from being carried any further than the fimbriated end. It began at once to send its suckers into the mucous membrane at the end of the tube, but in a day or two this area was too small to accommodate them all, and so they seized upon a neighbouring coil of intestine, and bored into its blood vessels. The latter, to save itself from perforation and the general peritoneal cavity from infection, rapidly took on phagocytic or defensive action, which at the same time thickened the wall of the intestine to a quarter of an inch and surrounded it with lymph, to wall the attacked part off from the rest of the peritoneal cavity. In a week the tiny ovum had grown to the size of a walnut and torn itself away from the fimbriated end of the tube depending on its rootlets in the intestine for its support. But the raw surface left in the tube began to bleed and this blood clotted. Although the passage in the tube was too constricted to allow the ovum to pass through it, it was large enough to allow a small stream of red serum to escape, and this was what came away from the uterus, making her and her doctor think that she had a miscarriage. But as no foetus came away and she had a bearing down feeling, they very naturally thought it was a miscarriage with the ovum still retained. The real reason of the bearing down feeling came from the rectum, which felt the clot in Douglas' cul de sac pressing upon it, but could not say whether the pressure came from within or without. To come back to the operation; the thickened and bleeding coil of small intestine and the oozing omentum were wrapped up in hot towels and the cul de sac of Douglas packed with hot gauze sponges and the right tube was examined. It and the ovary were bound down by old and dense adhesions and were with difficulty brought up. One of the adhesions proved to be the appendix.

which was so adherent to the tube that it was difficult to say where one began and the other left off. They were removed in one piece. Before the operation I explained my views about what was best to be done about the ovaries to the husband, and he left the matter in my hands. My views are briefly, first, that tubal pregnancy is a malignant disease, almost always ending in death if not removed early; second, that it does not happen to healthy ovaries and tubes; there must first have been pelvic peritonitis in order to close or constrict one tube; third, that the left tube is generally attacked first, but a year or two later the same thing overtakes the other one, so that there are hundreds of cases recorded of a second running of the gauntlet for one's life and a second dangerous operation to save it. We should never knowingly expose a woman to a second laparotomy; I therefore think it best for her and for the reputation of surgery that whatever has to be done should be done once and for all; that is why I remove both ovaries and tubes. That is why I removed the appendix; that is why I sewed the uterus up to the abdominal wall and that is why I closed the incision with three layers of sutures. I feel reasonably sure that she will never have to have the abdomen opened again.

This was my forty-first operation for tubal pregnancy, of which the thirtieth and the thirty-eighth died. It is a week since the operation was performed and so far she has not had a bad symptom. She had no prolonged sterility, no irregular menstruation, no fainting spells, no history of previous attacks of appendicitis, no dyspennorrhœa; nothing to help a diagnosis, but a supposed miscarriage with a mass in Douglas' cul de sac pushing the uterus to the right. Had I not been writing a paper on the subject at the time I might have omitted a careful preliminary bimanual examination and have gone ahead with the curetting, and had a fatal internal hæmorrhage on the table. Her physician very truly said to me that it would be a terrible thing to open her abdomen and not find a tubal pregnancy, when I told him I was only ninety-five per cent. sure that it was; but I added if we were to wait until we were a hundred per cent. sure of what we would find we would wait until most of the women were dead. The time to operate is when you know that there is something requiring operation, and you *suspect* that that something is a tubal pregnancy.

THE

# Montreal Medical Journal.

*A Monthly Record of the Progress of Medical and Surgical Science.*

EDITED BY

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## THE ANNUAL TYPHOID VISITATION.

The city of Montreal, like most other cities on the continent, suffers heavily from typhoid fever, and it behoves us to be on the lookout that every possible source of the disease be shut off as soon as it is recognized. This prevision has not always to be exercised most carefully within our own borders, as is exemplified by the state of affairs existent at the present moment. This summer there was a definite outbreak of typhoid fever in one of the villages on the shore of Lake St. Louis: we have reason to believe that it arose from a case on a milkman's farm; most of, if not all the cases were brought to Montreal as soon as they were recognized, and so they ceased to be dangerous. But by reason of the situation of the villages on Lake St. Louis, combined with the way in which the water and ice supply of Montreal are taken, a case carried to its termination in one of those villages may infect a large number of cases in this city, if the excreta are allowed to drain by the usual channels. As far as is known, no outbreak in the city has yet occurred, as a result of the above mentioned small epidemic. The lesson, however, is plain: it is that a case in one of those littoral villages is eminently dangerous to Montreal, unless its excretions are destroyed; at present, the onus of responsibility for this rests on the chance practitioner, or on someone, probably a summer resident, who has magisterial authority for the time being, in the municipality concerned. It is not quite fair

that this responsibility should be on the shoulders of anyone but an officer of the public health service. We presume that the health officers of the city have no jurisdiction there, and have abundance of work of their own to which to attend to. Again, we presume that the health of villages such as those on the Lake St. Louis shore, which have no health officers of their own, are in charge of the officers of the province. It would be well, we think, that the authorities of the province should be asked by the municipal authorities concerned, to exercise, during the summer months, an especially close observation upon places such as the villages on Lake St. Louis, which are so situated geographically, as to prove important to the health of a large city. A case of typhoid fever in Dorval, or Dixie, or Pointe Claire, or Beaconsfield, has opportunities for evil a hundred times more potent than a case in an inland village of the same size, because one such case might set up a hundred in Montreal. It is well when we can see these dangers in time to prevent them, instead of waiting for an epidemic to impress the lesson upon us, and we offer these suggestions as important for our future well-being.

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#### NEW AUSPICES AT MCGILL.

The seventy-seventh session of the Medical Faculty of McGill University opens this month under new and encouraging auspices, and the University is justified in looking forward with good hope to the work of the coming academic year.

Professor F. J. Shepherd was unanimously elected Dean, in succession to Professor T. G. Roddick, and has already assumed the direction of affairs. We need not refer to the popularity of this appointment, both among teachers and students, for it has long been recognized that the energy and enthusiasm which Dr. Shepherd has applied to the department of Anatomy would be well bestowed on the wider field of the college at large. There has been no time when these qualities were more necessary than the present, when the Faculty of Medicine is spreading out from the confinement of antagonistic circumstances. The new building, which will allow great expansion, has been commenced; our strong rival, the University of Toronto, adopts this year the five-year course, which will bring the two colleges upon an equality in the matter of choice exercised by the intending student, as far as length of course is concerned; best of all, the staff begin their work with the knowledge that strenuous and united work, such as that of the past collegiate year, can make headway against the most adverse circumstances. There is good authority for the state-

ment that stone walls do not make a prison, nor do they any more make a college, and enthusiasm and hard work in the coming year will continue to build up the university, so that when the buildings are complete they will but add a more fitting external appearance to the essential part—a live institution.

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#### THE NEW DEAN.

The most notable event in the opening of the session is the presence of a new Dean. The applause at Convocation last June when the appointment of Dr. Shepherd as Dean of the Faculty of Medicine was announced, showed how acceptable it was not only to his confreres in the faculty, but also to the body of students generally. On no other member of the faculty could the mantle, we think, have fallen with such general approval. Professionally the new Dean is of the highest standing. He has earned a well merited continental reputation as an anatomist and as a surgeon. His museum of anatomy and comparative anatomy which he had collected, during the quarter of a century he presided over this department, was not only of great educational value, but contained examples of many rare abnormalities. Unfortunately it was almost entirely destroyed by the fire of last year. From the great Hebra he early acquired an interest in dermatology, and a few years ago was chosen to fill the position of president of the American Dermatological Society, of which, we believe, he was an original member, and at whose meetings he has been a frequent contributor. Two years ago Edinburgh honoured him with the honorary degree of LL.D. With the exception of one other member, who, we understand, declined the office, feeling unequal to its onerous duties, Dr. Shepherd is the senior member of the faculty, and has ever since his connexion with it taken an active interest in all its departments. When the late Dr. Craik resigned the deanship the faculty passed a resolution that the period of office should be limited to five years, but owing to the important work rendered necessary by the disastrous fire of April of last year, Dr. Roddick's tenure of office was prolonged for an additional year. In recommending Dr. Shepherd for the position the faculty, we understand, reasserted the limit of five years for this appointment.

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#### THE TUBERCULOSIS EXHIBITION.

The tuberculosis exhibition will be held in Montreal, in the Arena, on November 3rd to 13th. The idea of the exhibition is to teach those who attend, in as graphic a way as possible, something about the disease which may assist them in combatting or preventing it. The plan of

holding such exhibitions has proved a very useful one, and the League for the Prevention of Tuberculosis is entitled to all the encouragement and assistance that can be given them. Dr. Fraser Gurd has assumed the duties of secretary from the 1st of September until the exhibition, and from him any information that is required may be obtained. His present address is The Imperial Bank Building.

The exhibition is intended primarily to interest the laity, but will be of even greater interest to the medical men of the district. In order that the greatest possible benefit may arise from the undertaking, the co-operation of every physician is hoped for.

A collection of moderately complete statistics showing the incidence of this disease, death-rate, etc., is being prepared. The various methods for the handling of consumptives and the cure of consumption will be demonstrated. A fairly representative gathering of many of the most interesting speakers upon tuberculosis will be heard.

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#### ADAMI'S PATHOLOGY.

We take advantage of the temporary absence from the editorial board of our colleague, Professor Adami, to offer him our good wishes and congratulations upon the publication of his "Principles of Pathology." During twelve years Professor Adami had laboured at this book, and we feel sure that it is vastly the better for the repeated and yet repeated mental overturnings to which many chapters have been subjected. Our purpose is not to laud Professor Adami beyond reasonable measure, but we feel sure that a milestone has been erected in the bibliography of pathology in the English language, and we are glad to have it the handiwork of our colleague and the product, in a sense, of our University.

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The coming International Congress on Tuberculosis is a vast undertaking, consisting, as it does, of a three weeks session at Washington, beginning on September 21st.

The section work of the Congress will be done in the week September 28 to October 3. During that week there will be two general meetings.

During the three weeks September 21 to October 12, a tuberculosis exhibition will be open, and a course of special lectures by distinguished men will be in progress. Clinics and demonstrations of unusual interest will be arranged for the whole period.

#### LIST OF SPECIAL LECTURES.

In connection with the Congress, a series of special lectures will be delivered in Washington and elsewhere by eminent foreigners. The names of the speakers, and the cities in which they will lecture follow.

Bernard Bang, of Copenhagen; Washington, October 3. Subject: "Studies in Tuberculosis in Domestic Animals and what we may learn regarding Human Tuberculosis."

A. Calmette, of Lille, France; Philadelphia, September 26. Subject: "Les nouveaux procédés de diagnostic précoce de la Tuberculose."

Emil Coni, of Buenos Ayres; Washington, October 2. Subject: "La Lucha contra Tuberculosis en la Republica Argentina."

Arthur Newsholme, of Brighton; Washington, September 29. Subject: "The causes which have led to the past decline in the death-rate from Tuberculosis and the light thrown by this history on Preventive action for the future."

Gotthold Pannwitz, of Berlin; Philadelphia, September 23. Subject: "Social life and Tuberculosis."

R. W. Philip, of Edinburgh; Boston, October 6. Subject: "The Anti-tuberculosis Programme-Co-ordination of Preventive Measures."

C. H. Spronck, of Utrecht; Boston, October 7.

Andres Martinez Vargas, of Barcelona; New York, October 9. Subject: "Tuberculosis of the Heart, Blood and Lymph Vessels."

Theodore Williams, of London; Philadelphia, September 25. Subject: "The Evolution of the Treatment of Pulmonary Tuberculosis."

Dr. Maurice Letulle and M. Augustin Rey (joint lecture), Washington, September 30. Subject: "La lutte contre la Tuberculose dans les grandes villes par l'Habitation; méthodes scientifiques modernes pour sa construction."

Dr. L. Landouzy, of Paris; Baltimore, October 5.

Dr. A. A. Wladimiroff, of St. Petersburg; Washington, September 28. Subject: "Biology of the Bacillus."

Prof. N. Ph. Tendeloo, of Leiden. Subject: "Collateral Tuberculosis Inflammation."

The exhibition will assemble illustrative materials from all parts of the civilized world. Members of the Congress will find many opportunities to acquire or to increase, by exchange or otherwise, a valuable collection of illustrative objects. Literature forms an important part of many exhibits, and much of this literature can be had on the spot, for the asking, or will be sent, on written request, to any address.

The papers announced in the official program will be printed in advance, and will be distributed on the day of their presentation. They will be printed in German, French, Spanish and English. The proceedings of the Congress will be carefully edited and will be published within three months after adjournment.

The section proceedings, with the special lectures, the discussions, and an account of the exhibition, will make four substantial volumes, about 2,000 pages.

There are two classes of members: Active members pay a fee of five dollars, and they receive, besides the ordinary privileges of membership, the full set of published transactions without extra charge. Associate members pay a fee of two dollars. They do not receive the published transactions, or vote in the Congress. They receive the official badge, the printed matter distributed during the Congress and at the exhibition; they share in the entertainments, attend the meetings, clinics, demonstrations, etc., and have the benefit of special transportation and hotel rates.

The sections beginning work on September 28th, are seven in number: Section I, Chairman, Dr. William H. Welch, Pathology and Bacteriology; Section II, Chairman, Dr. Vincent Y. Bowditch, Clinical Study and Therapy of Tuberculosis; Section III, Chairman, Dr. Charles H. Mayo, Surgery and Orthopedics; Section IV, Chairman, Dr. Abraham Jacobi, Tuberculosis in Children; Section V, Chairman, Mr. Edward T. Devine, Hygienic, Social, Industrial and Economic Aspects of Tuberculosis; Section VI, Chairman, Surgeon-General Walter Wyman, State and Municipal control of Tuberculosis; Section VII, Chairman, Dr. Leonard Pearson, Tuberculosis in Animals, and its relation to Man.

President Roosevelt has accepted the Presidency of the Congress, and a thoroughly international, as well as national response will undoubtedly be the outcome of the untiring efforts of the committees in charge.

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## Reviews and Notices of Books.

**THE NATURAL HISTORY OF CANCER**, with special reference to its causation and prevention, by W. Roger Williams, Fellow of the Royal College of Surgeons, New York. William Wood and Company, 1908. Price \$5.00 net.

Mr. Williams has long been known as having a mission regarding the debated questions of cancer, and his numerous writings are well known; he favours the view that cancer is the outcome of over-nutrition,—perhaps the expression “gross-feeding” is even more applicable, and that the meat-eating nations, and the most luxuriously fed parts of those nations are most liable. To write fairly upon cancer, when one has a decided leaning to one theory rather than to another, at a time when the apparent facts are chaotic, is a difficult task; but one must not for

a moment charge Mr. Williams with having done his task in any but a quite well-balanced and fair way. It is not just to him, to think that we have here the work of an enthusiast who is advancing his own views in a partisan way, for Mr. Williams' book is at once particular, as to his own view, and catholic as to the facts. He approaches all the questions upon a broad biological basis, and with a remarkable command of the literature.

The result is that one has an excellent dissertation upon the biological facts, and a full series of statistics with their interpretations, embodied in a style that is easy and clear. When one has read the book, knowing the author's strong views, one is surprised at the reasonable way in which he has subjected theory, even his own theory, to a dispassionate review of the facts.

The author, now as previously, tends to support a broadened modification of Cohnheim's rest theory; at the same time his views of the inherent power of growth, and the relationship of tumor growth to hyperplasia of inflammatory and of other origins, are essentially sound. We venture to think that Mr. Williams lays too great stress upon the microbic school of investigators, whom he strongly combats, but his chapter upon the bibliography of the supporters of this school of thought is very interesting. It is very pleasant to find an author who makes use of such wide biological illustration for his purposes, for in the auxiliary sciences of zoology and botany Mr. Williams is at home. In the discussion of each subdivision of the subject, his own view upon the question in hand is briefly and inobtrusively, but definitely stated.

We can heartily recommend this book to all who are interested in the subject of cancer, for agreeing or disagreeing with the author's particular views, the reader will find in it a very comprehensive statement of the mass of information now at our disposal regarding the cancer problem. The volume is light, the type clear and the index full.

**MODERN MEDICINE, Its Theory and Practice, in original contributions by American and Foreign authors. Edited by WILLIAM OSLER, M.D., Regius Professor of Medicine in Oxford University, England, assisted by THOMAS McCRAE, M.D., Fellow of the Royal College of Physicians, London. Vol. IV. Diseases of the Circulatory System. Diseases of the Blood. Diseases of the Spleen, Thymus and Lymph-glands. Illustrated. Philadelphia and New York, Lea and Febiger, 1908.**

This volume is devoted to the diseases of the circulatory system, the blood, the spleen, the thymus and lymph-glands.

The greater part of the work is occupied by the affections of the circu-

latory system. The writers in this section are to be congratulated on having produced a series of articles of a high scientific and literary character, and in the comparatively limited space of 569 pages the student of cardiac pathology will find both the older and newer views on this subject fully and clearly stated.

An excellent and thoughtful article is contributed by Hoover on general considerations in cardio-vascular disease. Although giving full credit to the myogenic theory of the cardiac functions he refers to the importance of the neurogenic theory. The only fault we can find in this article is its compression into forty pages, only allowing of a very brief discussion of some of the obscure problems in connection with the normal and abnormal movements of the heart.

Babcock's chapter on myocarditis, a somewhat difficult subject to treat in a systematic article, is skilfully handled. The writer lays some stress on chronic infective processes, e.g. cholecystitis and appendicitis, as a cause of myocardial disease. The section devoted to treatment, whilst recognizing the limitations of the subject, is judicious and helpful.

The articles on acute endocarditis, valvular lesions, diseases of the arteries and aneurysm, are contributed by the distinguished editor. In the chapter on endocarditis, although the different types of disease are clearly dealt with, there is no attempt to divide the different forms into sharply divided classes, a method of treatment which must commend itself to both the clinician and the pathologist. The tonsils are regarded as the point of entry for micro-organisms infecting the valves in a large number of cases of rheumatic or obscure origin. Reference is made to malignant types of endocarditis with little or no fever. The chapter on valvular disease, written in conjunction with Gibson, is an admirable one, and the portion dealing with treatment is particularly valuable; the remarks on digitalis should clear away the confusion which even yet clings to the indications for the administration of this drug.

Dr. Maude Abbott's article on congenital cardiac disease is one of the best in the book, and obviously represents an enormous amount of painstaking research. Its value to future students of this subject is greatly enhanced by a full bibliography, a feature which, we regret to see, is omitted by many other contributors. Another Canadian physician, McPhedran, contributes the article on pericarditis; his treatment of the subject is full and clear and well repays perusal. Other chapters on the heart, on hypertrophy and on insufficiency and dilatation, by Gibson, on functional disease of the heart by Hoover, on thrombosis, embolism and phlebitis, by Beemer, and diseases of the lymphatic vessels by Warthin, conclude this portion of the work.

The sections on the anæmias and leukæmias are written by Cabot, and form an authoritative presentation of existing knowledge on these subjects. The article on pernicious anæmia is based on an analysis of 1,200 cases of which 337 have come under the personal observation of the writer. The etiological factor of the disease is regarded as a toxin, probably generated in the hæmopoietic organs. The severe anæmias of pregnancy, of recurring hæmorrhages and of syphilis are regarded as secondary, and are to be distinguished as a rule from the primary form. Cases in which a small carcinomatous growth of the stomach has been found at autopsy are looked upon as an accidental complication, if the blood characters correspond with pernicious anæmia, the anæmia due to gastric cancer usually presenting the characters found in a secondary anæmia. The writer, we believe rightly, lays but little stress on Hunter's views on oral sepsis as an etiological factor.

That chlorosis is becoming a much less common malady than it was ten years ago, is a statement we do not recollect having seen in print before. The statistics given on this point are convincing, and we believe they apply in this city quite as much as in the centres from which the returns were obtained.

Purpura and hæmophilia are fully and adequately dealt with by Pratt, as are diseases of the spleen by Lyon. An excellent description of the thymus and lymph-glands by Warthin concludes the volume. The cases now so frequently recognized of sudden death associated with enlarged thymus are attributed to mechanical pressure on the trachea. The author refers to the narrow upper opening of the thorax in support of this view. He also believes that temporary enlargement of the organ occurs which may escape notice at autopsy. Many fatal cases of "cramps" while swimming are also regarded as of thymic origin. Recognition of the enlarged thymus is materially assisted by radiography, and the appearance is illustrated by an excellent plate.

We can cordially recommend this volume as a standard work of reference, and one which will prove of real assistance to the practitioner in his daily work.

F.G.F.

A TEXT-BOOK OF THE DISEASES OF THE NOSE AND THROAT. By D. BRADEN KYLE, A.M., M.D., Professor of Laryngology and Rhinology, Jefferson Medical College. Consulting Laryngologist, Rhinologist, and Otolologist, St. Agnes's Hospital, Fellow of the American Laryngological Association, etc., with 219 illustrations, 26 of them in colours, 4th edition, thoroughly revised and enlarged. Publishers, W. B. Saunders Company, 1907.

The earlier editions of this work have been previously reviewed in this

journal, and we shall therefore simply refer to some of the more interesting features. The author states in the preface of this edition, that the work has been thoroughly revised, and many new chapters have been added. The chapter devoted to the deformities of the nasal septum has been ably dealt with. J. A. White's ingenious operation for the correction of saddle back deformities of the nose has been minutely described and illustrated.

We heartily agree with the writer upon the advisability of conservatism in dealing with the accessory nasal chambers, but Killian's operation for the radical cure of chronic frontal sinusitis has not been described, an omission one would hardly expect to find in a work otherwise so complete. That portion of the book devoted to bronchoscopy is one of the many new chapters added. The principles involved and the technic used can, as the author states, be applied also to laryngoscopy, laryngo-bronchoscopy, tracheoscopy, oesophagoscopy, gastroscopy, and possibly magnetism. The technic of this work has been described by Chevalier Jackson, and needs no further comment.

The chapters devoted to voice, speech, defects of speech, and relation of voice to hearing, make very interesting and instructive reading.

The writer acknowledges that he has quoted verbatim in many instances from well known writers, yet I venture to think this in no way detracts from the work, but rather enhances its value, which is stamped with Kyle's good judgment and personality.

The publishers have done their work well. The print is good and the illustrations are excellent. We therefore recommend this book to those who are interested in nose and throat work. R.H.C.

STUDIES FROM INSTITUTE FOR MEDICAL RESEARCH. Federated Malay States. Vol. 3, part 3. Breeding Grounds of Culicidæ, by C. W. Daniels, M.B., Camb., M.R.C.S. (England), Director of the Institute for Medical Research, Federated Malay States; The Culicidæ of Malaya, by G. F. Leicester, M.B., C.M., Edinburgh. Assistant in the Institute for Medical Research, Federated Malay States, Singapore. Kelly and Walsh, Limited, Printers. Published by the Federated Malay States Government, 1908. Price 7s. 6d.

This is a technical catalogue with anatomical descriptions and remarks of general interest from an entomological standpoint upon the culicidæ of the localities above mentioned. Its application is distinctly limited, but inspection of the volume permits the reviewer to point out

how admirable such contributions to science are, especially as denoting the interest of the Government of the Malay States in original work.

**MEDICAL EXAMINATION QUESTIONS**, set at the University of Edinburgh, the Conjoint Board of the Royal College of Surgeons, Edinburgh, the Royal College of Physicians, Edinburgh, and Faculty of Physicians and Surgeons, Glasgow, for several years. Edinburgh. John Currie, 1908. Price 2s. net.

This is a little volume of 230 pages, which consists of the papers set at the various examinations in Scotland for the past few years. There is no attempt at comment nor answer, but the student who is concerned will be glad to find a large number of papers collected in a convenient form.

**PHYSICAL SIGNS OF DISEASES OF THE THORAX AND ABDOMEN**, by James E. H. Sawyer, M.A., M.D., Oxon., M.R.C.P., London, Casualty Assistant Physician and Medical Registrar, the General Hospital, and Physician to out-patients, the Children's Hospital, Birmingham, London. Baillière, Tindall and Cox, 8, Henrietta street, Covent Garden, 1908. Canadian agents, J. A. Carveth and Co., Toronto, Ontario. Price \$1.50.

This book, covering space that has been thoroughly written over before, fulfils its promise, which is that it is a book suitable for students. It deals with the simpler manifestations of the chief methods of examination; and the main points in differential diagnosis are dealt with more than is usual in books of this scope. There are twenty illustrations drawn by the author: of these, the ones on pages 20 and 23 have rather too much detail crowded into them, and the cardiac clock on page 88 seems to us scarcely obvious enough to one who is not quite conversant with the cardiac sounds. Coupled with this very mild criticism, we make the statement that the book is useful, the diction clear, and the making of the volume good.

**CONSUMPTION: HOW TO PREVENT IT AND HOW TO LIVE WITH IT.** Its nature, causes, prevention, and the mode of life, climate, exercise, food, and clothing necessary for its cure. By N. S. Davis, A. M., M.D., Professor of Principles and Practice of Medicine, Northwestern University Medical School, Chicago; Physician to Mercy and Wesley Hospitals. Second edition, thoroughly revised. 12mo. 172 pages. Bound in extra cloth. Price, \$1.00, net. F. A. Davis Company, Publishers, 1914-16 Cherry Street, Philadelphia, Pa.

Dr. Davis' book was first published, if we mistake not, seventeen years ago, since which time it has been often reprinted, but not revised. The

present reconstruction consists in additions and modifications, which render it better adapted to present day needs; such an addition is the chapter on sanitariums. The book is sane and sensible; it deals with the various questions of treatment in a brief, decisive way, and where required, there is good emphasis laid upon points that require to be emphasized. There are many books upon this subject, and there is need for them all: we can cheerfully recommend Dr. Davis' book as worthy of a place among the good ones.

THE EXTRA PHARMACOPOEIA, revised by W. Harrison Martindale, Ph.D., F. C. S., and W. Wynn Westcott, M. B. Lond., D.P.H. H.M.'s coroner for north-east London. Thirteenth edition, London. H. K. Lewis, 136, Gower street, W.C., 1908. XL+1163 pages, med. 24-mo. Price 10s. 6d. net.

We have had occasion frequently to review the earlier editions of this book, and always with commendation; the book becomes a bigger compendium of knowledge in a smaller space with each successive publication; let it suffice to say that the present edition, a thinner volume than the 12th edition, contains 128 pages more, and the authors may be forgiven if they point with pride to the fact that while the 1st edition 1883 contained 1,600 items in the index, the present contains 10,000. The preface contains comments upon additions of interest. We note that Fuller's earth is in disfavour, because of the possibility of its causing tetanus; also that tartaric acid of British manufacture is uniformly free from arsenical contamination. The paragraph on Patent Medicines contains some items of interest, such as this, that Munyon's Blood Cure and Munyon's Kidney Cure on quantitative examination, contain 100% of sugar. Mrs. Terry's Drink Cure contains only 98% of sugar, and 2% sodium chloride. These, however, are merely noted in passing; there is scarcely a page in the whole book that has not some fact of practical interest, and the 13th edition is thoroughly to be commended, not only as a pharmacopœial compend, but also as conveying a great deal of useful and up-to-date information in many departments of scientific medicine.

TREATMENT OF GONORRHOEA IN THE MALE. By CHARLES LEEDHAM-GREEN, M.B., F.R.S., Surgeon to Queens Hospital, Birmingham, Surgeon to Birmingham and Midland Hospital for Children, Consulting Surgeon to Birmingham General Dispensary. Second Edition, London, Baillière, Tindall and Cox. J. A. Carveth and Co., Ltd., Canadian Agents, Toronto, 155 pp. Price \$1.50.

The first edition of this small but well-known work is but two years old. To those who are acquainted with it, it is not surprising that a call

for a second edition has followed so quickly. In view of the countless pages yearly devoted to gonorrhœa and its treatment, one might have expected that the sum total of what is new in the last two years would have caused a more considerable alteration in the first edition. This has been unnecessary, and the additions and alterations are few but important. They include a description of Goldschmidt's new urethroscope which is the first published in an English text book of this ingenious instrument, and a brief description of Bier's hyperæmia as applied to gonorrhœal arthritis. The use of vaccines as applied to the more chronic forms of gonorrhœal infection, especially of joints, might perhaps have received more extensive treatment, but the book is eminently conservative and practical.

In the first part, which is devoted to urethritis, its pathology and treatment, and includes a short and clear presentation of the anatomy and physiology of the bladder and urethra, we are glad to find a short account of Mr. Leedham-Green's views on the sequence of the act of micturition as compared with Finger's. Mr. Leedham-Green's experiments in this respect have practically disproved Finger's views, views which long governed the mind of the genito-urinary surgeon.

The second part is devoted to the complications of gonorrhœa and calls for no special remark beyond the fact that the author expresses himself as a firm believer in gonorrhœal pyelitis, though unable to prove his point. The final chapter—the proof of the cure of gonorrhœa and its bearing in marriage—is a highly important one. The author strongly believes in the prolonged infectiousness of this disease.

The book is short, clear, eminently precise and practical though not abounding in prescriptions. It presents the latest views on the bacteriology, pathology and treatment of this wide-spread disease and of its complications, as very few books known to us do. To those who have suffered from the teaching of the ordinary text book of surgery, as most have, in short to all, the book is to be thoroughly recommended.

R. P. C.

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## Medical News.

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In the *Journal A. M. A.*, Aug. 15, 1908, the annual Educational number, are presented statistics of medical colleges, students and graduates for the year ending June 30, 1908. There were 22,602 students studying medicine last year, the lowest number in fifteen years. These are divided into 20,936 in the regular schools, 891 in the homeopathic

schools, 479 in the eclectic, 90 in the physio-medical and 206 in non-descript or unclassifiable schools. For the homeopathic and eclectic schools the totals are the lowest since 1880.

There were 4,741 medical graduates last year, likewise the lowest number in fifteen years. The regular schools had 4,370; the homeopathic, 215; the eclectic, 116; the physiomedical, 12, and the nondescript colleges, 28. The homeopathic schools have the lowest number since 1880 and the eclectic schools the lowest since 1900.

There are 9 less colleges than in 1907, the total now being 152, consisting of 123 regular, 16 homeopathic, 8 eclectic, 2 physiomedical and 5 nondescript or unclassifiable schools.

Women students constitute 3.7 per cent. of all students, about the same proportion as last year. Statistics show that college terms are being gradually lengthened.

Tabulated statistics of medical students and graduates for the past eight years show the average percentage of graduates to the total matriculants was 20.4 instead of 25 (one class of four). Four colleges, however, graduated on an average over 30 per cent. of all their matriculants.

A list is published showing that 374 medical colleges organized in the United States have ceased to exist under their original titles, some becoming extinct, some having merged into others, and some taking new titles. A portion of these were fraudulent institutions.

Of the 152 existing colleges, 13 now require one or more years of work in a college of liberal arts for admission, and 40 others have voted to establish this requirement in 1910 or before. Five state examining boards have established the requirement for preliminary education of one year's work in a college of liberal arts, which applies to all beginning the study of medicine in the session of 1908-9 and thereafter.

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## Retrospect of Current Literature.

### MEDICINE.

UNDER THE CHARGE OF DRs. FINLEY, LAFLEUR, HAMILTON, AND HOWARD.

S. FLENNER AND J. W. JOBLING. "Antimeningococcic Serum."  
*Sour. A. M. A.* July 25, 1908.

The authors have tabulated 357 cases of epidemic cerebrospinal meningitis treated with the antimeningococcic serum, taking account of all the leading features, all having been diagnosed bacteriologically as well as by the usual clinical tests. Forty-three moribund patients

or fulminant cases, in which the patients survived the first serum injection less than 24 hours were excluded from the tabulation. Under one year of age the recoveries were 50 per cent. and the ratio rapidly increased with the age, being 92 per cent. in patients between 5 and 10 years of age. Above that it again fell to 67.9 per cent. in those over 20, which is accounted for in part by the fact that a large number of these were treated by scattered physicians who had had little experience with the serum. Wherever a series of cases have been treated by one observer, the recovery rate at this age has been high. The histories were sufficiently explicit in 328 cases to show approximately the period of the disease when the injections were begun. In 121 patients injected between the first and third days, there were 103 recoveries (88.1 per cent.); in 100 first treated between the fourth and seventh days, 78 recoveries (78 per cent.); in 107 treated only after the seventh day 68 recovered (63.6 per cent.). The benefit of early injection is clearly shown, but the authors think the outlook for later cases is still encouraging with the treatment. In 207 cases the histories were sufficiently definite as regards the mode of termination of the disease to show that 201 terminated by lysis, and 69 by crisis. The average duration of active symptoms in the 220 cases where it could be ascertained was about eleven days. This later study has confirmed the former observations of the rapid decrease of the diplococci under the influence of the injections, the lessened turbidity of the meningeal exudate and the decreased leucocytosis in favourable cases. This series of observations also shows, like the earlier ones, that in the great majority of the cases, the recovery after the serum treatment is complete.

HENRY KOPLIK, M.D. "Congenital Pyloric Spasm and Congenital Hypertrophic Stenosis of the Pylorus in Infancy." *American Journal of the Medical Sciences*, July, 1908.

This condition has of late years aroused increasing interest, and is no longer to be classed among the very rare disorders of infancy. Its history is briefly reviewed, and an attempt made to explain the confusing difference of opinion as to the nature of the disturbance. Is it a spasm of the pylorus, or hypertrophy with stenosis, or both? The controversy in some quarters has been actually bitter. Koplik, in this paper, gives the results of his observations, reporting in some detail and critically analyzing the fifteen cases which have come under his care. He takes the stand that the condition may be either spasm or hypertrophy, and that it is not very difficult to distinguish between the two. Their differential diagnosis he gives as follows: "In simple spasm there is the persistent and full vomiting; the retentive vomiting present in the

cases of hypertrophic stenosis; there is also the steady emaciation and the constipation. There may be no peristalsis, and the pylorus, if palpable at all, is felt only as a small contracted nodule, not as hard or large as in the cases of hypertrophic stenosis. There are also, once or twice daily, stools which contain a certain amount of milk feces. In hypertrophic stenosis all the symptoms are present to an aggravated extent, but in addition there is marked and disordered peristalsis visible on the abdominal surface. This peristalsis is generally in one direction, toward the pylorus, which, in a great number of cases, is distinctly palpable. The constipation is more inordinate, and the stools show little or no milk feces, only bile-stained mucus."

Eleven of his fifteen cases he ascribes to simple spasm of the pylorus. They all got well without surgical interference, some of them after months of persistent vomiting and extreme emaciation. The sudden cessation of the vomiting observed in many cases, when after many trials, a form of food appropriate to the individual case is finally found, speaks strongly for spasm as against organic stenosis.

Of the four cases of hypertrophic stenosis, two were operated on, one of which recovered, the other died after a secondary operation for complicating mastoiditis. Another died suddenly after being under observation only one day. The fourth slowly recovered after the surgeon had refused operation on account of the weak condition of the patient.

Three of his cases after apparent recovery have shown disquieting late effects. One gradually developed the most severe rickets, while the two others, in their second and third years, are beginning to show an intolerance of solid food, with pain and vomiting. One of these latter was the case of stenosis successfully operated on, and the present symptoms would point to a narrowing of the artificial opening in the stomach.

As to treatment, the majority even of stenosis cases, in view of the high mortality in cases operated on (50 to 75 per cent.), have a better chance without operation. All forms of feeding should be tried, from one or more wet-nurses, down through the long list of artificial methods, scientific and otherwise, if necessary, till the tolerated food is found. Mixtures containing the minimum of fat are probably the best, in any case small amounts at longer or shorter intervals. Local applications do good. Stomach washing is useless and often exhausting. Small enemas of salt solution help to maintain nutrition. Opiates, citrate of sodium, and pancreatin, at best give but temporary benefit.

The prognosis in all cases of simple spasm is good. If there are one or two stools daily containing milk feces, one can generally feel that the ultimate outcome will be favourable.

W. W. F.

## PATHOLOGY.

UNDER THE CHARGE OF DRs. ADAM, KLOTZ, DUVAL, AND NICHOLLS.

E. D. TELFORD, "On Hydrocele in Children." *Med. Chronicle*, 1908 XLVIII, p. 73.

The subject of hydrocele in childhood is quite inseparable from that of hernia, since both are conditions resulting from the delayed or incomplete closure of the processus vaginalis. The imperfect closure of the processus vaginalis renders the child the victim of a potential or actual hernia or hydrocele. The various types of hydrocele result from the nature of the closing of the peritoneal sac. A reduced hernia is often followed by a hydrocele. Only two per cent of cases occur in females, of fifty cases 14 were bilateral, and of the remaining, 22 were on the right, and fourteen on the left. In 14 cases the hydrocele was present at birth. The partial funicular type is the commonest. However, this funicular hydrocele is often not in communication with the abdominal cavity. Occasionally the fluid in the processus vaginalis is due to other causes, such as tuberculosis.

MANDLEBAUM. "The Staining of Living Spirochaetes." *Munch. Med. Wochen*, 1907, November.

A drop of serum from a primary sore is mixed with a small quantity of Loeffler's methylen blue and a drop of 10% saline solution. The mixture is prepared into a hanging-drop specimen, and examined with the oil immersion. At the margin of the hanging-drop the spirocheta pallida can be distinguished in the stained and living state, and may be differentiated from the *S. refringens* by its paler colour. The organisms show motility for 24 hours. By this method the characters of the movements of the organisms may be studied.

BAB. "Bacteriology of Congenital Syphilis." *Munch. Med. Wochen*, 1907, November.

The author gives a bacteriological report on 50 cases of congenital syphilis. In these he was able to demonstrate the *S. pallida* in some organ or organs, or else the product of these organisms was found. The interesting feature noted was that the quantitative distribution of the spirochetæ varied in the different cases. Whereas in many the liver and spleen contained innumerable organisms, in other cases few or no spirochetæ were found here, but were present in the ovary or testicle. In several cases organisms were not to be found in any of the organs, and he gives various theories to account for their absence. It may be that in some instances the toxin alone finds its way from the maternal

tissues, and that the living organism itself never reaches the foetus. These cases in which no spirochetæ were found were demonstrated to be true syphilis by the presence of the specific antibodies.

LOCHELIN. "Three Cases of Primary Cancer of the Liver." *Ziegler's Beitrag zur Path.*, 1907, XLII Heft, 3.

Much doubt is often thrown on the reports of primary cancer of the liver. The author brings forward three well studied cases, which have been examined in detail microscopically. The characters of his cases are as follows: Case I.—Tubular adeno-carcinoma, arising from the epithelium of the fine bile passages, without cirrhosis of the liver. Case II.—Primary cancer of the liver, beginning in the liver cells themselves. In the liver elsewhere there was extensive hæmachromatosis and cirrhosis. Case III.—Primary cancer of the liver tissue complicating echinococcus cysts of the liver. The author concludes that primary cancers of the liver may arise from the finer bile ducts, or from the liver cells proper. In two of the three reported cases, it appears that the malignant growth developed upon a normal regeneration of liver tissue. In the regeneration of liver parenchyma or of bile capillaries, the actively growing cells, it may be, acquire a malignant nature in the unlimited power of growth.

BABES. "The Occurrence of Fat in the Interstitial Tissue of the Kidney and in the Renal Vessels." *Cent. f. Path.* 1908, XIX, p. 275.

Tissues were examined with scharlachrot. Amyloid degeneration of the renal vessels shows within its substance fine granules of fat, while this substance is absent from amyloid degeneration in the other organs. Fat drops are found in the renal arteries in cases of generalized arteriosclerosis or atheroma. In these cases the renal arteries may not be affected in disease. Diseased renal cases which become thrombosed often present much fatty degeneration in the thrombus. Sometimes the fatty endothelial cells of diseased renal arteries are swept away to form fatty thrombi in the smaller vessels. In thrombosis of the arteria afferens the glomerulus undergoes a fatty change, affecting mainly the epithelial lining of the capsule. With the destruction of the epithelial cells, fat-droplets are left behind. This may also occur in the lumina of the glomerular capillaries, where the endothelial cells show fatty degeneration. Fat is more rarely found in the veins and capillaries, occurring, however, in processes of infarction and necrosis of the kidney tissue. Occasionally leucocytes loaded with fat-droplets wander into the interstitial tissue in sufficient numbers to deposit evident quantities of fat.

GLASERFELD. "Calcium in the Cortical Vessels of the Kidney in Children." V.A., 1907, 188, H1.

Author examined 70 cases in children up to two years of age. In thirty of these he demonstrated cylindrical masses lying parallel to and of about the same size as the tubules of the intermediate zone. These cylinders gave the chemical reaction for calcium phosphate. Calcium carbonate was only demonstrated twice. In sections the calcium was shown to lie within the arteriac intertubulares and the vasa afferentia. Never was the calcium found in the kidney tissue proper. Neither the age of the child nor the character of the disease processes elsewhere had any influence on the calcium deposit. The author believes that rickets may have some association with the arterial changes. All cases over eight months old had rickets

O. K.

## PHYSIOLOGY.

UNDER THE CHARGE OF DRS. MILLS AND MORROW.

The bulk of the papers appearing in the English and American journals for the past year have been chemical and physico-chemical in character: one might safely say, two thirds of the work is of this nature, an indication of the present drift of physiological investigation.

The subject of metabolism naturally takes a large place, mainly approached, however, from the standpoint of the composition of individual intermediate and end products.

Electro-chemistry also has absorbed a large share of the attention of investigators, and closely connected with this subject comes the inquiry into the effect upon the body tissues of different chemical environment.

The cause of the heart beat, as heretofore, is a very live subject, and especially among American writers, has occupied a foremost position.

Work on respiration has come chiefly under two heads. (1) The behaviour of the centre under altered vascular conditions, and (2) Analysis of air.

Perhaps none of the work done can be looked upon as epoch-making, but much of it has shown a great deal of industry and attention to details. One cannot touch on the subject of physiology in the year 1907-1908, without mention of Sir Michael Foster, who died somewhat more than a year ago, on Mar. 25th, 1907, at the age of 71.

He was truly a scientific man who, though first among his equals as a physiologist, was so catholic in his view that every department of science claimed his interest and his energy. Nor were his energies confined to his laboratory or his lecture room, for he served his country as a mem-

ber of the Royal Commission on Vaccination in 1889, on sewage disposal 1898, and on tuberculosis 1901, was a commissioner of London University, served on the committee of the War Office on military education, was a member of the Royal Society for 35 years and secretary for 21 years.

He represented London University in Parliament from 1900 to 1905 as a Unionist, but voted with the opposition on the Education Act.

He taught physiology in London from 1867 to 1870, when he was called to Trinity College, Cambridge, where he remained until his death.

Though himself the author of a number of original investigations, it was chiefly as a sound and broad reasoner that he excelled.

To us he is known most kindly as the author of his "Text Book of Physiology," the English medical classic of the generation; a source of delight as well as of profit, from which no seeker need ever go empty away.

He was also the first and a constant editor of the *Journal of Physiology*, and the author of "A History of Physiology," which is also a history of the development of scientific medicine, written with the same charm and grace that mark his "Text Book." In Michael Foster's death, physiology and medicine and science and citizenship lost a man who advanced and graced them all.

We shall take up in sections a very few of the papers which have appeared to be of more general interest.

In the work on the *Heart*, Matthews and Jackson (*Am. Journ. Phys.* Jan. 1907) investigated the effect of magnesium sulphate on heart muscle.

Dropping solution of mag. sulph. on the excised frog's heart led to blocking of the systolic impulse, the ventricular beat ceasing before the auricular.

After complete stoppage, mechanical stimulation could still elicit beats. The heart was reduced to the condition of skeletal muscle. The same result followed in atropinized hearts, showing it was not a vagus effect. These results were confirmed upon dogs' hearts.

A paper of considerable interest by Carlson and Meck, appeared in the *Am. J. Phy.* for Feb. 1908.

Carlson has done considerable work on the heart of the King Crab, which throws some light upon the muscle and nerve battle for the control of the cardiac rhythm. He has shown previously that the heart of *Limulus* loses its power to beat and to conduct beats, if separated from its dorsal nerve cord, this piece of work going far to strengthen the hands of the neurogenic school.

In the present article he takes up the developmental aspects of the question, and by examining a series of *limulus* eggs, he finds that distinct

rhythm appears in the heart, then a median tube, without muscular striation, at the 23rd day; but in no case is there any difference of the dorsal nerve cord until the 29th to 33rd day.

His explanation, which does not seem convincing, is that there is a transference of automatism and conductivity from myocardium to nervous tissue at some stage in embryonic development. But this embryological evidence in favour of the myogenic theory does not cause him to recede from his position that in *limulus* at any rate, the heart rhythm is primarily nervous in origin.

Two papers by G. N. Stewart upon certain phases of the bulbar centres are worthy of note.

One paper in *Am. J. Phy.* Aug. 1, 1907, by Stewart and Pike, approaches the essential character of the bulbar centres by the method of vascular occlusion and subsequent release; their idea being that by this method complete isolation of the centres from external influences may be secured.

In general, the technique was as follows:—After isolating the brachial plexus and the vagus trunks, these were stimulated and the results recorded by blood pressure and respiratory tracings. The cerebral arteries were then temporarily ligated and the afferent nerves again stimulated. Following release of the ligature stimulation was again done.

*The Respiratory Centre.* They found that after occlusion of the arteries to the brain the respiratory movements ceased in from  $\frac{1}{2}$  to 3 minutes; following this quiescent period came a few irregular gasps and then absolute apnoea until resuscitation.

After release of the head arteries, respiratory movements began on an average in about 6 minutes, but some time still elapsed before the centre became amenable to afferent impulses.

They noted in a large number of animals a very constant rate of respiration—about 4 per minute in the first moments of resuscitation. At this time the centre was discharging rhythmically and effectively, but stimulation of brachial or vagus had not the slightest effect on respiration, nor did the section of the vagus nor the brain-stem alter the rhythm.

Asphyxia, however, produced the usual increase in respiratory movements.

These facts the authors regard as a new proof of the automatism of respiratory centre.

During the inactivity of the bulbar centre, respiratory movements involving the lower ribs and abdominal muscles at a rate of 9 per minute were noted.

*The Vaso-motor Centre.* Here occlusion first causes a rapid rise

of blood pressure, then a fall to a fairly constant low level, which is maintained until the release of the cerebral vessels. After release a rise, but only slight, occurs before stimulation of afferent pressor or depressor nerves becomes effective.

This result indicates that the vaso-motor centre possesses a less degree of automatism than the respiratory, but also that some at least of its tone is independent of reflex causes.

*The Cardio-Inhibitory Centre.* Occlusion leads to rapidity of heart-beat, (loss of inhibitory influence) even during the early rise of blood pressure.

After resuscitation the tone of the centre is long in re-appearing as shown by an unaltered rate on section of the vagi: but earlier than this, stimulation of the upper end of the vagus gave rise to slight cardiac inhibition.

In a later paper in the same journal, Stewart gives some results of double vagotomy where he finds that in animals surviving for some time after vagus section, the respiratory rate remains slow, whereas the pulse rate, at first slow, gradually approaches the normal.

This constancy of the respiratory rate, he attributed to the assertion of the fundamental respiratory rate, in the absence of impulse through the Hering-Brewer fibres of the vagus. Here double vagotomy closely resembles vascular occlusion.

In connection with the vaso-motor centre, Porter, Marks and Swift, in the Amer. Journ. of Phys., discuss the possibility of the dangerous lowering of the blood pressure through fatigue of the vaso-motor centre from prolonged stimulation, as in a severe surgical operation.

In a considerable number of animals they stimulated on an average for 3 hours, the central end of sciatic and brachial, posterior spinal roots, and various sympathetic fibres. In no case did they find from this procedure a fall of pressure, as compared with controls not so treated.

From a rather lengthy article by Erlanger, upon the relative rhythmicity and conductivity of the auricles in the mammalian heart, one may point a few of the conclusions as follows:—The region of the right auricle in the vicinity of the mouths of the great veins is possessed of the highest degree of rhythmicity. In the majority of instances this region sets the pace for the whole heart.

The sudden withdrawal of the influence of this region results in transitory stoppage of the parts below it, which after recovery usually beat at a permanently slowed rate. The right auricle possesses a grade of rhythmicity second only to the great veins, all parts of it beat when functionally isolated from the rest of the heart.

The left auricle isolated from the auricular septum and right auricle, is rarely spontaneously rhythmical.

A block may be established between any two parts of the auricles, provided one is spontaneously rhythmical, by narrowing the functional connection between them. Since all the phenomena of heart block can be obtained by narrowing the functional connection between any two spontaneously rhythmical parts of the auricles, there is no reason for assigning to the auriculo-ventricular bundle any special physiological properties other than those which result from the fact that it is a narrow bridge of tissue joining two other spontaneously rhythmical masses of heart tissue.

Cannon, of Boston, *Am. J. Phy.*, Nov., 1907, contributes an article upon "The Acid Control of the Pylorus."

After noting the views at present held concerning the function of gastric evacuation, he states the two factors in this process:

- a The Peristaltic waves.
- b The condition of the pyloric sphincter.

From X-ray observations he finds the former do not vary in strength, and as food is intermittently discharged, the control of the discharge must reside in the sphincter.

Cannon propounds a theory to explain the mode of pyloric action as follows: The pylorus is tonically closed when food is ingested and remains closed against recurring pressure. The appearance of acid at the pylorus causes the muscle to relax.

The pressing peristaltic waves now force some of the acid chyme into the duodenum. The acid in the duodenum tightens the sphincter against further exit, the same acid also stimulates the flow of alkaline pancreatic juice. As neutralization proceeds, the stimulus closing the pylorus is weakened, now the acid in the stomach is able again to relax the sphincter and thus until the stomach is emptied. He makes use of the X-ray to work out his hypothesis.

Making a mixture of mashed potato, cracker and rice, and bismuth subnitrate, and feeding to a cat in 25 cc. amounts, and examining by X-ray at  $\frac{1}{2}$  hour intervals, and measuring the length of the food masses in the duodenum, he found that when given simply moistened with water, ten times as much had passed the pylorus in  $\frac{1}{2}$  hour as when moistened with 1%  $\text{NaHCO}_3$ , in one hour three times as much, and in two hours twice as much.

Proteid food was tested by comparing the rate of discharge of simple proteid food and of acid proteid made by digestion with 10% Hcl. and dialysis.

In  $\frac{1}{2}$  hour 5-10 times as much acid proteid as natural proteid had passed into the duodenum. In two hours twice as much had passed.

The appearance of acid at the pylorus was tested by a cannula in the antrum upon mashed potato mixed with dimethylamido benzol coincident with X-ray observation. This showed that the appearance of a pink colour (free acid) in the cannula fluid corresponded with a discharge of contents through the sphincter.

In an excised stomach suspended in Ringers sol., hydrochloric acid caused relaxation of the sphincter, while sol.  $\text{NaHCO}_3$  failed to do so.

The second part of the theory, namely, that "Acid in the Duodenum retards Gastric discharge," was tested by ligature of the pancreatic and bile ducts, which presented the normal alkaline reaction in the duodenum.

As compared with the normal animal, the passage through the sphincter was excessively delayed.

Applying the theory to the known time of stay in the stomach of the various food elements, it is found that proteid remains for a considerable time and emerges slowly, which may be explained by the union of acid and proteid, which delay a pronounced free acid reaction.

Carbohydrates leave the stomach rapidly, as not uniting with acid, and thus early acidity at the pylorus occurs.

Fats are long retained as they inhibit the secretion of Hcl., and after entering the duodenum form fatty acids which, in turn, stimulate the sphincter to contraction.

Some observations on human chyle were made in *J. Phy.*, Dec. 1906, by J. M. Hamill. He was fortunate in observing a young man of 20 in the London Hospital, with a congenital chylous fistula in the groin. He found an average sample to have the following composition:

Total solids 3.87, ash .83, fat 1.3 gm. (variable). Total N. 364, extractions N. 0112, lecithin 4.2 per 100 gms., ether extract cholesterin 5.2 per 100 gms.

In colour from bluish white to yellow, alkaline, sp. G. 1.007, it clotted readily, but its coagulation was prevented by drawing into oxalate solution.

The rate of flow was 4 litres in 12 hours. No reducing sugar was found.

Amylose was found by taking two tubes of filtered chyle, boiling one and not the other, and adding to each, boiled starch, and standing for 4 hours at  $37^\circ\text{C}$ ., when the unboiled tube gave well marked Fehling test, the boiled no reduction. Lipase was found by similarly heating two tubes and adding to olive oil, when in the unboiled tube the acidity increased to 1cc.  $\text{NaOH}$ . Concerning the fat content, it was found this was at its maximum 6 to 8 hours after the chief meal of the day.

After feeding large amounts of butter but scant traces of the volatile butter fats were found, but the higher fats, olein, etc., were increased corresponding to the fat intake.

Lecithin fed by the mouth showed an increase in the ether soluble phosphorus in the chyle, indicating that lecithin is absorbed.

Paraffin fed in emulsion did not appear in the chyle, showing its uselessness as a nutritive fat.

Bainbridge and Beddard repeated Bradford's experiments, in which he removed portions of the kidney in cats. They removed part of one kidney at one time, and some weeks later the other. In all cases death occurred in a few days or weeks after the second operation.

Differing from Bradford's observations they found no increased N. output until 28% of body weight was lost, when the animals became to all intents starving animals in which the N. output is always increased.

Bradford found that nephrectomized cats were unable to pass anything but a very dilute urine, and this in large amounts, whereas the other observers found a normal amount of moderate concentration.

They thus conclude that nephrectomy does not set up an abnormally great nitrogenous metabolism.

The much debated question of the effect of alcohol upon the heart is considered by W. E. Dixon, in the *J. Phys.*, March 27, 1907.

As to the rate, he finds that the ordinarily noted acceleration of the heart is due to reflex stimulation by concentrated solution and to the circumstances attending administration.

Given in weak solutions this effect is not seen.

In a feebly beating heart, however, as at the end of a long perfusion experiment, small doses of alcohol improve the quality and increase the rapidity of the heart rate.

Dixon has found a similar effect from the administration of glucose.

Large doses of alcohol slow the beat. This does not occur in the severed heart, nor after section of the vagus. The latter procedure, indeed, restores the rate to the normal. Perfusion of the heart with moderate .08% alcohol permanently increased the amplitude of the beat, but .8% solution first increases but later decidedly weakens the beat.

In a rabbit's heart, immunized by giving 1 gm. per kilo body weight of alcohol to the animal for three weeks, perfusion with .2% alcohol greatly increased the height of the contractions.

Evidently alcohol possesses, according to dose, two distinct actions: stimulation and depression, and the boundary may be easily overstepped. Dixon explains the former quality by the nutritive power of the drug.

Blood pressure in moderate doses is raised by alcohol, but this is largely a cardiac effect. In large doses it causes a cardiac fall of B.P. analogous to chloroform.

A. R. G.