JANUARY, 1934

THE ULSTER MEDICAL JOURNAL

PUBLISHED BY
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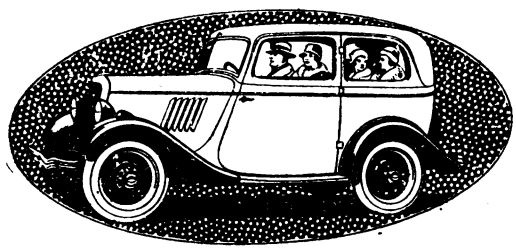

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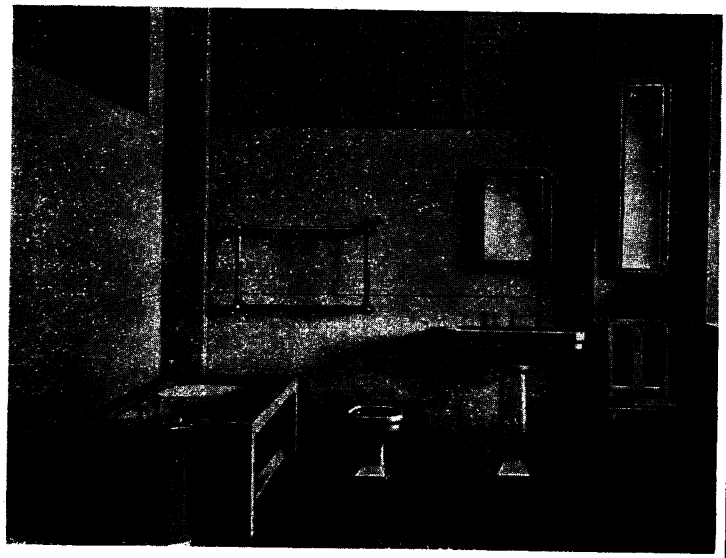

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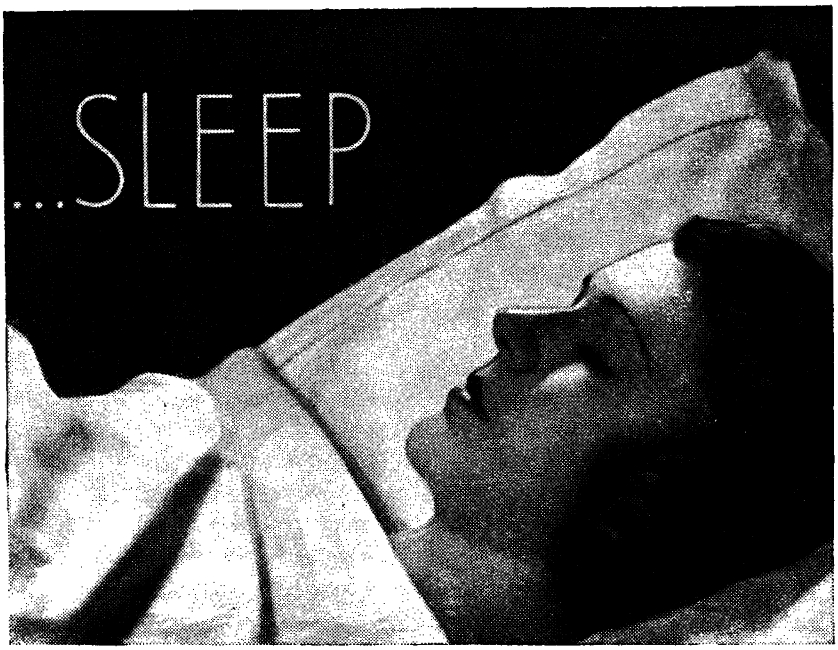

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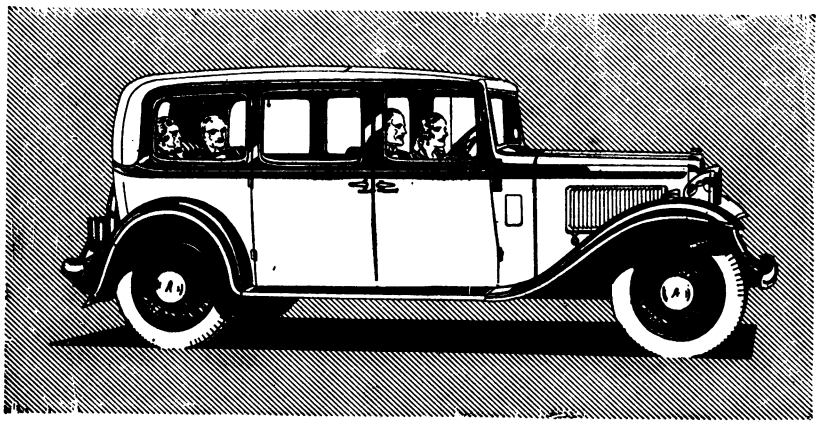

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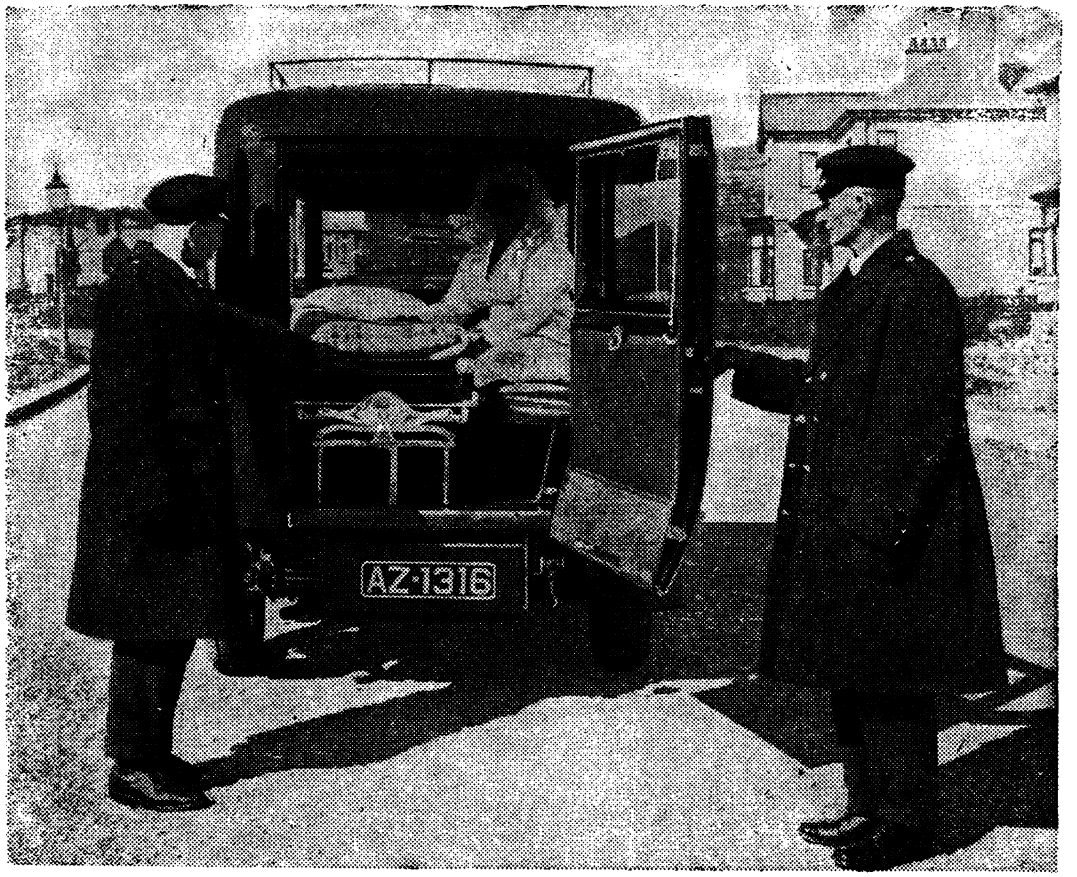

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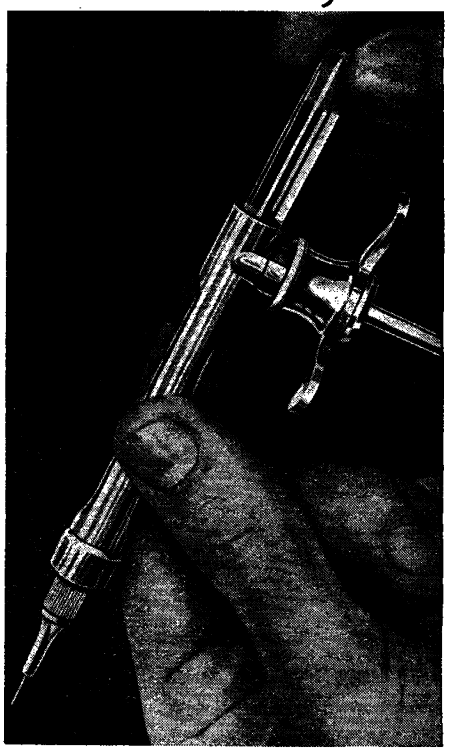

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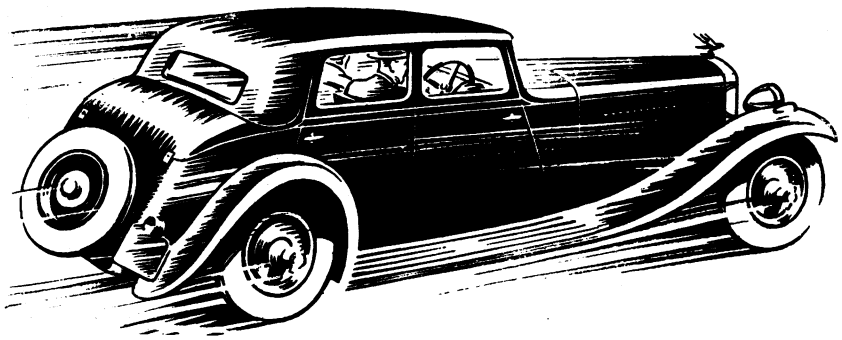

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THE ULSTER MEDICAL JOURNAL

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1st January, 1st April, 1st July, 1st October.

THE ULSTER MEDICAL SOCIETY

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Dear Sir (or Madam),

If you are not a member of the Ulster Medical Society, we would appeal to you to give the question of joining your consideration. The Society has been in existence since 1862, and has always been active in keeping its members interested in the advances in medical science as well as in current professional affairs. The Medical Institute, situated in College Square North, belongs to the Society (through the generosity of Sir William Whitla), and is ideally adapted for meetings, committee meetings, and recreaton. There is a library with current medical periodicals, and facilities for reference to medical literature are available in conjunction with the library at the Queen's University. There is also a billiards-room available to members, and lighter periodicals are also provided. An annual dinner is held each year in December, and a golf competition in June. Meetings are held at intervals of a fortnight during the winter months, and papers are contributed by members. Distinguished visitors are occasionally asked to contribute papers on subjects upon which they are specially qualified to speak. THE ULSTER MEDICAL JOURNAL, the official organ of the Society, is issued to all Fellows and Members free of charge.

The subscription to the Society is one guinea for Fellows and Members living in the country; two guineas for Fellows living in Belfast; and one guinea for Members living in Belfast who are not qualified more than seven years. The payment of a sum of twenty guineas entitles one to election to Life Membership.

May we, therefore, appeal to you to join the Ulster Medical Society, and so enable us to widen its influence and sphere of usefulness still further? For your convenience a proposal form is attached, which, if filled in and sent to the Honorary Secretary, will ensure your name being put forward for election to membership of the Society.

If you do not wish to become a member of the Society, will you consider entering your name as a subscriber to THE ULSTER MEDICAL JOURNAL? The subscription is five shillings per annum, payable in advance to the Honorary Treasurer, for which a banker's order form is attached for your convenience.

We remain,

Yours faithfully,

W. J. WILSON, *President.*

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THE
ULSTER MEDICAL JOURNAL

PUBLISHED QUARTERLY ON BEHALF OF THE ULSTER MEDICAL SOCIETY

VOL. III 1st JANUARY, 1934 No. 1

EDITORIAL

THE ULSTER MEDICAL JOURNAL enters on the third year of its existence. When it was first proposed there seemed to be an almost universal consensus of opinion that it would not survive the first year; that sufficient material would not be available to fill its pages, and the interest of the profession in it would wane. Happily these pessimistic views have not been substantiated by events. The Journal has been a success, both from the point of view of interest and circulation. The high standard set in the papers published is a point of pardonable pride both to the Editorial Board and to the authors who contributed to its pages; but the Editorial Board is not content to rest on these achievements, and it is ever ready to receive constructive criticism, or suggestions to increase the interest of its pages.

One suggestion recently made is that a portion of the Journal should be devoted to short clinical reports of unusually interesting or uncommon cases. This suggestion has been approved, but to make this section a success, the Editorial Board must depend on its readers for assistance. Many suitable cases come to the attention of practitioners from time to time, and it is unfortunate that the lessons derived from their study should have the rather restricted sphere of usefulness of two or three practitioners only. Publication in this Journal would give a wider publicity to these cases, and would, it is thought, materially benefit the profession as a whole. Short clinical accounts of such cases, both medical and surgical, will be most acceptable to the Editorial Board. Two clinical reports appear in this number of the Journal, but they both come from Belfast readers. It is to be hoped that the next number will see similarly interesting cases from the provincial centres. The large county infirmaries receive patients just as interesting, and the practitioners of the provincial towns are as capable of writing just as accurate accounts as those of Belfast.

The Epidemiology of Enteric Fevers in Northern Ireland

By W. J. WILSON, B.A., M.D., D.SC., D.P.H.

Presidential Address, Ulster Medical Society,

SESSION 1933-4

Ladies and Gentlemen,

Let me begin by thanking you for your kindness in electing me to the position of president of the Ulster Medical Society for the session 1933-4. It is an honour which I greatly appreciate and of which I am very proud.

When I consider the names of the men who have held this position since 1906, when I became a member of the Society, and that distinguished line extending back to 1862, I feel elated to be admitted to their company, and shall try to emulate their example, and hope that in the discharge of my duties I shall not dishonour the trust you have reposed in me.

My next duty is to refer to the loss the Society has sustained during the past year in the death of four of its Fellows. I had the privilege of enjoying the friendship of all of them. The Society and the community are much poorer since their passing.

Dr. Hugh William Bailie obtained his medical qualifications in Edinburgh in 1888, and for many years had an extensive practice in Belfast. In 1905 he obtained the D.P.H. of the Royal College in Dublin, and soon after was appointed Superintendent Medical Officer of Health of Belfast. He had, at the start, to reorganize the Public Health Department, and did it so efficiently that it has required little alteration, but only slight extension, by his successor. The improvement of the public health of Belfast during his twenty years' service, was in no small measure due to the work of his Department, and is to him a worthy memorial. For many years Dr. Bailie was Lecturer in Public Health Administration and Examiner for the Diploma in Public Health at Queen's University. Dr. Bailie was a modest, unassuming man, but those who knew him found him a loyal and helpful friend.

Dr. John Tate Creery was one of the oldest of our members, having obtained the M.B. degree of Dublin University in 1880. He had an extensive practice in Coleraine, where he was also District Dispensary doctor and medical officer to the Royal Academical Institution. In spite of the long journey involved, he was a frequent attender at the meetings of the Society, and enjoyed the respect and affection of the whole medical profession.

Dr. Richard McCulloch was cut off in the flower of his life, but already he had made a position for himself as an authority on chest radiography. He obtained the M.B. degree of Queen's University in 1912 and the D.P.H. in 1915. For a considerable number of years he was Assistant Tuberculosis Officer to the Belfast Corporation, but eventually set up as a consultant, specializing in diseases of the chest. His X-ray photographs were, I am told, of extraordinary merit, and he seemed destined to occupy a commanding position in his speciality. He was medical

officer in charge of the Radiological Department of the Belfast Hospital for Sick Children. A paper entitled "The Use of X-ray in the Diagnosis of Pulmonary Tuberculosis" appeared in the October number, 1932, of THE ULSTER MEDICAL JOURNAL. He had suffered from nephritis for many years, but in spite of his disability he was always cheerful and had always a kindly word and a smile upon his lips. He was a delightful after-dinner speaker, and told a story in an inimitable manner.

Dr. James Colville's passing leaves a blank which it will take years to fill. We shall miss his kindly presence and his genial and whimsical remarks. His medical colleagues held him in honour, and his numerous patients in Belfast mourn the loss of not only "a beloved physician," but of a dear friend, always a help and support in time of trouble. Dr. Colville had a distinguished academic career, obtaining the B.A. of the Royal University in 1888 and the M.B. and M.D. degrees of the same university in 1893 and 1895. In 1893 he became a Life Fellow of this Society, and was its president in the session 1918-9. Dr. Colville, jointly with Dr. Donnan, published in the "British Medical Journal" in 1898 a paper entitled "Examination of One Hundred Cases of Typhoid Fever by Widal Serum Test." The poor of the city have lost a great benefactor, since to the hospitals Dr. Colville gave ungrudgingly of his skill, and with it kindness and encouragement. He was for a time registrar to the Royal Victoria Hospital, and for many years honorary physician to the Ulster Hospital for Children and Women, and physician to the Belfast Hospital for Sick Children.

To these four names I, on your behalf, and on my own, would like to pay this brief tribute of respect.

The subject which I have chosen for my address illustrates the importance of preventive medicine, an aspect of our work as doctors which is not only concerned with checking the spread of disease, but with the removal of the conditions which allow of its occurrence. In these islands, knowledge of the means to control outbreaks of enteric fever had been obtained and to a great extent acted upon before the specific bacilli had been isolated.

Budd (1856) recognized that the living poison of the disease was present in the stools of the patient, and that the disease was mainly acquired through the consumption of water, milk, and vegetables contaminated with such excreta. The measures which would reduce the occurrence of the disease were those which would secure pure water supplies from clean catchment areas or from pure wells, and provide drains and sewers to remove filth rapidly from the premises. Abolition of privy middens and cesspools followed. The control of typhoid was brought about by the water engineer and town surveyor following the advice of the clinician. The bacteriologist at first had no part, since many decades elapsed before the typhoid bacillus was cultivated by Gaffky in 1884. The Public Health Act of 1875—an Act in which many previous Acts were consolidated—contained provisions which, if enforced, would have materially reduced the incidence of typhoid fever. The measures—good housing, good drainage, pure water supplies—

were expensive but lasting, and were useful for the eradication of many other diseases. It was probably an advantage that bacteriology developed later than sanitary engineering, as it is possible that active immunization might have been advocated as being cheaper than the great public health schemes which were undertaken.

In making this statement I do not wish to disparage bacteriology, the study of which has added much to our knowledge of the etiology of enteric fevers, assisting in their diagnosis and calling attention to the part played by the "carrier" in their dissemination. It has also shown that enteric fever is not invariably due to infection with the B. typhosus, but also to infection with B. paratyphosus B, B. paratyphosus A, B. paratyphosus C, and occasionally to other organisms.

Since the war an increasing number of the cases of enteric fever are due to infection with B. paratyphosus B. From my experience in examining blood and stools of suspected cases, my impression is that about fifty per cent. of the cases in the counties of Northern Ireland are due to infection with para. B.

From Dr. C. S. Thomson's Report on the Health of the County Borough of Belfast for 1931 I find that of forty-five cases of enteric treated at Purdysburn Hospital, twelve were infected with B. typhosus, and thirty-three with B. paratyphosus B.

Mortality from Enteric Fever.

When the records of mortality in these islands are studied, one of the most gratifying facts that emerges is the great decrease in mortality from enteric fever that commenced at the beginning of the present century and has continued up to the present time. In the seventies of the last century the enteric mortality-rate in Great Britain was more than double that of Ireland. In 1875 the rates per ten thousand of the population were, for Scotland, England, and Ireland, 4.6, 3.7, and 1.6 respectively. From 1875 till 1886 there was a decline in the rate in Great Britain, but practically no change in Ireland during this period. In 1886 the rates for Scotland, England, and Ireland were 1.9, 1.8, and 1.6. The rates in Great Britain remained more or less stationary until 1899, when a decline occurred in all three countries, being preceded in 1897 and 1898 by a very steep ascent in Ireland, mainly due to severe epidemics in Belfast. From 1900 there has been a fairly steady decline, but more pronounced in Great Britain than in Ireland. In 1924 0.10, 0.13, and 0.31 were the rates for Scotland, England, and Ireland. In 1931 the rates per ten thousand were—in Northern Ireland 0.12, in the Irish Free State 0.23, and in England and Wales 0.06.

In Belfast, up to 1909, the mortality-rate from enteric fever was comparatively high. In the seventies, eighties, and nineties the rate per ten thousand averaged 6.7, 5, and 7.3 respectively, and for the first ten years of the present century it was 3.5. Since 1910, when it was 0.5, there has been a gradual decline, the figures for the quinquennia 1912-6, 1917-21, 1922-6, and 1927-31 being .5, .6, .2, and .1.

Perhaps the position will be more readily appreciated when it is stated that in 1898 the deaths from enteric fever in Belfast were 640, and that in 1931 the number was one.

In connection with the epidemiology of enteric fever in Northern Ireland, the greatest problem is to explain the enormous number of cases which occurred in Belfast up to 1905, and the steady and rapid decline which has prevailed during the past twenty-five years.

In 1907 the Irish Local Government Board appointed five sanitary experts to form a commission and hold an inquiry into the cause of the high death-rate in Belfast, and in connection with this work Dr. L. W. Darra Mair wrote a special report on enteric fever in Belfast, and in 1909 he communicated to the Epidemiological Section of the Royal Society of Medicine a paper on "The Etiology of Enteric Fever in Belfast in Relation to Water Supply, Sanitary Circumstances, and Shellfish." The Commission concluded that the water supply was not responsible for the epidemic prevalence. The main reasons for this opinion were (1) That the outbreaks in Belfast were not of an "explosive" nature; (2) that the cases had no relationship to the distribution of any of the three different water supplies to the city; (3) that the fever was mainly limited to the quarters of the city occupied by the working classes.

Mair did not consider the general sanitary condition of Belfast worse than that of most of the other towns and cities in the United Kingdom. He stated that although there had been and still were many serious sanitary shortcomings in Belfast, and the system of scavenging of privies and ashpits even then was exceedingly defective, it could not be contended that in a sanitary sense Belfast was on an altogether lower level than other cities and towns in the United Kingdom. In fact, there could be no doubt that in some respects the evidence pointed the other way. Belfast (he said) was a town of rapid modern development—that is to say, it was a new town—consisting largely of wide streets lined by rows of comparatively modern dwellings, the vast majority of which were self-contained, so that there was an almost complete absence of antiquated courts, alleys, and common-yards, such as might be seen in Dublin and Cork and also in many of the older seaport towns in England and Wales.

Mair concluded that the extraordinary incidence of enteric fever in Belfast could not be attributed to infected water or to insanitary conditions, though the latter no doubt contributed, but that the consumption of shellfish collected from the polluted foreshore of Belfast Lough was a hypothesis which fitted best with all the epidemiological facts.

In a paper which I read before the Royal Society of Medicine in 1926, I stated that no doubt a considerable amount of enteric fever which had occurred in Belfast had been due to the consumption of contaminated cockles and mussels, but I was very doubtful whether the extraordinary decrease which had occurred in recent years was due to a complete change in the habits of the population. I pointed out that amongst 83, 151, 106, 51, and 117 cases of enteric fever occurring in Belfast in the years 1909, 1913, 1914, 1915, and 1921, a history of recent consumption of shellfish was obtained in 1, 15, 15, 2, and 6 instances respectively. Shellfish was therefore a possible source of infection in 39 out of 508, i.e., in 7.6 per cent. of the cases.

It was my opinion that the decrease was to be attributed to the abolition of privies and the substitution of ashbins for ashpits, the improved scavenging, the abatement of nuisances, the decrease of stables and byres and their concomitant flies, the more effective sanitary administration, the isolation of cases in hospital, the higher standard of living and of education, and the growth of a sanitary conscience.

I showed that in 1897 the number of houses with privies was 26,620 out of a total of 67,479; in 1902 the numbers had become 10,000 and 77,788, whilst in 1908 there were only 2,000 privies remaining; that in recent years practically all privies had been converted under the Belfast Corporation Act of 1899.

Mair appreciated that there were facts which his hypothesis did not explain, and that he realized that the rapid growth of the city might have been a factor in the great prevalence of the disease, would appear from the following statement: "It is possible that the diminution of fever which marked the first two years after 1901 may have preceded somewhat any very great reduction in the consumption of shellfish. The point was difficult to establish with exactitude. The question arises, however, whether the earlier diminution of fever may not have been due in part to exhaustion of susceptible material among the population. It is a fact that about this time the Belfast population was not increasing at anything like the same rate as previously; indeed, it is probable that in 1901 and 1902 the population diminished somewhat. With this relative stagnation of the population, the enormous incidence of fever during the critical period of five years—there had been a total of nearly nineteen thousand cases, or about five per cent. of the population—suggests that for a time insusceptibility might have been a not unimportant factor in effecting a diminution of fever."

The work of Topley and Greenwood and their colleagues has demonstrated, in connection with mouse typhoid, the great influence effected on an epidemic by the immigration of susceptible individuals into the cages. Topley states: "When the pre-epidemic stage has been passed, and a definite epidemic prevalence of the disease has been established, the future course of events is largely determined by the rate of immigration of susceptible hosts. If no such immigration occur, the epidemic gradually dies down, leaving a varying number of survivors."

In connection with enteric fever in Belfast, it is perhaps not without significance that the highest mortality prevailed during the periods of most rapid expansion. The increase of population was due not merely to an excess of births over deaths, but to an immigration (1) from rural areas of large numbers of individuals and families; and (2) from Scotland of many shipyard workers and their families. The areas which were most infected were those in which the shipyard and factory workers mainly resided. The growth of Belfast during the fifty years between 1851 and 1901 was remarkably rapid, the population at the end of that period being quadrupled.

Whilst the factors concerned in causing the great epidemics of typhoid fever in Belfast towards the end of the last century must remain obscure, it must be conceded that for the past twenty-five years every outbreak has been well investi-

gated, and in most instances the source of infection has been discovered. This has been due to the putting into operation of the Infectious Diseases Notification Act and the co-operation of the medical practitioners with the Public Health Department. The Corporation of Belfast, and in particular its Public Health Committee, guided by chairmen like Alderman Dr. Williamson and the late Dr. King Kerr, deserves the gratitude of all citizens for the work which has been accomplished. Much assistance has also been given by the Medical Inspectors of the Central Departments of Government, and lastly, by the new light that bacteriology has thrown on the subject. As a result of Koch's work in Southern Germany, the importance of contact infection and of the part played by the "carrier" has been demonstrated.

It is interesting to note that Sir Thomas Houston in 1899 discovered the first chronic carrier of the B. typhosus. This was a case of cystitis due to infection with the bacillus. With the establishment of a Department of Pathology and Bacteriology at the Queen's College, a great impetus was given to the investigation of typhoid fever. Professors Lorrain Smith and W. St. Clair Symmers not only assisted in these investigations, but inspired many practitioners with the new knowledge.

In consequence, bacteriologists were available to assist the clinician, the medical officer of health, and the medical inspector in the investigation of any outbreak of the disease. I could record instances where "carriers" were discovered by T. Houston, N. C. Graham, S. Barron, G. F. W. Tinsdale, and others. Accounts of these outbreaks which have been published elsewhere were most instructive and most interesting, but time prevents my dwelling upon them. I could draw on the reports of the medical inspectors of the old Local Government Board and of the present Ministry of Home Affairs and of the Superintendent Medical Officer of Health of Belfast, for material to fill a dozen papers, but I trust that Doctors Patrick, McCloy, and Thomson will pardon me for refraining.

I shall give again a short account of an epidemic in which the late Dr. Brian O'Brien—a name dear to many of the older members of the Society—carried out an investigation, and in which I assisted in the bacteriological work.

This was a milk-borne epidemic which occurred at the latter end of December, 1910. The scene of the outbreak was a small village, D——y, consisting of one hundred and thirty houses, and with a population of eight hundred, practically all employees of a large weaving factory. The houses were modern and the majority possessed water-closets. The first case was notified on 24th December, 1910; the second case was that of the driver of the milk-cart, who was medically examined on 22nd December and sent to bed, a diagnosis of enteric fever being made on 27th December. The Medical Officer of Health, Dr. Frier, and Dr. Boucher, had already on 25th December stopped the milk supply; in fact, that day's supply was only partially consumed, as the dairyman, Mr. H——, went round to his customers who had got their morning supply and urged them to destroy it, as it was probably infected. I think this action on the part of a dairyman whose milk is under suspicion is unique, and it is sad to relate that he himself later developed the disease and

died. There were thirty-six cases in all, twenty-five being in the village of D——y, eight at M——n, a small collection of houses half a mile from the village, and three at the milkman's house, situated two miles from D——y. The one factor common to all was the milk supply. The source of infection proved to be a servant girl who came to the farm on 15th November, 1910. This girl had an attack of enteric fever in December, 1908, and, curious to note, she was infected by a former mistress who was a "carrier," and who as a landlady of a small hotel had infected several of her guests. In 1910 another employer of this girl had enteric fever. Typhoid bacilli in large numbers were found in her stools, and though she was treated in hospital for many months with vaccines, intestinal antiseptics, etc., she remained a "carrier."

Another outbreak traced to a "carrier" which occurred recently in a mental hospital presents some points of interest. Dr. Weir has supplied me with the main facts, and I have his permission to mention them in this address.

In March, 1932, one case of typhoid fever occurred in the hospital, and three cases in the following July. No further cases occurred until March, 1933, when there were five cases, and then five more in April. On the 1st April an inmate of the institution who handled the milk was found by me to be a fæcal "carrier." B. L. was a man of twenty-eight years of age who was admitted to the institution in May, 1931. No history of his having previously suffered from typhoid fever could be obtained, although on 1st April, 1933, his stools contained enormous numbers of B typhosi, his blood was negative to the Widal test. The interesting point is that this "carrier" in August, 1933, developed a typical attack of typhoid fever, i.e., over four months after the time he was discovered to be a "carrier." When and how he became a "carrier" cannot be ascertained.

Why did this man not develop the disease within the usual incubation period? If we could answer this question, immunity would not be so full of mystery.

At one time the difficult problem in connection with the etiology of typhoid fever was to show that it was possible for the patient to have had the opportunity of swallowing typhoid bacilli. The problem to-day is to explain why any person escapes an attack of this disease.

Improvements in bacteriological methods have facilitated the isolation of enteric bacilli, and it has been shown that these micro-organisms are very frequently present not only in the human intestine, but in the sewage of institutions and of towns. In a recent paper in the "British Medical Journal" I give references to numerous reports on the isolation of B. typhosus from sewage and water, which have been published since 1928, when by means of a new medium developed in my department, typhoid bacilli were first cultivated from sewage and shellfish.

In Belfast sewage a typhoid or a paratyphoid bacillus is usually present in 1 c.c.

In his report for 1931, Sir Alexander Houston of the Metropolitan Water Board gives the results of the weekly examination of the sewage of Epping following an outbreak of paratyphoid fever in this area. On one occasion he found as many as 2,880 B. para. B in 1 c.c. of the sewage, and 355 in the effluent. He calculated that

on 18th February, 1931, over thirty-three thousand million paratyphoid bacilli were being discharged daily into Cobbins Brook, a tributary of the Lee.

Besides typhoid and paratyphoid bacilli, various food-poisoning organisms have been found in sewage, and Scott has found these organisms not infrequently in duck eggs.

It is seldom that the B. typhosus has been isolated from a water supply, but on 26th May, 1932, by means of the Wilson and Blair medium, I succeeded in cultivating the germ from a sample of water taken from a stream. Along the course of the stream cases of typhoid had occurred. The water sample was found to contain on an average, in every 3 c.c., one typhoid bacillus, two B. welchii, and thirty B. coli. I have reason to believe that the bacilli were derived from the fæces of a "carrier."

The problem of how to deal with the chronic "carrier" presents great difficulties to the medical officer of health. To prove that a suspected person is a "carrier" it is necessary to cultivate the infective agent from his excreta. There is, however, no statutory obligation on a suspected "carrier" to submit specimens for bacteriological examination unless he be engaged in dairy work, and even then it is very probable, unless he has been removed to hospital, that the specimens of excreta supplied for examination do not come from the body of the suspected individual.

Dr. Armstrong, a Queensman who is County Bacteriologist for Dumfries, made in 1932, for Dr. Ritchie, the County Medical Officer, five examinations of the stools of a woman who had been proved a "carrier" in 1926. All were negative, but at the same time typhoid bacilli were cultivated from the cesspool which took the drainage from her cottage!

Fortunately, the great majority of "carriers" never, under good sanitary conditions, convey the disease, but in the case of a "carrier" who has been connected with an outbreak of the disease, what can the medical officer of health do to protect the community? He can, on paper, prohibit him or her from following an occupation involving the handling of milk and food. But here, as elsewhere, prohibition has not been a complete success!

From this review of the position of enteric fever in Northern Ireland, one may claim that the sanitary authorities, central and local, have won a great victory. The enemy has been defeated and driven underground, but, given the opportunity, he is ready to take the field again. One may ask, What of the future? What practicable measures might be taken to prevent sporadic outbreaks? I would continue to enforce the various Acts that would secure pure water, pure air, and clean soil, and then improve the housing of the working classes and abolish slums; chlorinate all shellfish in the manner in which this is effected at Conway, and, recognizing that in recent years milk and cream play an important part as vehicles of infection, I would urge on the Government the necessity for all milk and milk products to be efficiently pasteurized and hygienically distributed. The latter measure would also help to reduce the incidence and mortality from surgical tuberculosis, and prevent milk-borne outbreaks of scarlet fever, diphtheria, and undulant fever.

The Carotid Sinus Mechanism

By J. D. Boyd, M.B., M.SC.,

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The carotid sinus is a small dilatation present on the commencement of the internal carotid artery. It has so little obvious importance that, until recently, it was neglected by anatomists and physiologists as an uninteresting detail of blood-vessel anatomy. Adachi[1] states that it is present in eighty-five per cent. of cases, but I have found the dilatation constantly present in a series of fifty-two adults (104 carotid arteries). Closely associated with this swelling is the carotid body which has been thought to be an abberant portion of chromaffin tissue. The researches of Hering,[2] de Castro,[3] Heymans,[4] and others have shown that these two structures, far from being mere incidentals of body structure, are of very considerable importance in controlling the circulation and, possibly, the chemical balance of the blood.

Parry in 1799 described slowing of the pulse following digital pressure on the carotid vessels. Tschermak[5] rediscovered this phenomenon in 1868, but he attributed the result to pressure on the vagus nerve with consequent stimulation of the vagal cardio-inhibitory fibres. This explanation was accepted by most physiologists until Hering published his work. Hering showed definitely that the bradycardia and the fall in blood-pressure following digital pressure on the side of the neck in the neighbourhood of the carotid bifurcation was due to compression, not of the vagus nerve, but of the carotid sinus. He suggested, on physiological grounds, that the nerve-endings of the carotid branch of the glosso-pharyngeal nerve were stimulated by such pressure, and he expressed the opinion that the nerve endings in the artery wall respond to the stimulus of increased internal pressure within the artery and subsequent expansion of the artery wall.*

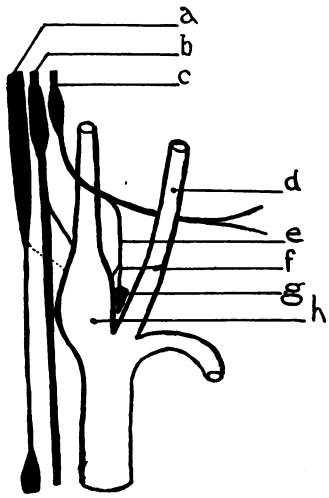
Hering's suggestion was demonstrated to be correct by de Castro, who showed that the nerve-endings of the carotid branch of the glosso-pharyngeal nerve (now called the *sinus nerve*) are the receptor-mechanism of such stimuli. He also showed that the histology of the sinus nerve-endings was very similar to that of those found in the wall of the arch of the aorta and associated with the cardiac depressor nerve. This comparison is of particular interest when it is remembered that in embryonic life the commencement of the internal carotid artery is the third branchial arch artery, the aorta is the fourth branchial arch artery, and the nerves going to these branchial arches are the glosso-pharyngeal and a branch of the vagus. There is, thus, anatomical reason to homologize the aorta with the carotid sinus, and this homology fits well with the known analogy of their depressor mechanisms.

* I have found it possible to demonstrate, mathematically, that the expansion produced by an increase of internal pressure in a vessel subject to hoop-tension is greater at a dilatation of the vessel, i.e., any adjustment which works in response to expansion will respond more effectively there. This is the reason for the existence of the sinus caroticus—any change in the internal pressure of the arteries is magnified at this dilatation, and the nerves are thus supplied with an amplifying mechanism.

The nerve-endings in the wall of the carotid sinus, when stimulated by intra-mural or extra-mural pressure, cause reflexly—through the afferent impulses sent to the hind-brain—bradycardia, a marked fall in blood-pressure, and a diminution in the amount of adenaline secretion. The adequate stimulus for this reflex in the intact animal is a rise in the blood-pressure within the aorta and within the carotid sinus. It is also thought that a fall in the blood-pressure within these vessels can cause, reflexly, tachycardia, a rise in the blood-pressure, and an increase in the adrenaline secretion. The carotid sinus, therefore, can send depressor and probably pressor impulses to the vaso-motor centre, the impulses sent depending upon the pressure within the sinus. The centripetal impulses in the sinus nerve thus tend to keep the circulation stabilized at a certain pressure and rate, that is, they constitute a part of the much more embracing mechanism which keeps the *milieu interieur* as constant as possible. This is the mechanism to which Cannon[6] has given the name *homeostasis,* and it includes such diverse physiological phenomena as the water-balance of the organism, the concentration of substances in the blood, temperature regulation, and the other factors involved in maintaining the constancy of the internal environment.

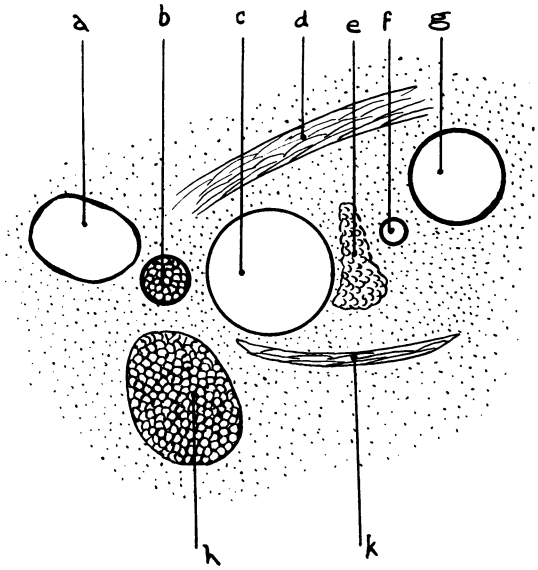
The carotid body has been described by many histologists as a chromaffin organ containing cells of sympathetic origin. A study of the histogenesis and structure of the carotid body has convinced me that there are some, but very few, cells in it which give the chromaffin reaction, and, as there is no experimental evidence to suggest that it produces a hormone, the term carotid *gland* is a misnomer.* The carotid body is lobulated, its cells are arranged in whorls around the numerous arterioles, and there is a very rich nerve supply coming from the sinus nerve and, to a small extent, from the vagus and the cervical sympathetic. The first appearance of the carotid body in development is a condensation of tissue beside the endothelium of the third branchial artery. It appears in my series at the 13 mm. stage, shortly after the branchial arch arteries have adopted the permanent arterial arch pattern. During embryonic life many small arteries enter the carotid body. These arteries are derived mainly from the internal carotid artery; they traverse the substance of the carotid body and bring the blood into intimate relation with the nerve-endings found on the constituent cells. Developmental history thus shows the carotid body to be very closely related to the carotid sinus region, and any sympathetic contribution to the body is only secondary. There is reason to believe that the carotid body acts as a filter which brings arterial blood into close contact with the glosso-pharyngeal nerve-endings. This is the anatomical basis of certain respiratory reflexes described by Hering and by Heymans as having their seat in the carotid sinus region. Heymans has also shown that the site of action of many respiratory stimulants is the carotid body, not the respiratory centre. Thus nicotine stimulates

* The problem of ectopic chromaffin tissue is a complicated one. Its amount and distribution varies in different animals; thus I found a considerable amount of chromaffin tissue in the pig carotid body, but only a few cells in the human and rabbit carotid bodies. Pathologists have found chromaffin tissue in large amounts in "tumours" of the carotid body, but I do not think that the possibility of such growths being true sympathetic tumours has been excluded.



TEXT FIG. 1.

Diagram of the general relations of the carotid sinus region: *a*, sympathetic cord; *b*, vagus nerve; *c*, glossopharangeal nerve; *d*, external carotid artery; *e*, sinus nerve; *f*, branching of sinus nerve; *g*, carotid body; *h*, carotid sinus.



TEXT FIG. 2.

Diagram of a transverse section through the neck of a 100 mm. C.R. human fœtus, to show the general relations of the carotid sinus at this stage. In the adult the hypoglossal nerve is at a higher level.

a, internal jugular vein; *b*, vagus nerve; *c*, internal carotid artery; *d*, hypoglossal nerve; *e*, carotid body; *f*, ascending pharangeal artery; *g*, external carotid artery; *h*, superior cervical ganglion; *k*, superior laryngeal nerve.

the nerve-endings situated on the carotid body arterioles, and afferent impulses are conveyed up the sinus nerve to the respiratory centre, and are there reflected as efferent impulses to the muscles of respiration. Anoxæmia also produces this reflex. The existence of such peripheral chemo-receptors is very probable, and I[7] have adduced evidence to suggest that the existence of chemo-receptors in the region of the internal carotid artery is a very old one phylogenetically.

This brief description of the carotid sinus mechanism has been a necessary introduction to a paper which has been written to call attention to the possible clinical importance of the mechanism, especially to its importance in considering the problem of hypertension. It has been found[8] that section of the aortic depressor and sinus nerves in the experimental animal results in the rapid development of high blood-pressure with sclerotic changes in the arteries. This appears to be due to the removal of the safety device which these nerves constitute. The uncontrolled rises in blood-pressure which follow such nerve section appear to be able by "damnable reiteration" to cause structural changes in the arteries as a consequence to the functional lesion. It is obvious that such a result following removal of the sinus and depressor nerve impulses is of considerable importance in studying the pathogenesis of high blood-pressure.

Not only has the carotid sinus this interest for pathologists, but also there are facts which suggest that the reflex may have a clinical value in the determination of the variety and intensity of hypertension in any given case, and it is of definite use in the detection of latent vaso-motor instability. The latter condition can be readily demonstrated by digital pressure over the carotid sinus, and Sir Thomas Lewis[9] has shown that such instability helps to explain that form of fainting attack to which he has applied the term 'vaso-vagal syncope.'

When deep digital pressure is applied over the carotid sinus in a person with a systolic blood-pressure within normal limits, there is a fall in blood-pressure and a slowing of the heart-beat. In a series of forty personal observations on hospital patients with no cardio-vascular or renal disease, the average falls in blood-pressure and heart-rate were 20 mm. Hg. and fifteen beats per minute. In two cases out of this series, the fall in blood-pressure was over 30 mm. Hg., and marked bradycardia and considerable distress, physically and psychically, was evinced. Pallor was marked, and one of the two cases perspired profusely* and lost consciousness. The resemblance of this case to a person in an "idiopathic" syncopal attack was very striking. These two cases obviously show hypersensitivity of the sinus nerves, and can be considered to have a very interesting type of vaso-motor instability.

The effect of carotid sinus stimulation was appreciably different in a small series of ten cases, in whom there was an elevation of the systolic and diastolic pressures of an amount great enough to warrant a diagnosis of high blood-pressure (as far as possible, primary renal disease was excluded). I found that the fall in blood-pressure and heart-rate in this series was smaller, averaging only 5 mm. Hg. and seven

* This is an interesing observation, because Sir Thomas Lewis suggested that sweating ought to be one of the symptoms of the human carotid sinus reflex, although he had not himself noticed it.

beats, and in one case there was no detectable change in either condition. There appears to be justification, therefore, for the statement that the sensitivity of the carotid sinus reflex in cases of hypertension is reduced. It seems to me that such a test may prove of value in determining whether or not a rise in blood-pressure is associated with loss of the control normally exercised by the aortic depressor and sinus nerves, and one would think that it could be utilized in distinguishing essential hypertension from the high pressure associated with primary renal disease. It certainly can be used to distinguish a permanent rise in blood-pressure from one due to emotional excitement, and, if a suitable technique can be elaborated, would be of importance in insurance examinations.

Pressure on the carotid sinus as a therapeutic measure has been found to stop paroxysmal tachycardia, and such pressure has been observed to cause disappearance of auricular and ventricular extra-systoles. Electro-cardiograms have shown that stimulation of the sinus nerves increases the P-R interval and, in susceptible patients, the appearance of incomplete heart-block. On such findings Freundlich[10] has suggested that the sinus nerves may be involved in the appearance of certain abnormalities of auriculo-ventricular conduction. In surgical operations on the neck it is obvious, in view of the depressor nature of the carotid sinus mechanism, that every precaution should be taken against possible stimulation of the carotid sinus region, and, in operations which induce any marked degree of shock, local anæsthesia of the sinus nerve has been advocated.

In my series of sixty digital compressions of the carotid sinus, there were no untoward results, except the typical case of vaso-vagal syncope which has been described. It is well to record, however, Heyman's warning : *"Une compression brutale de la bifurcation des carotides peut provoquer une syncope cardiaque mortelle chez un individu hypersensible."* The medico-legal implications of this statement are obvious, and, to prevent undue risk, I have never stimulated both carotid sinuses at the same time.

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Premedication as an Aid to Anæsthesia

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MEDICINE is for many of us the centre around which our little world revolves. In the daily routine of life, the "ego" of our patient—especially of our poor patient—too often suffers neglect, his pathological condition alone being regarded as worthy of our consideration. To most of us in this era of surgical advance, the spectacle of an operation and the administration of an anæsthetic are commonplace everyday events. We now relegate our patient to the surgeon's care with complete confidence, and, as we are not, and devoutly hope never shall be, the object upon which he and his anæsthetist will exert their skill, our professional unconcern sometimes causes us to forget that to the patient such an event is no mere matter of routine, but is very rightly regarded as one of outstanding importance and gravity. Few, indeed, reflect with equanimity upon their approaching visit to the surgical theatre, and to the many it is an ordeal awaited with apprehension and terror. Therefore, it is fitting that at all times we endeavour to appreciate the patient's point of view, and that our attitude be always one of sympathy and understanding. The adoption of this course entails no extra trouble or expense. A moment of thoughtfulness alone is required.

It is doubtless the experience of most general practitioners and surgeons, that on the eve of an operation, dread of the anæsthetic is uppermost in the patient's mind, and it is the purpose of this short paper to bring before you some of the measures which may with safety be employed to prevent, or at any rate, to ameliorate, this unnecessary and harmful mental distress.

Surrender of the conscious self is abhorrent to the normal individual, and should the unhappy patient pass through the Spartan test of being unceremoniously hustled from his bed to the operating-theatre, and, whilst submitting himself to the unpleasant ordeal of inhaling an irritant vapour, he is constantly assailed by strange and awesome noises which echo and re-echo down the long vista leading at last to a merciful oblivion, then truly are his worst premonitions all too fully justified.

To the unfortunate individual who under such unfavourable circumstances is doing his best to go quietly asleep, there may be added, as a refinement to the torture, the ill-considered interference with dressings by the nursing staff, the unexpected attack of an over-zealous assistant with towel-clips, or a sudden splash of methylated ether on a sensitive and unsuspecting umbilicus.

When we consider the advances which have been made in the science of anæsthesia in recent years, it seems almost incredible that such a trial of stoicism as I have depicted should even to-day constitute a not infrequent prelude to the drama of a surgical operation. It is difficult to understand why the vast majority of medical practitioners will adopt with enthusiasm all the alleged modern improvements in therapeutics, and yet remain content to practise methods of anæsthesia which in all humanity should now be regarded as merely of historical interest.

Medicine has long since been divorced from the occult, and there is little doubt that to-day the interest of the general public in medical affairs is growing rapidly—indeed, almost uncomfortably. The enterprising lay press which is responsible for the dissemination of much interesting if somewhat inaccurate medical information, has ensured that the subject of anæsthesia no longer suffers an apathetic neglect, but has now assumed a degree of importance already too long delayed. As a result of several recent articles dealing with pre-anæsthetic medication, the public are alive to the fact that such humane methods can be adopted, and it is certain that the demand for some form of basal narcosis prior to the administration of an anæsthetic will before long become general.

Now, other things being equal, the family physician should be, and very often is, the ideal anæsthetist. He begins his task with the twofold advantage of knowing his patient's mentality and enjoying his trust. Indeed, it is by no means uncommon for a patient to refuse any surgical interference unless his own doctor is present to administer the anæsthetic. Undoubtedly such confidence is eminently desirable, but unfortunately it is sometimes misplaced, and conservative methods on the part of the anæsthetist may occasion the patient to spend several days in close communion with a vomit-bowl—an agonizing experience which should be entirely avoidable.

Before mentioning a few of the premedication measures which are in vogue at the present time, I should like to discuss the supreme importance of resorting to some means whereby the patient's mental excitement may be allayed, and the psychic shock which precedes and accompanies the induction of an anæsthetic in great measure prevented.

To my mind, fear on the part of the patient constitutes the greatest difficulty and the greatest danger with which the anæsthetist has to contend. Those who are naturally nervous, or who are rendered so by unskilful handling, tend to struggle and resist while going under, thereby interfering with the desirable smoothness of the induction stage; and to convert a bad induction into a good anæsthesia is a task wellnigh impossible.

A struggling patient is to the anæsthetist a testimony of failure.

While it is certain that, even in the absence of any preliminary basal narcotic, an experienced anæsthetist will be able, by virtue of suggestion, and by skilful administration, to render the induction of anæsthesia relatively pleasant, and in so doing to modify such after-effects as psychical post-operative vomiting, I am, nevertheless, convinced that the assistance which efficient premedication affords should be utilized in every suitable case.

The importance of an easy and pleasant induction cannot be over-estimated. While the psychical effects of fear might be considered capable of danger and harm only so long as consciousness remained, I am satisfied that the result of a distressful induction is manifest not only during the whole course of anæsthesia, but also for many days of the post-operative convalescent period. It is hardly too much to say, that, given a patient whose clinical condition affords a reasonable hope of operative success, then, from the anæsthetist's point of view, any method, consistent with safety, whereby fear may be allayed, should ensure an almost complete freedom

from danger during induction, a successful surgical anæsthesia and a post-operative period undisturbed by nausea or vomiting.

Obstetrical work affords a classical example of how the absence of fear confers on these patients a remarkable immunity from danger during anæsthesia, and their appearance of well-being on subsequent return to consciousness is no less striking. Chloroform, admittedly a most dangerous anæsthetic, is often the agent employed. Its special risk, even in the hands of experts, is its occasional liability to cause a sudden heart failure during the induction stage. Obstetrical patients would appear to be almost immune from this risk, and it must be remembered that in these cases the rôle of anæsthetist is often assumed by a person who, in the realms of anæsthesia, 'knows no science and practises no art.'

Comparable, from a mental point of view, with the woman in labour, whose fears are lost in the prospect of relief from pain, we have the surgical emergency case. The circumstances under which these cases arrive for operation would at first sight appear to increase the difficulties and dangers of the anæsthetic. A sudden catastrophe has occurred, such as a ruptured duodenal ulcer or the onset of an acute appendicitis. The patient is advised that he must submit to a immediate operation and is promptly rushed into hospital, where the sole preliminary treatment may consist in the execution of some tonsorial artistry on his abdomen, a procedure in nowise calculated to allay mental confusion. He is then hurried into the operating-theatre, where the resident pupil in all probability takes command of the anæsthetic, and it is not unlikely that the technique of induction will exhibit many of the elements of a surprise attack, with their attendant disadvantages. In spite of all this, the anæsthetic vapour is breathed in with an eagerness and content, and in most instances perfect anæsthesia follows. Fear is forgotten in the craving for relief from agony. Therein lies the patient's safety and the pupil's success.

The attitude of these patients is in marked contrast to the ordinary operation case who is submitting himself in cold blood to a strange and terrifying ordeal. Rightly or wrongly, he is apprehensive of the risk of the operation and of his chances of survival. It should, therefore, be the duty of the anæsthetist to alleviate this mental distress as much as possible, and for this purpose the employment of some suitable pre-anæsthetic medication is invaluable. One need hardly urge the importance of a clinical examination of the patient by the anæsthetist some time prior to the operation, preferably the preceding night. Bearing in mind the operative requirements, a knowledge of the patient's physical and mental peculiarities is essential, not only to determine the most suitable form of premedication, but also the dosage in which it can with safety be employed. Apart from acquiring such necessary information, an attempt should be made to gain the confidence of the patient. Much can be done to allay his fears by suggestion, explanation and the assurance that the dreaded period of "going under" will be rendered almost akin to the onset of a natural sleep.

In the following brief résumé of the more popular methods employed in the production of basal narcosis, I would like to make it quite clear that drugs used for this purpose should be given only in such dosage as will produce in the patient a condition so drowsy, that, either he is entirely unaware of the administration of

the supplementary anæsthetic, or at any rate has no apprehension of it. Complete surgical anæsthesia *should never* be deliberately attempted.

Among the many basal narcotics in use at the present day, avertin may perhaps be regarded as the most popular. Chemically it is tri-brom-ethyl alcohol, and was first produced in 1923 by the German chemists Willstätter and Duisberg. At first it was only available in powder form, but owing to difficulty of dosage this has been abandoned in favour of avertin fluid, which is a highly concentrated solution of the drug in amylene hydrate. The method of introduction is generally by the rectum, the requisite quantity of avertin fluid being dissolved in distilled water, sufficient in amount to make a two and a half per cent. solution. The weight of the patient is taken as a rough guide to the quantity of avertin which may be given. One gram of avertin is present in each cubic centimetre of avertin fluid, and for general purposes the dose recommended is 0.1 gm. per kilogram body-weight. That is, for every 2.2 pounds the patient weighs, 0.1 c.c. of avertin fluid is given. From much experience and carefully controlled clinical trials, this empiric dosage has been advocated as affording a reasonable margin of safety, and at the same time being sufficient to procure satisfactory basal narcosis in the great majority of cases.

Avertin being now presented in a form suitable for ready calculation in basal dosage, and as tables are provided showing the exact quantities required for the completed solution in both metric and imperial measure, one no longer requires to be an exponent of the higher mathematics in order to arrive at the correct posology. With regard to the preparation of the patient, no elaborate measures are required. As detoxication takes place largely in the liver, an intravenous glucose saline some time before operation has been advocated. If it is certain that the operation will not involve the opening of stomach or duodenum, there can be no objection to the patient taking a few drachms of glucose by mouth, so that the more elaborate procedure is scarcely necessary, except in the event of the patient having undergone a prolonged pre-operative period of starvation.

When avertin is to be administered, it is sometimes difficult to decide upon the advisability of giving a preliminary dose of morphine, especially to the aged, or in toxic cases. If there is any doubt at all, it is preferable either to omit a pre-narcotic altogether, or to give some preparation such as luminal, which exerts a less depressant action on the respiratory centre. There is no doubt, however, that morphine up to one-sixth grain can be given to the majority of surgical patients with safety and advantage. It should be given about half an hour before the time arranged for introduction of the avertin. One-hundredth grain of atropine sulphate may be injected at the same time if ether is to be the supplementary anæsthetic. On the other hand, if nitrous oxide and oxygen is to be employed, it is probably better to withhold the atropine and to give morphine alone.

When one has determined the requisite dose of avertin, a quantity of distilled water sufficient to make a 2.5 per cent. solution is placed in a flask having a capacity of 400 to 600 c.c., and heated to a temperature of 35 to 37°C. The avertin fluid is measured very accurately in a graduated 10 c.c. pipette, and quickly run into the flask, which is then shaken vigorously for some minutes until complete solution occurs. The resultant liquid must be quite clear. At temperatures over

40°C. avertin is decomposed into hydrobromic acid and di-brom-acetaldehyde. This is a point of practical importance, as di-brom-acetaldehyde, if present in the solution, will cause irritation of the rectum and colon, and may give rise to an actual necrosis. For this reason the so-called obligatory Congo-red test must be performed in every case prior to the administration of the fluid. Two to three c.c. of the prepared solution are placed in an ordinary test-tube. If, on the addition of a few drops of an aqueous solution of Congo-red, the colour remains pink, no decomposition has taken place, and the preparation may safely be used. On the other hand, a blue colouration denotes the presence of hydrobromic acid, and in such an event the entire solution must be rejected and a fresh quantity prepared. If sufficient care is taken to ensure that during preparation a temperature of 40°C. is not exceeded, such a contingency will seldom arise.

The method of pocedure will, or at any rate should, have been explained to the patient on a previous occasion. In dealing with highly nervous individuals, it is preferable that administration should take place in the ward or bedroom, and avoidance of noise or fuss is an absolute essential. Actual introduction of the fluid is a matter of simplicity, and requires little comment. It is, in almost all respects, similar to the administration of an ordinary rectal saline. The patient is instructed to lie on the left side, and to assume as comfortable a position as possible. A No. 6 or No. 8 sized rubber catheter, which has been warmed and lubricated, is passed into the rectum for a distance of three or four inches. To this is attached a small glass funnel. There has been some controversy as to the rate at which the solution should be allowed to enter the rectum. Personally, I am in favour of a very slow administration, and as a rule the introduction of 250 c.c. occupies approximately a quarter of a hour. By this means, any tendency on the part of the bowel to return the solution is minimized, and also, before the entire quantity has been introduced, sufficient time is given to note individual differences in tolerance. The absorption of avertin from the bowel is extremely rapid, and patients are usually asleep before administration of the fluid has been completed. Nevertheless, they should be allowed to remain undisturbed for a further period of ten minutes prior to any attempt being made to transport them to the operating-theatre. As muscle tone is soon lost, there is an inclination for the tongue to fall back against the posterior pharyngeal wall, thus producing a condition of asphyxia. Introduction of a Hewitt's artificial air-way overcomes this difficulty, and avoids the necessity for manual advancement of the jaws.

With regard to dosage, I have mentioned that 0.1 gm. per kilogram body-weight has been suggested as affording a satisfactory standard. It must be remembered, however, that a patient's weight and his powers of detoxication are by no means directly proportional. In the obese type with a low metabolic rate, such a dose calculated on body-weight would be altogether too high, whereas, in the case of the hyperthyroid patient whose basal metabolic rate is in excess of the normal, a similar empiric dose will often fail to procure an adequate basal narcosis. Much experience is necessary in order to acquire an accurate judgment of the optimum dosage for each individual patient, and until one has become familiar in the use of this drug it is wise to keep well within the limits of safety.

Although primarily intended as a basal narcotic, avertin has been given in amounts up to 0.2 gm. per kilogram body-weight in an effort to secure full surgical anæsthesia by this means alone. While doubtless some degree of success has thus been attained, one feels certain that such enthusiastic endeavours must inevitably lead to much anxiety, and occasionally, indeed, to some regrets. When one observes the marked deepening of narcosis which may accompany even an increase of 0.01 gram per kilogram of body-weight over the usual basal dose, one realizes that the therapeutic margin of avertin is by no means great. Familiarity with this drug breeds nothing but respect. Used with discretion, in conjunction with an ether or nitrous oxide and oxygen inhalation, it approaches the ideal anæsthetic more closely than any other at our present command.

Such preparations as paraldehyde in ten per cent. solution, the well-known Gwathmey's ether-oil mixture, and others, have all been administered rectally as aids to anæsthesia, but have now been largely superseded by avertin. Their preparation and introduction are on the whole more difficult, while the fact that excretion takes place to a great extent through the respiratory system constitutes a distinct disadvantage to their use.

The introduction of the barbituric acid compounds as complementary or basal narcotics has been a valuable addition to the anæsthetist's armamentarium. Of these, nembutal and sodium soneryl are probably the most widely used in this country, and each can be administered either by mouth, rectum, or directly into the blood-stream.

For intravenous use, nembutal is supplied by the makers in ampoules containing seven and a half grains. Prior to injection the powder is dissolved in the ampoule by the addition of 10 c.c. of distilled water at body temperature. When solution is complete, injection is made directly into a vein, an ordinary 10 c.c. syringe being used for this purpose. Two c.c. may be introduced rapidly into the circulation, after which the rate of injection should not exceed 1 c.c. per minute. Meanwhile, the patient is engaged in conversation, and as the injection proceeds his speech becomes more and more slurred, until finally he fails to respond to questions and sinks into a deep sleep. When this occurs, a further half to 1 c.c. may be given, and administration is then stopped. Four to six c.c. is about the average quantity used. By this method one is undoubtedly able to estimate the exact amount required to secure complete narcosis, but, while more certain results can thus be obtained, the effect of the drug on the patient may be prolonged for a period sufficient to cause anxious speculation as to whether consciousness will ever return. As detoxication of the barbiturates is assumed to take place in the liver, it would appear that toxins reaching this organ by the portal system are more rapidly and effectively dealt with, and with less damage to the liver itself, than those arriving *via* the hepatic artery.

For administration by mouth, capsules containing one and a half grains of nembutal are generally employed. The usual method consists in giving one capsule overnight, and, according to the effect produced, two or more capsules are given one hour prior to operation. A dose of three grains by mouth will secure a satisfactory condition of somnolence in the majority of cases.

Sodium soneryl is the latest addition to the list of barbiturate preparations, and as the makers recommend that its use be confined to oral administration, it is dispensed solely for this purpose in capsules each containing 0.15 gm. Although the chemical formula of this preparation is almost identical to that of nembutal, it is claimed to possess a lower degree of toxicity and to exert a definitely less depressant action on the respiratory centre—contentions with which I am inclined to agree.

For some time now, I have combined the oral administration of sodium soneryl with a hypodermic injection of omnopon one-third to two-thirds gr., and scopolamine hydrobromide 1/150 gr. On the night before operation, one capsule of sodium soneryl is given in order to ensure for the patient a restful sleep. Early on the following morning, a cup of well-sweetened tea or a few drachms of glucose may be taken. One hour before operation the patient receives two capsules of sodium soneryl by mouth, together with an injection of omnopon-scopolamine. The room is then darkened, and in a short time sleep quietly supervenes. Transport to the theatre may serve to rouse the patient, but as a rule, on return to consciousness, all memory of the journey or of any subsequent happenings is lost. On several occasions, through error, the patient has been roused and permitted to walk to the theatre, and yet on awakening some time after the operation had been finished there was complete failure to recollect ever having been disturbed. Whilst unable to claim complete amnesia in all cases, there is no doubt that by using this combination of drugs extremely gratifying results can be obtained, and in my opinion the method described is preferable to the administration of nembutal, either orally or intravenously.

It is not my intention to enter into a discussion as to the relative merits of the numerous basal narcotics, or of their use in the various surgical specialities. In many cases it is largely a question of personal preference. Experience in the different methods is necessary in order to make a suitable selection, and to obtain the best results with each. Some enthusiasts recommend that avertin should be employed in all types of cases. Apart from the fact that routine anæsthesia is bad anæsthesia, there are some definite contra-indications to the use of this preparation; its exhibition in the aged, in those suffering from extreme degrees of thyroid deficiency or toxæmia, and in patients whose blood-pressure is much reduced as a result of grave shock or loss of blood, may well be regarded as such.

As all the various basal narcotics available at the present time have a tendency towards reduction of blood-pressure and depression of the respiratory centre, the inhalation of chloroform in order to produce full surgical anæsthesia is inadvisable. Ether, however, may be used for this purpose with safety, and only a relatively small quantity will be required in order to secure and maintain a pleasing degree of muscular relaxation. While contra-indications to the use of ether are few indeed, I must confess to a preference for nitrous oxide and oxygen as the supplementary anæsthetic in all cases where avertin or one of the barbiturates has been employed. This may be partly due to the comforting fact that by using gas and oxygen one has the means at hand whereby, in the rare event of respiratory

failure, oxygen and carbon-dioxide can be forced into the lungs under pressure. Basal narcotics appear to increase in an extraordinary manner the susceptibility of the patient to the action of nitrous oxide, so that a much lesser degree of anoxæmia is sufficient to secure satisfactory muscular relaxation. Apart from the consideration mentioned, and in the absence of any respiratory disease, equally good results can doubtless be obtained with ether, and at much less expense.

When any basal narcotic has been administered, the exhibition on the 'anæsthetic table' of a carbon-dioxide sparklet, together with ampoules containing coramine, lobeline, and ephedrine is to be recommended. While in ninety-nine per cent. of cases, resort to such restorative measures will be unnecessary, the knowledge of their near presence serves to exert on the mind of the anæsthetist a desirable and a beneficial calm.

I am all too well aware that in this short paper I have dealt with the subject of pre-anæsthetic medication in a manner totally inadequate to its importance. Nevertheless, I hope enough has been said to stimulate the interest of practitioners who, so far, have not availed themselves of certain methods which undoubtedly constitute a very great advance in anæsthetic technique. It may seem to many of you that the dangers and difficulties attendant on basal narcosis have been unduly stressed. For this I offer no apology. Until considerable knowledge has been gained of the effects which may be anticipated as a result of utilizing any of these premedication measures, the dosage must be well within the recognized margin of safety.

The induction and maintenance of anæsthesia is to-day a very different procedure from the older methods, and it will be a great pity if reproach is brought to bear upon basal narcosis by the thoughtless and the inexpert. Some still hold the opinion that by adhering firmly to the administration of ether they will at least be reasonably certain to get the patient off the operating-table alive. I would remind you, however, that the anæsthetist is responsible for the after-results of the anæsthetic he has given, and his sole consideration must never be the avoidance of a coroner's inquiry.

Basal narcosis undoubtedly marks a distinct advance in anæsthesia. The advantage of minimized mental shock is sufficient alone to warrant its use, but when it also enables us to ensure for our patients absence of vomiting and a post-operative period of somnolence during which a great deal of pain is evaded, then indeed is its use doubly justified.

The last word in anæsthesia has not been said. Better methods will undoubtedly be available for our use in the future, but let us make use of the best that is now at our command. From the earliest ages man has striven to discover means whereby pain may be alleviated. In the Book of Genesis, a work regarded as being of respectable antiquity, there is to be found a very fine conception of anæsthesia. The passage referred to reads: "And the Lord God caused a deep sleep to fall upon Adam, and he slept: and He took one of his ribs and closed up the flesh instead thereof." As to the extraordinary end-result of this particular operation I make no comment, but at any rate, the delightful description of anæsthesia might very well apply to what we to-day can realize by the aid of the so-called basal narcotics.

Hæmorrhage—A Historical Survey.

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"To die of hæmorrhage," says an ancient book of surgery, "is perhaps the most awful death; the loss of blood intimates approaching dissolution, and as the patient feels his strength and spirit ebbing, he calls to the surgeon for aid, if not to cure, to try and at least delay the fatal moment." Throughout the ages this fear of hæmorrhage was a nightmare to the surgeon, and held back his art for centuries. The ancients, ignorant of the anatomy of the blood-vessels, had no means of arresting hæmorrhage, and did not dare even incise an abscess, or cut out the most superficial tumour, without fear and trembling. Such operations, when performed at all, were performed not with a knife, but with a red-hot iron. If they ventured an amputation of a limb, it was only after it had become gangrenous, and the incision was made through the putrid flesh rather than through the healthy tissue above it. The surgeon in these cases merely separated parts which were already dead and bloodless. Even as late as the sixteenth century the fear of hæmorrhage was so great that operative measures to arrest bleeding were only attempted when prayers and magical incantations failed. Live toads were placed behind the ears or under the armpits of pregnant women, to act as charms to prevent post-partum hæmorrhage. It was even stated that the efficacy of the toad in preventing hæmorrhage could be demonstrated by anyone, if a toad be hung around a cock's neck for a day or two, after which the head could be cut off the cock, and the neck "would not bleed a single drop."

A more efficacious method of arresting hæmorrhage from a limb was to cut open a live hen and tie the bleeding end into the abdominal cavity. The discovery of this method is ascribed to a hangman's wife, an account of which is as follows:

"The servant of a certain priest, who knew that he carried all his money, to the amount of two hundred crowns, about him, watched him one night when he was sitting by the fire roasting a partridge, and while he was twirling it about came and knocked him down with a billet, and then was at the superfluous trouble of cutting his throat. . . . About a year after, the villain was taken and condemned to be divided into quarters, for the benefit of the whole city; but before this he underwent the following initiatory ceremony: He was carried to the square where he had committed the murder, and there the hangman cut off the right hand with an axe; . . . but, lest he should die of hæmorrhage, the hangman's wife, in whose lap the thief sat during all his progress, took a live foul, which she had provided, cut it up with a knife from the gut to the breast-bone, thrust the bleeding stump into it, and tied it firm, and hooped it on with garters, like a boxing-glove. He was dragged on the hurdle for a whole hour before he arrived at the spot where he was to finish his career, and to the admiration of all who followed him, lost not one drop of blood."

But in the early history of medicine, the only hope of controlling hæmorrhage was the cautery. The cautery, indeed, was at first believed to be a panacea for all ills. Hippocrates himself was one of the firmest believers in its efficacy. He says: "That what medicament quelleth not, the iron doth; and that which iron amendeth not, the fire extermineth; while that which the fire cureth not must be considered incurable." During the Middle Ages certain diseases, i.e., apoplexy, epilepsy, headache, and insanity, were treated by cauterization of the skin over the frontal bone. Tumours were destroyed by its use, rheumatism cured, and piles obliterated. John Bell the surgeon writes: "The learned were worshippers of fire, and those who seceded from the great doctrine were recognized as heretics, and as ignorant men, incapable of understanding the writings of the ancients, or of relishing their doctrines, and were hardly accounted as regular physician."

The method of employing the cautery in hæmorrhage has been described by Albucasis. He says: "Apply the hand over the opening of the vessel, press with the index finger until the blood is stopped and flows forth no more. Heat the cauteries and apply over the artery itself, after having quickly raised the finger, and hold it there until the bleeding is stopped." A more detailed account is as follows: "A number of irons are to be heated in the fire at one time; they should be of conical form, so as to enter the wound and touch the mouth of the artery without injuring the surrounding tissues; the cauterizing irons are brought from another room, for the surgeons must be careful to hide their fearful instruments." The account continues: "The surgeons must first strike the cautery against the side of the grate, rub its face upon the floor, and then introduce it into the wound, twisting it round and round until the bleeding stops." The fear and trembling of the patient, the agonizing cries, the haste of the operator, and the dull glow of the irons hissing as the blood poured over them, must have made surgery in those days a horrible business. So horrible must it have been that Turner gives specific instructions: "Your patient, especially if a woman or child, or a woman with child, should never be suffered to see the irons, or, if possible, to know anything of them, for which end it is necessary that the face be covered at such times, and the part held steady by a servant or proper assistant, among which some of your own fraternity are the fittest."

From the actual cautery it was natural to proceed to the use of substances which produce similar results, such as caustics, boiling oil, and pitch. Of these substances, boiling oil was considered the most efficacious. But a more readily-prepared and easily-controlled substance was found in little bags of powdered vitriol. These bags were placed upon the mouth of the artery (the bleeding having been first arrested by a tourniquet), and after a short time the blood was allowed to ooze slowly over the bag, so that the powdered vitriol was dissolved, and the solution then acted like a cautery, and a slough was formed which fell off in a few days.

Terrible as the cautery and boiling oil must have been, they were not always successful. The sloughs sometimes loosened too early, and secondary hæmorrhage must have resulted which in turn must have caused the death of many patients.

It is small wonder that the discovery of some means to effectually control hæmorrhage was so eagerly sought, and many and extraordinary—to our eyes—were the devices invented with this end in view.

A German chemist named Rewbell invented a styptic which he claimed as a certain cure. He went to Paris and received permission from the King to demonstrate its effectiveness upon one of the soldiers at the Hopital des Invalids. A patient's leg was amputated, and the styptic applied, but the blood flowed through the dressings. A double dose of the styptic was then used, but still the blood flowed, and in a short time the unhappy subject of the experiment was dead.

A more successful styptic was discovered by a French surgeon named Denys, about 1740. The following description of this substance is given by Turner: "In the reign of King Charles the Second, Mr. Denys' Essence made a great noise amongst us, many experiments being tried therewith by Dr. Walter Neenham and Mr. Richard Wiseman, as well on brutes as human beings, several of the court physicians and principal surgeons being present, the king himself also a spectator at some of them, and declaring his satisfaction in the same; upon which Mr. Denys was desired (but not without a princely reward) to communicate his secret, which was prepared in the Royal Laboratory, and often used with great applause under the title of 'Stypticum Regis,' yet quickly after the secret taking the air, the same began to be overlooked, and little set by, which put another secret-monger upon publishing one not half so good, as was proved by that faithful and judicious practitioner, Mr. Cowper, in the hospital of St. Thomas, Southwark, who, notwithstanding the differing characters given it by the author, declared it a most painful and violent caustic, at the same time ineffectual in the end of its application."

An Englishman named White then discovered the value of a sponge firmly compressed against the wound. It was described as a compress "having this curious property, that at first it pressed moderately, but if one single drop of blood escaped, the compress swells by absorbing that blood, still preserves its contact with the bleeding artery, and swells more and presses harder, exactly in proportion as such pressure is required."

The pressure of the sponge was a distinct advance in the conquering of hæmorrhage, but a better and more certain method was soon to be demonstrated by Ambroise Paré. This author published a book on surgery in 1564, in which he advocated the simple ligaturing of vessels instead of the cautery or styptic. Paré started life as a poor barber, but by sheer ability he forced his way to the front of his profession, and became in succession surgeon-in-ordinary to four kings of France: Henry II, Francis II, Charles IV, and Henry III. He enjoyed such complete confidence of each of these monarchs that he soon earned the envy and hatred of his fellow-surgeons, who lost no opportunity of humiliating and persecuting him. When he published his book on surgery in which he condemned the cauterization of bleeding vessels and advocated their ligature instead, this was their opportunity. The College of Paris claimed the right to license books for publication, and as Paré had not previously obtained this permission it instigated

his prosecution. Paré lost his case, but declined to recognize the authority of Parliament in such matters.

In this epoch-making book, Paré gives the following instructions for the treatment of hæmorrhage:

"If there be a bleeding artery . . . clap your finger upon the point of the artery, and wait patiently till a clot be formed.

"If the artery continue to bleed, cut up the wound and pass a needle under the artery, enclosing along with it in the ligature much or little flesh, according to the circumstances of the case.

"If the artery has shrunk up along the flesh, cut up the wound and tie the artery higher.

"If an amputation stump, draw your arteries out with the forceps, tie them neatly with a thread; but if once you miss the artery, or your first thread gives way, do not use the forceps any more, but pass a needle four inches long into the stump, so as to tie in the artery, along with much of the flesh.

"Sometimes the surgeon needs to cut the vessel entirely across, by which its ends, shrinking both ways among the flesh, the flux stops: but always the surest way is to tie the vessel before cutting it thus across."

The instrument used by Paré to catch the artery was the *bec de carbin,* a pincer-like instrument which up to that time had been used alone for grasping bullets in wounds. Paré was in the habit of using this instrument while acting as an army surgeon. And during a battle, running short of the recognized boiling oil with which to cauterize the soldiers' wounds, he was forced to find an alternative method of treatment. He took his *bec de carbin* and, catching the vessels, ligatured them; he then made a mixture of the yolk of eggs, olive oil, and turpentine, and dressed the wound with it. After this method of treatment, Paré was greatly disturbed in mind, and could not sleep, fearing the consequences, because he had always been taught that gunshot wounds were poisoned. He says: "That night I could not sleep at ease, fearing by lack of cauterization that I should find the wounded, on whom I had failed to put the said oil, dead or poisoned, which made me rise early to visit them, when, beyond my hope, I found them upon whom I had put the digestive medicament feeling little pain and their wounds without inflammation or swelling, having rested fairly well throughout the night. Then I resolved with myself never more to burn thus cruelly poor men wounded with gunshot."

The results thus obtained set Paré thinking, and he began the series of observations which ended in his abandoning the use of the cautery and boiling oil. And in 1552 we learn that he used the ligature exclusively in amputating the leg of an officer who had been wounded at the siege of Danvilliers. Writing of the patient, he states: "I dressed him, but God healed him, and he returned home gaily with a wooden leg." It was after this operation that Paré published his "Dix Livres de la Chirurgie," in which he advised the total abandonment of the cautery in any form.

The use of the ligature was not the invention of Paré, but it was he who popularized the procedure and applied it to the treatment of hæmorrhage from operations, particularly from amputations. Celsus had taught that in cases of intractable hæmorrhage from a wound the vessel should be ligatured, a proceeding recommended by various authors from time to time afterwards. But the ligature here was a matter of last resort, and not of election, and the use of it was infrequent and confined to wounds received by accident.

The reign of aseptic surgery had not arrived, but with the control of hæmorrhage surgery should have made rapid advances. The surgeons, however, were afraid to follow the lead of Paré. They said the ligature would give way, or that it would cut the artery across, or that it might be thrown off by the continual beating of the artery. It was even said that the procedure was difficult, time-consuming, and dangerous, and that when it was accomplished it led to fever, with the additional danger of puncturing the adjacent nerve, which would result in tetanic convulsions, and great danger to life.

Even as late as the middle of the eighteenth century the matter was not settled, and in Cheselden's edition of Le Dran's "Operations in Surgery," there is a long discussion on the relative merits of styptics and ligatures.

He states: "Though each of these methods have their inconvenience, yet we are obliged to make use of one of them; and herein we must be determined according as different circumstances appear to make either of them preferable. When a patient is properly accommodated, and can be kept quiet, the button (of vitriol) may be applied, as we may thereby secure the hæmorrhage without running the hazard of convulsions; but if the patient must be moved after the amputation, it will be proper to use the ligature as being the most secure means, and especially as the convulsions, if they do ensue, do not appear till some days after the operation."

He ends by saying: "The ends of the threads (the ligatures) should be long enough to be brought over the stump, that they may be distinguished from the lint which is to cover the wound." The long ends of the "threads" were necessary because the ligatures were always removed a few days after the operation, probably to prevent the "convulsions." The removal of the ligature from the vessel carried with it the risk of secondary hæmorrhage, and there was a strong argument against its use. The experiments of Lister, however, in 1868, proved that the removal of the ligature from tied vessels was unnecessary, and that the ligatures could be cut short and left in the wound, if animal tissues were employed for the purpose, provided always that the surgeon has studied the principles of the antiseptic system. Lister employed catgut, which was at first carbolized, but in 1876 he described his chromatization method to render the catgut aseptic, and in so doing laid down the principle of the present-day absorbable ligature.

The difficulty in the appreciation of Paré's method of ligation was in large part due to the Hippocratic method of amputation, which was still practised at that time, that is, amputation was through the diseased part of the tissues. Paré on

the other hand practised amputation above the diseased portion of the limb through healthy tissue. The surgeon who followed the Hippocratic practice would have relatively little difficulty in controlling hæmorrhage, because the vessels would be to a large extent thrombosed and there would be little bleeding.

It was for this reason, therefore, that surgeons did not at first accept the simple ligation of the arteries in amputations. But when the method of amputating through healthy tissue was acknowledged as giving better results, the ligation of arteries quickly took the place in surgery which it occupies to-day, as being the one and certain method to control hæmorrhage.

Lister, after the researches of Pasteur, revolutionized surgery, and changed it from a septic to an antiseptic, and then to an aseptic age, but surely Ambroise Paré is deserving of equal fame, for it was he who taught us how to arrest and to control hæmorrhage, and by so doing made possible modern surgical technique.

BOOK REVIEWS

BRIGHT'S DISEASE. By J. Norman Cruickshank, M.D., D.Sc., M.R.C.P.Lond. Edinburgh : E. & S. Livingstone, 1933. pp. 208. Price 10s. 6d. net.

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A Study of the Cardiac In-Patient in the Royal Victoria Hospital, Belfast

By S. B. Boyd Campbell, M.C., M.D., F.R.C.P.EDIN.;
and T. H. Crozier, M.D., D.P.H., M.R.C.P.LOND.

This paper is based on the examination of the medical history sheets of 1,253 cardio-vascular cases admitted to the Royal Victoria Hospital from 1924 till 1928, and in 1932. They are classified under the following headings :—

1. Congenital.
2. Infective, which is sub-divided into—
   (*a*) Rheumatic.
   (*b*) Syphilitic.
   (*c*) Endocarditis, i.e., bacterial and ulcerative.
   (*d*) Various.
3. Toxic, which is sub-divided into—
   (*a*) Thyroid.
   (*b*) Alcoholic.
   (*c*) Various.
4. Degenerative, which is sub-divided into—
   (*a*) Hyperpietic.
   (*b*) Decrescent.
5. Doubtful.

The Congenital group was a very small one, as there were only three cases in the six years. This is due to the fact that most congenital hearts are diagnosed before the age for admission to the Royal, and in consequence find their way to one of the children's hospitals.

The Infective group consists of 674 cases, or 53.8 per cent. of the total admissions, and of this group the rheumatic had 453 cases, one-third of the total, or 67.2 per cent. of the Infective group. In this group are placed those cases with a definite history of rheumatic fever, chorea, growing pains, tonsillitis, scarlet fever, and erythema nodosum. Ten per cent. of the patients with a definite valve lesion under the age of thirty gave no definite history of any previous illness. This negative history corresponds roughly with the findings of Swift,[1] who, in a recent record of 253 girls with rheumatic heart disease, found that twenty-one per cent. did not give a history of chorea, rheumatic fever, or growing pains; and of 174 boys, fourteen per cent. gave no history of the above previous illnesses.

Of the cases with a definite history, the largest number was admitted under one year from the time of infection, and 68.2 per cent. under fifteen years from initial infection. Seventy-nine per cent. of the cases were under 40, and fifty-nine per cent. between 10 and 30. This large percentage in the second and third decade appears

to be usual, for Gager[2] in an article on cardiac prognosis in rheumatic heart disease found the average age of death between 28 and 32.

Most of the cases admitted to hospital were suffering either from the initial acute infection or a recurrence of one or other of the predisposing diseases, or had definite symptoms and signs pointing to myocardial failure. It is rare to get cases admitted at present simply because a murmur has been found at routine examination. Some of the cases have been readmitted after a period of months or years, and here one often finds very definite valvular lesions where previously only some minor change, such as a reduplicated second mitral sound, had been noted. These findings emphasize the importance of a much longer period of rest and treatment in young people with even slight changes in the heart-sounds following rheumatic fever or the other associated diseases.

In the Royal Victoria Hospital, where it is impossible to keep patients convalescing for an indefinite time, we find that in this group the time period in hospital is relatively higher than in any other group, ten cases being 100 days or more, and one case as long as 170 days in hospital. The case mortality was nine per cent., being the second lowest of the four main groups, while the number of patients who went out C.T.A. (1.8 per cent.) was the highest of the four groups.

The occurrence of acute rheumatism in hospital practice does not seem to be so rare as articles in the various journals would lead one to suppose. During this autumn several cases have been admitted to the ward, some of which turned out to be other forms of rheumatism and not rheumatic fever. We make it a routine to put all these cases on to large doses of salicylates, giving them sod. sal. grs. 15 and aspirin grs. 10 alternately every two hours till the temperature and joint pains subside. In an uncomplicated rheumatic fever an immediate response may be expected, and in cases where the temperature and pain persist, the lesion has been found, in some cases, to be acute gonorrhœal rheumatism, in others an active endocarditis with subacute rheumatism or acute rheumatoid arthritis.

Salicylates have been proved to have no effect on an endocarditis, but we feel satisfied that if given early and in sufficient dosage they will often prevent cardiac trouble.

Then there is the case with a recurring history of sore throats and rheumatic fever, where the problem of tonsillectomy has to be considered. This is a debatable point, and we find some authors strongly recommending it, others criticizing it adversely. The recent work of Collis,[3] who found the hæmolytic streptococci in the throats of such cases, would make one feel that the removal of an obvious infection at least could do no harm. For instance, we have just discharged from the ward one of the hospital message-boys who was admitted first with a sore throat, then some time later with erythema nodosum, and again recently with tonsillitis and rheumatic fever. His tonsils have been removed without any flare-up of his rheumatic condition. Though erythema nodosum was only found in two cases in our series, it is more frequently found in patients with a history such as the boy's, though without cardiac disease.

Two of the most distressing symptoms in the failing heart are dyspnœa and œdema, and although rest, digitalis, attention to the bowels, and restriction of diet are main lines of treatment, one often finds that these are not sufficient to give relief, and it seems a pity that morphia at night is not more generally used. No drug will relieve an attack of cardiac dyspnœa to the same extent. Palmer and White,[4] in reviewing 250 cases of cardiac asthma, state that morphia is almost specific, and that if a patient in middle life, or over, suffering from paroxysmal dyspnœa, is not relieved by morphia, allergic asthma is likely. Conversely, if epinephrine (adrenalin) only gives slight relief, cardiac asthma is likely. If the cardiac œdema is severe, and there is no gross associated renal damage, injections of salyrgan, either intramuscularly or intravenously in 1 c.c. doses, will often produce a remarkable diuresis and obviate the necessity of acupuncture.

The complication of auricular fibrillation was most commonly found in the rheumatic group, and, as is generally recognized, did not seem to aggravate the prognosis to the same extent as it did in the sclerotic groups. The treatment is directed firstly to that of myocardial failure if present, and secondly to the restoration, if possible, of normal ryhthm. Wolfe and White[5] state that one thousand cases treated by quinidine have been reported in literature, and that in these the normal rhythm was restored in 65.7 per cent. They found one hundred per cent. were successful in the normal type of heart, the next best being the rheumatic heart group, then the hyperthyroid, and lastly the arterio-sclerotic and hyperpietic. Each case has to be carefully considered before deciding whether it is suitable for quinidine therapy, and whether the restoration of normal rhythm is likely to be of permanent benefit.

The next largest Infective group was the syphilitic, in which there were 116 cases, or 17.2 per cent. of the total. The age period in this group is older than that in the rheumatic, no fewer than 84.5 per cent. occurring between the ages of 40 and 60. It was difficult to estimate the time period since primary infection, as only twenty-nine cases gave a history of syphilis. We remember some years ago seeing a patient in the U.V.F. Hospital who had a typical syphilitic aortitis, and even when confronted with a positive Wassermann denied a primary infection. To convince him, the Wassermann was repeated, with a similar result, and at last the patient admitted that he had had a "sore" at the age of 19, but said it was due to the kick of a jackass! This patient rather upsets the statement that the expectancy of life, once aortic incompetence is diagnosed, is only from two to four years, as he has recently been re-admitted to the U.V.F. Hospital twelve years since his first admission.

Symptoms and physical signs as a rule are not evident till from twenty to thirty years after the infection, and generally symptoms such as fatigue, dyspnœa, and pain precede the finding of definite physical signs. Though this long latent period is the rule, cases have been reported where an aneurysm of the aorta has developed within a few months of the primary sore, and we have all seen cases showing tachycardia and fatigue while secondary signs are still present.

Carey Coombs[6] in his Lumleian lectures on cardio-vascular syphilis, estimated that five per cent. of all cases in Bristol fell into the syphilitic group; other authors find fifteen per cent. He found that the commonest lesion was aortic aneurysm seventy-five per cent., (2) aortic regurgitation, (3) ventricular failure, (4) transient cardiac pains, (5) heart block, (6) cardiac infarction, which was uncommon and was less than three per cent. In the present group, aortitis was the commonest, consisting of thirty-seven per cent., most of these showing aortic regurgitation. Twelve cases showed auricular fibrillation.

The treatment of the syphilitic heart resolves itself partly into the treatment of symptoms, or of failing myocardium, and partly into the treatment of the syphilitic infection. Rest in bed is as important an adjunct of treatment in this group as in the rheumatic, and if pain is marked, if an aneurysm is present, or if œdema is more than slight, the rest should be from two to three months. The treatment of the symptoms pain, dyspnœa, and œdema is on the usual lines, while for the syphilitic element it is usual to start with iodide and mercury, and then to give small doses of N.A.B. at weekly intervals. If arsenical injections are given, it is essential that the patient report for repeated courses, as otherwise we have found that the initial improvement has been followed in a few months by a more serious relapse. Oedema in a syphilitic heart must always be looked on as a very serious prognostic sign.

The case mortality of the syphilitic group was 21.6 per cent., being the second highest.

The third group—endocarditis—includes both ulcerative and subacute bacterial endocarditis, and was 13.3 per cent. of the Infective group.

The group labelled 'Various' includes patients with valvular lesions but no definite history pointing to the type of infection. Neither of these groups have been gone into in detail in this paper.

The Toxic group has been sub-divided into (*a*) thyroid, (*b*) alcoholic, (*c*) various, the latter being cases showing evidence of myocardial trouble but no definite previous illnesses, and usually associated with bad teeth, bowel infections, and other toxæmias.

The alcoholic group are those who confessed to over-indulgence, and did not include those who looked the part but merely said they could "pass themselves"!

The time at our disposal did not permit of our being able to tabulate the thyroid group, so it will be dealt with on general lines. The whole toxic group comprised 9.4 per cent. of the total admissions, and the thyroid 52.6 per cent. of its group. This number is not complete, as for the five-year period 1924-8 only those cases included in the cardio-vascular diseases were analysed, and not those under the heading of "Goitre." In 1932 all cases were included. That there is a very definite association between thyroid and cardio-vascular disease has long since been recognized. Cheskey[7] in a long article states that hyperthyroidism, regardless of

the type of goitre by which it is produced, has probably a more damaging effect on the cardio-vascular system than on any other, and the damage is progressive.

In two hundred consecutive goitre patients operated on, the following symptoms were found :—Rapid, irregular, pounding heart; nervousness; dyspnœa; fatigue and weakness; tachycardia; auricular fibrillation; extra-systoles; paroxysmal tachycardia. Fibrillation generally occurs in transient attacks at first; toxic œdemas produce the most marked cardiac symptoms.

Cheskey[7] also emphasizes the fact that cardiac symptoms may exist with a co-existing goitre where the heart is the primary lesion, and quotes the young, frail female with menstrual symptoms, and tachycardia during the day, and often normal pulse-rate during the night. The cases of essential hypertension with a co-existing goitre may have a persistent tachycardia for years without any organic change. He has found that cases dying of exophthalmic goitre often show chronic inflammatory changes in the heart with cellular infiltration, and he considers that some of the so-called "goitre deaths" are in reality cardiac.

Thirteen cases of auricular fibrillation were associated with thyroid disease.

Anderson[8] in a report on 120 cases of auricular fibrillation associated with hyperthyroidism, states that all cases of hyperthyroidism should be treated for at least a week prior to operation with digitalis and Lugol's iodine. The practice in the Royal Victoria Hospital is to give a much longer course of treatment with iodine and, in many cases, digitalis, but some of the cases where fibrillation is not present do not appear to have had any digitalis until immediately after the operation. This point might be considered by us all in dealing with future cases.

Smyth,[9] in an article on toxic goitre in THE ULSTER MEDICAL JOURNAL, July, 1933, issues a note of warning, and states : "It is true that in many cases the hyperthyroid flames will ultimately die down if long enough time be given, but to what advantage if they leave burnt-out viscera. The tale of the cured exophthalmic left a permanent cardiac invalid is a sad one, whose sadness is not diminished by the thought that timely surgery might instead have left a useful member of society." I am sure none of us will disagree with this emphatic statement, as we can picture to ourselves cases seen and treated who, though apparently free from hyperthyroidism, are physically and often mentally below normal.

The DEGENERATIVE group has been sub-divided into—

(*a*) Hypertensive, which includes all cases with a systolic pressure of 160 or over, or a diastolic of 100 or over.

(*b*) Decrescent group, which includes the degenerative cardio-vascular cases where the pressure is below the figures mentioned.

The total group consists of 425 cases, or 33.9 per cent., and of this 253, or 59.5 per cent. were in the hyperpietic group, and 172, or 40.5 per cent., in the decrescent.

The family history in the hypertensive group is instructive in so far as it goes, as again many patients have only a vague idea as to the cause of death of their

parents or relations; but many of these have died of heart disease, stroke, kidney trouble, and blood-pressure, and in some cases we find that both parents have died of one or other condition. In one instance a grandmother, mother, and uncle died of kidney trouble, and father died of heart disease. In another seven brothers died of "stroke." 68.4 per cent. of the cases were in the 50-60 age period group, and on looking into the previous illnesses we find a large variety of diseases which may or may not have a bearing on the case.

The largest group was that in which the patients stated they had no previous illness, while we find that only 13.8 per cent. of the cases give a definite history of having previously had nephritis or scarlet fever. The majority of the cases were in hospital for a month or less, and the case mortality of six per cent. was the smallest of the four main groups. This included cases of apoplexy, failing hearts, and cases of high pressure and the associated symptoms, headache, fatigue, and giddiness. These types of cases are known to us all, and we do not intend to discuss them. The same applies to cases of auricular fibrillation, of which there were forty-nine in the group.

The high pressure cases with associated changes in the kidneys and heart are included with those of essential hypertension. The latter condition ultimately leads to sclerotic renal changes, though at first it seems to be due largely to hyper-irritability of the vaso-motor nervous system.

Pardee[10] bases his diagnosis of heart disease in arterio-sclerosis on the following findings :—

1. Angina of effort or rest.
2. Unusual shortness of breath on exertion, or palpitation.
3. Unusual fatigue.
4. Age of the patient.
5. Cardiac enlargement.
6. Murmur of mitral insufficiency without rheumatic history.
7. A ringing second aortic sound, or a faint or prolonged first mitral.
8. Gallop rhythm.
9. Cardiac arrhythmia.
10. Abnormality of cardiogram.

Of these, probably the most serious are the symptoms of pain and dyspnœa, and the physical signs of gallop rhythm and changes in the cardiogram. We are all familiar with the mitral systolic murmur in cases of high pressure, though sometimes a mistake is made in diagnosing the lesion as rheumatic rather than sclerotic.

Levine and Fulton[11] investigated 762 cases of mitral stenosis over 45, and found hypertension quite common. They state that opinions vary on the ætiology of the pathological change. The majority of writers think that it is the end-result of early rheumatic endocarditis, atheroma and calcification supervening. In their group there was a previous history of rheumatic infection in fifty-three per cent. of their

cases. They found the average pressure 160/89 as compared with the normal of 130/86. They consider that these patients live longer than mitral stenosis without a raised pressure, and they found more with a high pressure than with a normal, women being more frequently involved than men.

Treatment in these cases depends largely on the complications present. If there is evidence of myocardial failure, rest, relief of insomnia and dyspnœa by morphia or hypnotics, afterwards restriction of both mental and physical effort, restriction of the amount of food rather than the type, and attention to the alimentary system are all helpful.

In essential hypertension one needs to regulate the home life and occupation of the patient and to relieve his nervous irritability. Moderate exercise is helpful, and as many of these cases are obese, the most important restrictions in diet are those in relation to fats and carbohydrates rather than restriction of protein.

Mosenthal[12] states that fluids, up to six litres per day, do not influence blood-pressure, and that salt restriction does not lower it. In most cases it is impossible to lower it, and our object is to try to get patients to live within their cardio-vascular reserve.

The decrescent group of 172 cases, or 40.5 per cent. of the Degenerative, show a somewhat similar family history to the previous. The age period, as would be expected, is slightly higher, and 90.7 per cent. of the cases are found between 50 and 70. The case mortality, 23.2 per cent., was highest of all groups. This high case mortality is to be expected, as this group contains the cases of coronary thrombosis and coronary sclerosis. In recent years there has been a remarkable increase in coronary thrombosis, an increase which is real, and not merely due to more accurate diagnosis, and a similar finding has been reported by cardiologists in the British Isles. The severe case with the long-drawn-out and severe pain in the chest is, as a rule, easily diagnosed, but the mild cases and those simulating abdominal lesions may sometimes be overlooked.

Pain itself may be absent, as definite and well-marked cases may give a history of acute dyspnœa without any other symptoms. One case was that of a woman aged 50 with no previous cardiac symptoms who became suddenly dyspnœic while wringing out clothes. Clinical signs were very indefinite, but the cardiogram showed the typical changes of coronary thrombosis. Another case of an elderly doctor seen by Professor Thomson also showed the typical cardiogram, though again dyspnœa without pain was present.

Keefer and Resnik[13] state that sixty to seventy-five per cent. of patients with angina die suddenly, and that the actual cause of death is supposed to be ventricular fibrillation in most cases. Cardiograms are rarely available, as death is too sudden.

The association of coronary thrombosis and abdominal symptoms is well known. Often the chief difficulty is to differentiate between it and gall-bladder trouble. Cases are often admitted to the hospital as surgical emergencies, but owing to some abnormal cardiac sign the surgeon suspects, and correctly so, that the heart is

primarily at fault. In mild cases passive congestion causing loss of appetite, distention, and fatigue, may be the only symptoms, and Riesman[14] discusses these symptoms under the title of "Myocardial Disease and Its Gastric Masquerades."

One very typical case of coronary thrombosis, who, after several months' complete rest in a nursing-home, still had severe attacks of pain, was re-admitted eighteen months later with cholecystitis and jaundice. He was anxious for an operation, and being willing to undergo what we considered a very grave risk, his abdomen was opened and a very septic and adherent gall-bladder was removed with complete success. He has had no attacks of pain during the eighteen months since operation.

This association of gall-bladder disease often leads to an incorrect diagnosis of coronary trouble. Several cases emphasize this—one was a woman aged about 60 who had had pain referred to her left shoulder, and had been diagnosed and treated as angina for years, and who made a complete recovery on removal of several gall-stones. Another, a district nurse, had had several attacks of pain in her left chest and shoulder, but as nothing abnormal was found either on clinical or cardiographic examination, an X-ray of her gall-bladder was suggested, and showed definite gall-stones. Removal of these met with complete success.

Gall-bladder and other septic foci seem to predispose to anginal pain, and if untreated may be the forerunners of coronary thrombosis. Although the majority of the cases are in the late middle life or older, coronary thrombosis may be found at any age, and several cases have been admitted in the early thirties. In one case there was a definite history of a neglected influenza.

DOUBTFUL CASES: Cases sent in as cardiac on account of palpitation, dyspnœa, and other mild symptoms, but nothing abnormal was found on examination. There were thirty-three in this group, or 2.7 per cent.

We have to acknowledge our indebtedness to our colleagues on the staff of the hospital for allowing us to make use of their case records.

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Some Late Effects of Gastro-Enterostomy Performed for the Relief of Peptic Ulcer.

By R. S. ALLISON, W. H. PATTERSON, AND B. M. MAXWELL

from the Royal Victoria Hospital, Belfast

A WRITER, recently reviewing the known facts of the etiology of peptic ulcer, comments on the well-known observation that it is found in that part of the gastro-intestinal tract that is directly exposed to gastric juice, and is subjected to the greatest mechanical stress by the passage of the gastric contents.[1] Another established fact is the frequent association of ulcer with hyperchlorhydria, in from sixty to eighty-five per cent. of duodenal cases,[2 3] and about thirty per cent. of gastric.[3] Achloryhydria is rare in either form of ulcer, and achylia gastrica believed to be unknown.[3] The importance of an excess of free HCl in the genesis of an ulcer has been illustrated by the experiments of Mann and Bollman,[4] Matthews and Dragenstedt,[5] and others. The former found that experimental jejunal ulcers were produced in about twenty per cent. of dogs after gastro-jejunostomy, when the bile and pancreatic juice had free access to the loop of jejunum used in the anastomosis. When, however, these juices were diverted and drained into the ileum and only gastric juice allowed into the loop, a jejunal ulcer developed in ninety-five per cent. of cases. Chronic gastric ulcers were also produced in dogs by the instillation of dilute HCl (0.4 per cent.) through a fistula for several hours in the day. These ulcers tended to heal if the acid was discontinued, but became chronic if it was resumed. The effects of a rich secretion of gastric juice on an empty stomach has been shown by Buechner,[6] who produced ulcers in starved rats by repeated injections of histamine. The trend of these experiments is, therefore, to assign an important rôle to the acid of the gastric juice in the formation and chronicity of ulcer, and to show that its effect can be mitigated by the neutralizing action of the alkaline duodenal juices and by the presence of food in the stomach.

The view that there is a definite ulcer diathesis seems to be gaining ground, and Hurst has spoken of the hyposthenic and hypersthenic gastric diathesis. The former, which is associated with a long hypotonic stomach, is liable to gastric ulcer, and the latter, with a short hypertonic stomach, to duodenal ulceration. The same view of a diathesis, but from a more central angle, is taken by Cushing,[7] who relates it to abnormal parasympathetic discharges and vagotonia. The motor effect on the stomach of stimulation of the vagus has, of course, been long recognized, and recently it has been demonstrated that hyperchlorhydria and ulceration may result from this procedure (Keppich,[8] Stahnke[9]). The central end of the long vagal pathway would also seem to be higher than has hitherto been supposed, for Beattie[10] has shown that stimulation of the tuber cinereum in animals causes increased gastric movements and hyperchlorhydria. If stimulation is kept up some time, hæmorrhage and ulcer formation result. These effects are abolished by section of the vagus. Moll and Flint,[11] on the other hand, have made a clinical and

experimental study of the depressive influence of the sympathetic on gastric secretion and peristalsis. It seems probable, therefore, as Cushing says, that the dual nerve supply to the stomach, the cranio-sacral autonomic system, and the thoraco-lumbar sympathetic system, represent a balanced and mutually antagonistic mechanism. "Highly-strung persons who incline to that form of nervous instability called vagotonia . . . are particularly prone to chronic hyperchlorhydria and increased gastric peristalsis, often leading to ulcer. These effects are comparable to those produced by irritative lesions made anywhere in the course of the parasympathetic . . ."

On clinical grounds also there is evidence of an ulcer diathesis in the recurrence of symptoms after careful treatment. It is possible that we have attributed such recurrences too often to indiscretions in diet, tobacco, and alcohol, when at the most these can only be accessory factors. So persistent, indeed, can the recurrence of symptoms be in some cases, that one might well apply the words of Jeremiah: "Can the Ethiopian change his skin, or the leopard his spots?"

Evidence that it may be possible to change the subject of the ulcer diathesis is forthcoming in the recent reports of cases of gastrectomy and gastro-enterostomy which have been cured of ulcer, apparently for all time, but have developed in its place an opposite type of disorder, namely, pernicious anæmia—subacute combined degeneration of the spinal cord and simple achlorhydric anæmia. It would appear that the surgical operation in these cases has been too radical, and that the picture has swung from one extreme to the other. It is noteworthy in this connection, after what has been said of the relationship between ulcer and hyperchlorhydria, that these changes have only been observed when free HCl has disappeared from the gastric juice as a result of the operation. Thus they are more prone to follow gastrectomy than partial gastrectomy, and least likely to result from gastro-enterostomy. Morley[12] found, in comparing the Polya and Shoemaker type of partial gastrectomy, that anæmia was present in twelve out of twenty-one "Polyas," and in only four out of twenty-one "Shoemakers." The explanation probably lies in the fact that the Polya type removes more of the secreting tissue and is more likely to be followed by achlorhydria.

The anæmias which follow these operations may be of two kinds. The first, pernicious anæmia, is a rare sequel. Not more than fifteen cases from the literature are mentioned by Rowlands and Simpson,[13] who contribute two cases. Some of the cases referred to—those of Moynihan[14] and Delore[15]—had insufficient evidence to support a diagnosis of pernicious anæmia, and many which gave that clinical and hæmatological picture had been operated upon for malignant disease (Hartman,[16] Hochrein,[17] Morawitz[18]). The case of Campbell and Conybeare,[19] Dennig,[20] Glanvill and Hurst,[21] and those of Rowlands and Simpson, appear, however, to be definite examples of pernicious anæmia.

The second type of anæmia is much more common, and closely resembles the simple achlorhydric or microcytic anæmia described by Faber[22] and by Witts.[23] Here there is often the same pallor of the skin and smoothness of the tongue as in pernicious anæmia; but there are additional features in the finger-nails, which have

a curious curved appearance not unlike a spoon or the shell of an oyster, and known as coilonychia. The anæmia, of course, also differs, being of the low-colour index type, and the red corpuscles are smaller in size than normal. Several of these cases following gastric operations have been described by Witts,[23] Lublin,[24] Hurst and Cosin,[25] Davies,[26] Meulengracht,[27] Vaughan,[28] and others. We have seen five cases of this type, though none of pernicious anæmia, following operation for peptic ulcer. In these subjects the former ulcer diathesis has apparently been exchanged for an anæmic diathesis with achlorhydria, and in view of their rarity and possible bearing on the etiology of peptic ulcer, a description of them is now given.

Five Cases of Simple Achlorhydric Anæmia Following Gastro-enterostomy.

Case No. 1.—*J. S., female, aged 43* :—Gastro-enterostomy for duodenal ulcer three years ago. Former notes not available. No further symptoms of indigestion. Recent nervousness, tiredness, occasional diarrhœa, flatulence. Physical examination negative, except for some pallor of the face and conjunctiva. The finger-nails have a hollow curved surface, and the tongue is smooth and clean. *Barium meal:* rapid emptying of stomach. *Fractional test meal:* achlorhydria. No occult blood in fæces. *Blood count:* red blood-cells 4,300,000, hæmoglobin 45 per cent. Van den Bergh reaction negative. Rapid improvement in blood and general condition followed large doses of iron.

Case No. 2.—*T. S., male, aged 67* :—Gastro-enterostomy for duodenal ulcer twelve years ago. Notes of former operation confirm this statement. No further symptoms until three years ago, when noticed increasing weakness, dyspnœa, sore tongue. Physical examination negative except for lemon-yellow pallor of face with malar flush. Tongue smooth atrophic type. Finger-nails normal. *Barium meal:* rapid emptying of stomach. *Fractional test meal:* achlorhydria. No occult blood in fæces. Red blood-cells 3,200,000, hæmoglobin 50 per cent., Van den Bergh negative. This case had been suspected of pernicious anæmia, and treated by liver as hepatex with little or no response. After three intramuscular injections of hepatex the maximum reticulocyte count was 1.6 per cent. The total chloride of the gastric juice as estimated after the subcutaneous injection of histamine. The fasting juice showed 35 c.c. N/10 chloride in 100 c.c. Twenty minutes after 50 c.c. of 5 per cent. alcohol it was 51 c.c. Histamine was then given, and twenty minutes later the figure was 100 c.c. N/10 chloride per 100 c.c. The case subsequently improved steadily on iron given as bipalatinoids by the mouth.

Case No. 3.—*S. W., male, aged 38* :—Long-standing recurring symptoms of pain after food relieved by food and alkali for some years, until gastro-enterostomy three years ago. A large chronic duodenal ulcer was found (confirmed). Recovery and no symptoms until a year later, when pain after food returned and there was a small hæmatemesis and melæna. At a second operation a jejunal ulcer was found (confirmed), excised, and the anastomosis undone and a gastro-duodenostomy performed. Since then there have been no symptoms, and the patient looks and feels well twenty months after the second operation. *Fractional test meal:* before the first operation showed moderate hyperchlorhydria; after the gastro-enterostomy free HCl was still present, though the curve of acidity was lower. A year later, when symptoms from the jejunum recurred, the curve of acidity showed hyperchlorhydria. Finally, after the gastro-duodenostomy achlorhydria resulted. (See fig. 1, which gives the four curves referred to.) *Blood count:* before the first and second operation the patient showed a tendency to polycythæmia. Red blood-cells 5,500,000, hæmoglobin 110 per cent. This count was actually done when he was suffering from the jejunal ulcer and after he had had the hæmatemesis. Occult blood was present in the stools at that time, but after the gastro-duodenostomy and production of achlorhydria, repeated tests of the stools for occult blood were negative. A blood-count, however, showed red blood-cells 4,500,000, hæmoglobin 50 to 60 per cent., and microcytes and poikilocytes were present in the film. Hæmoglobin rose to 85 per cent. after giving iron.

CASE No. 4.—*E. C., female, aged 42* :—Gastro-enterostomy for duodenal ulcer (confirmed) eleven years ago. No symptoms of indigestion since then. Attended hospital this year (eleven years later) complaining of rheumatic pains in the arms and shoulders. Physical examination negative. No evidence of joint or nervous disease, but looks anæmic. The tongue is smooth and glazed in appearance, and the finger-nails have a hollow curved surface. *Barium meal:* rapid emptying of stomach. *Fractional test meal:* achlorhydria. No occult blood in fæces. Hæmoglobin 50 per cent. Van den Bergh negative. Good response to iron.

CASE No. 5.—*S. H., female, aged 33* :—When aged 18 to 25 repeated attacks of pain in epigastrium one hour after food, relieved by alkali and vomiting. Notes of two periods of treatment in hospital inspected and verified. At 23 a fractional test meal showed moderate hyperchlorhydria. After 25 admitted again, symptoms worse, and barium meal showed large six-hour residue. "Tongue furred and moist." An operation was agreed upon, and a gastric ulcer was found on the lesser curvature (confirmed). This was resected and a gastro-enterostomy performed. At 31 again admitted to hospital with soreness in the upper abdomen unrelated to food and not relieved by alkali. A secondary anæmia and achlorhydria were observed. An exploratory laparotomy showed no evidence of the former ulcer, and the anastomosis was sound. The abdomen was closed. Aged 33 (this year), again under observation. On examination, no abnormal physical sign was found, except a lemon-yellow tinge round the eyes and mouth and a malar flush. The conjunctiva and mucous membranes were pale. The tongue was smooth and glazed. The finger-nails were hollow and cracked at the edges. *Barium meal:* rapid emptying of the stomach. *Fractional test meal:* achlorhydria. On an ordinary diet the fæces gave a positive benzidine reaction, but on a milk diet repeated tests were negative for occult blood. *Blood count:* red blood-cells 1,510,000, hæmoglobin 25 per cent., Van den Bergh reaction negative. Treated with thirty grains of ferri et ammon. cit., and hæmoglobin rose from 25 per cent. on 3rd July, 1933, to 85 per cent. on 7th November, 1933, with corresponding physical improvement and relief from symptoms of dyspnœa, tiredness, etc. Fig. 2 illustrates the result of fractional test meals performed in 1923 before the operation when hyperchlorhydria was present, and in 1931 and 1933 when achlorhydria was found.

These cases of simple achlorhydric anæmia following gastric operations should be distinguished from the anæmia which results from hæmorrhage from a jejunal ulcer. In the former there is no evidence of ulcer (case No. 5, aged 31, exploratory operation), or loss of blood by hæmatemesis or melæna, and certain other clinical features are present. The following table is suggested as indicating the main points of distinction.

	Jejunal Ulcer + Anæmia.	*Simple Achlorhydric Anæmia.*
Occurrence -	1—2 years after operation.	3—12 years.
Symptoms -	Pain related to food. Hæmatemesis. Melæna. Constipation.	Pain when present: indefinite. Tiredness, nervousness, dyspnœa, sore tongue, diarrhœa.
Tongue -	Rough and furred.	Smooth and atrophic.
Nails -	Normal.	Often spoon-shaped and cracked.
Gastric Analysis	Free HCl present.	Achlorhydria.
Fæces -	Occult blood +.	Occult blood negative.
Barium Meal -	Hold up in stomach. Niche.	Rapid emptying.

FIG. 1

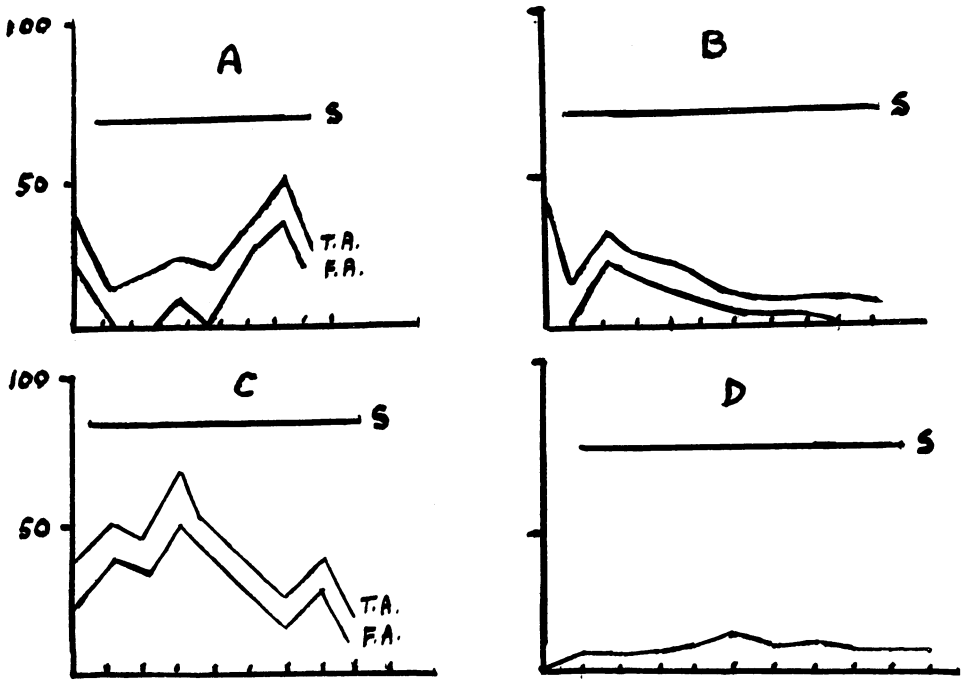
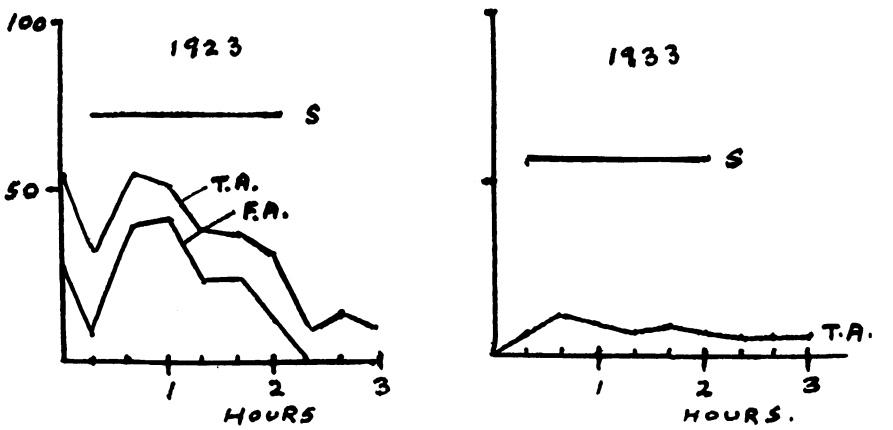


FIG. 2

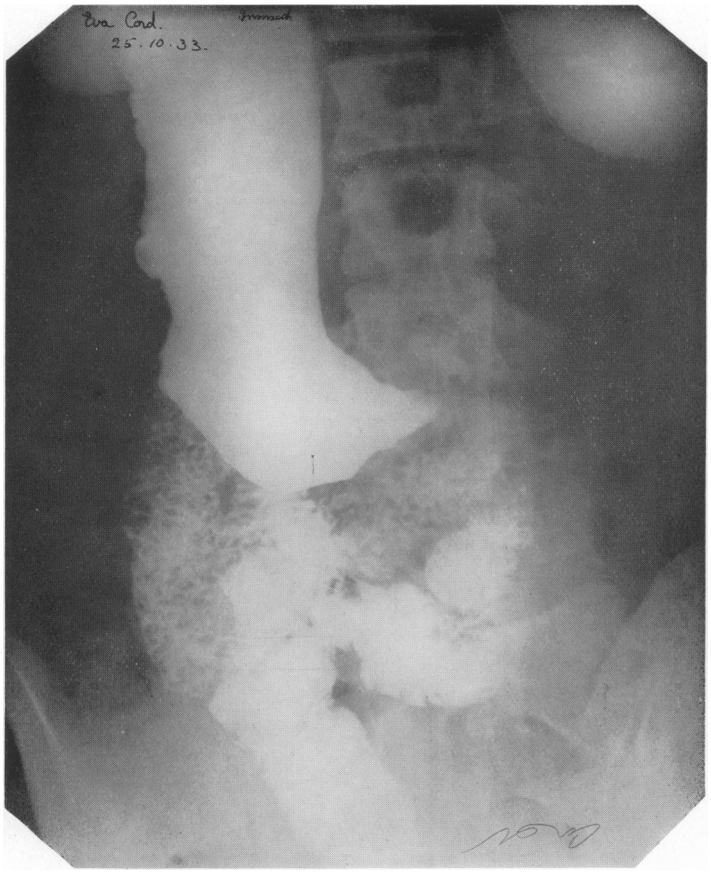


S = STARCH. T.A. = TOTAL ACIDITY. F.A. = FREE ACID.

Dr. R. S. Allison's Paper

A case of suspected jejunal ulcer after gastro-enterostomy. Radiograph taken six hours after barium meal. There is delay in emptying and a moderate residue in stomach.

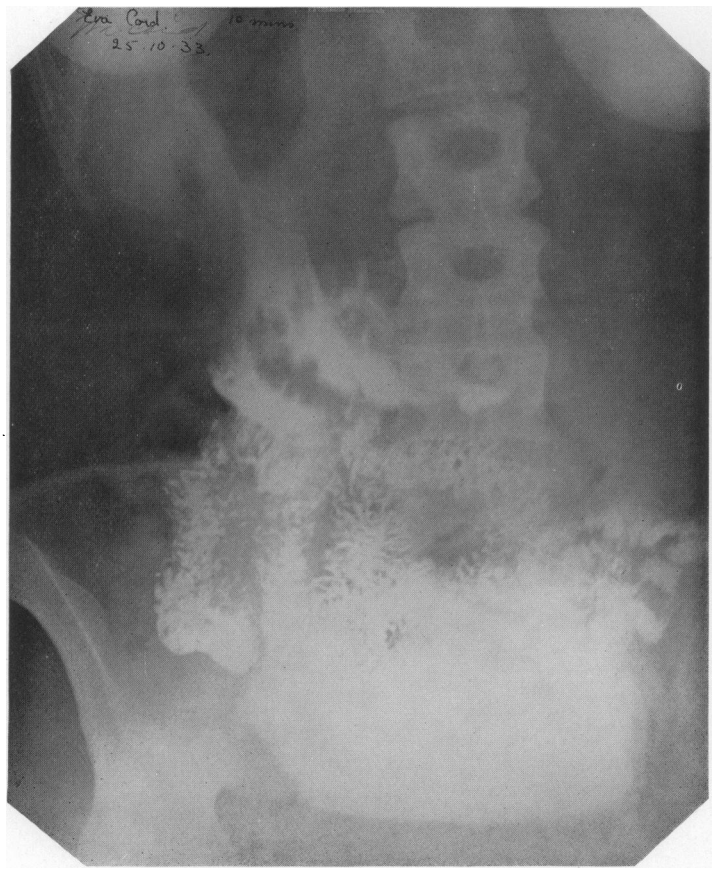
FIG. 3



CASE No. 4.

Gastro-enterostomy eleven years ago. Radiograph taken immediately after swallowing barium meal, showing stomach filled and emptying at the same time.

FIG. 4



CASE NO. 4.

Twenty minutes after fig. 3. The stomach is almost empty and the meal scattered through the small intestine.

Free HCl is usually present when jejunal ulcer recurs after operation. In Evans-Jones series of forty-two cases quoted by Hurst,[3] hyperchlorhydria was present in 70 per cent. and achlorhydria in only 4.8 per cent. In a recent investigation, Davies found in sixteen cases of jejunal ulcer, hyperchlorhydria in twelve, a normal acidity in three, hypochlorhydria in one, and none of the cases showed achlorhydria. It is possible to consider the development of achlorhydria after gastric operations in three ways: (1) When at operation the whole of the acid-bearing part of the stomach is removed, and in consequence no secretion of HCl is possible, a true achylia gastrica results. (2) When part of the acid-secreting gastric tissue is removed, and free mixture of the gastric and duodenal juice is permitted as in a partial gastrectomy. Here the achlorhydria is partly due to diminished secretion and partly due to neutralization. (3) In gastro-enterostomy, when no gastric tissue is removed, and the achlorhydria is due solely to neutralization. An alternate view would be to assume that the secretion is inhibited by the rapid exit of the food from the stomach. This undoubtedly can be demonstrated radiologically (see figs. 3 and 4), but the results of gastric analysis, when total chlorides are estimated, do not support this view. As Bolton and Goodhart[29] pointed out, the total chlorides are low in true hypochlorhydria and achylia gastrica, whereas they rise to a high level when the pseudo-hypochlorhydria or achlorhydria is due to neutralization. Case No. 2 suggests that this is what takes place in these cases. Fig. 5 also shows the curve of total chlorides in case No. 3 plotted alongside that of free and total acidity. The first analysis was made when the patient had a duodenal ulcer and before any operation was performed; the second after the final gastro-duodenostomy, which resulted in achlorhydria, yet the curves of total chloride do not differ greatly. With the achlorhydria the curve of total chloride is even greater in the later samples, and this is probably due to the presence of regurgitated bile and intestinal secretions, which, as Roberts[12] has pointed out, have a relatively high chloride concentration.

The presence or absence of occult blood in the fæces may help in deciding between these post-operative cases of achlorhydric anæmia and jejunal ulcer. We have noticed that on an ordinary diet with meat and vegetables, the former often give a positive benzidine reaction. This may be related to the finding of Deganello,[30] who investigated the fæces of a patient who had had a partial gastrectomy. Intact muscle fibre was almost constantly present. It appears likely, therefore, that the positive benzidine reaction so often obtained is due to the rapid rate of passage through the stomach and intestine. In four of the cases a negative result was obtained when they were put on a hæmoglobin-free diet.

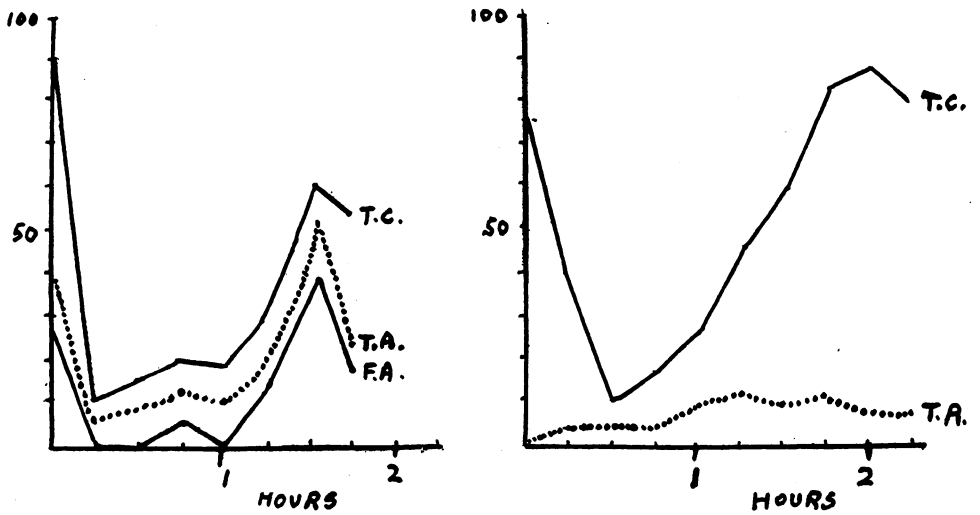


FIG. 5.

CONCLUSIONS.

In conclusion, one would again emphasize the comparative rarity of these cases after gastric operations. It is only fair to observe also that many cases of post-operative achlorhydria remain cured of their ulcer and never develop anæmia. One of us has seen a case of fifteen years' standing where the blood-count gave normal figures. The frequency of jejunal ulcer is placed at about two per cent., and certainly the occurrence of simple achlorhydric anæmia and pernicious anæmia must be rated as still less.

To return to the possibility of a change in diathesis—a swing from the hyperchlorhydria and ulcer on the one side to achlorhydria and anæmia on the other. It is clearly important to decide whether these cases are really related to the operation or not. In two of the cases (Nos. 3 and 5) there is evidence to favour a connection, but though highly suggestive it is scarcely sufficient to be conclusive. Two similar cases have been described by Hurst[25] and Vaughan.[28] If indeed it is possible that a person should at one time of his life suffer from peptic ulcer, and at another stage develop a simple idiopathic anæmia, then the way to the change is apparently to be found in the alteration from a normal or hyperacid gastric juice to a subnormal or achlorhydric juice. The increased rapidity of emptying of the stomach is also an important factor which cannot be disregarded. Such a change would lend further support to the rôle of the gastric juice, both in the formation of ulcers and in the development of anæmia. It would, by representing extremes, serve as a connecting link between ulcer on the one side, with its tendency to hyperchlorhydria, and

anæmia on the other, with its tendency to achlorhydria. In short, there may not be such a gulf between these two conditions as their respective clinical features would lead us to suppose. The connecting link which may make them part of the same chain, though at opposite ends, is the stomach and the gastric juice.

We have pleasure in acknowledging help received from the biochemical and radiological departments of the Royal Victoria Hospital, Belfast. All of the cases were seen in Medical Out-patients' except case 3, which was formerly under the care of Dr. E. I. Spriggs, to whom thanks are due for the results of the investigations before and after operation.

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CASE REPORTS

PRIMARY CHRONIC INTUSSUSCEPTION IN AN ADULT

By MAURICE LAVERY, F.R.C.S.Eng., *Mater Infirmorum Hospital, Belfast*

CLINICAL HISTORY.—Mr. H—— H——, aged forty years, a carter by occupation was admitted to a medical ward of the Mater Hospital under the care of Dr. T. Kean. I was asked to see him because his symptoms were suggestive of chronic appendicitis. He had pain and tenderness in the right iliac fossa. He gave a history of a previous illness characterized by generalized swelling and pus in the urine.

No operation was performed on admission, and the symptoms became more severe. He then developed attacks of colic, accompanied by vomiting. He was constipated. He lost weight.

ON EXAMINATION.—He was a thin man with abdominal tenderness which varied in position, and which could be localized to the right side. He had an intermittent cystic swelling in the right hypochondriac region which varied in size from day to day.

INVESTIGATION.—He had albuminuria.

Cystoscopy.—Bladder and ureteric orifices were normal.

Right Pyelogram.—A normal but movable kidney.

Barium Meal.—Stomach and intestines were normal. A definite hold-up occurred in the hepatic flexure.

DIAGNOSIS.—A new growth of the hepatic flexure was suspected.

FIRST OPERATION, 31st OCTOBER, 1933.—The abdomen was opened through a right paramedian incision. A chronic intussusception of the ileo-cæcal region was discovered. The tumour came easily out of the wound, but attempts at reduction failed. Malignancy as an underlying cause could not be excluded, although it was considered improbable.

A junction was established between the ilium and the transverse colon. It was expected that this would relieve the more acute symptoms, and that resection would be possible later.

SECOND OPERATION, 21st NOVEMBER, 1933.—The patient had improved, but the colic returned four days before the second operation. The abdomen was reopened through the old incision. Omental adhesion had formed, and mobilization of the tumour was difficult. It was found that the apex of the intussusception had moved over towards the splenic flexure, and that the short circuit stoma was now obstructed. Right hemicolectomy was performed.

THE MACROSCOPIC APPEARANCE.—On examination of the specimen after removal, the ileo-cæcal valve appeared to form the apex. No gross disease of this region could be found. The part removed is at present in formaline, and the appendicular region has not yet been examined.

PROGRESS.—The patient is doing well after his recent operation.

COMMENT.—I believe that this is a case of chronic primary intussusception. There is a tendency to regard all cases of this disease as secondary conditions. For instance, the common acute intussusception of infants is said to be secondary to an inflammation of a Peyer's patch. I think that this idea is pure speculation, and I cannot see how an investigator could possibly collect material to prove the theory. Primary intussusceptions occur at death. I recall a large intussusception in the dissecting-room which was undoubtedly primary, and I have seen a similar condition at operations. On one occasion when examining the small intestine for associated injuries in a case of ruptured spleen, I noticed two small intussusceptions, one of which was retrograde. I reduced these, and they re-formed at once. It struck me forcibly that there is something in the contraction of normal bowel to explain this phenomena. The patient was under gas and oxygen. I have noticed that in cases of this disease in children it is possible to deliver the tumour before complete reduction. I think that this shows that the peritoneal attachments of the ascending colon are abnormal. The view that the condition is primary fits in very well with the common site of the disease. Why it occurs at the age of nine months has not been explained. It may be that at that age the variation between the diameter of the large and small bowel is at the highest point. Why it is more common in males is also unknown.

One other fact of interest is the question of protrusion of the apex at the anus. The textbooks mention this as a sign, and students are inclined to doubt that this occurs. I think that the textbooks were written in days when intussusceptions were neglected. I once operated on a case of five days' standing, and I was able to feel the apex per rectum.

The operation of ileo-transversostomy is neglected to some extent by works on operative surgery. Many surgeons I have met treat it with distrust. I have done this operation as a first stage for an operable growth of the ascending colon. Obstructing growths in this region are fortunately rare, and when found unexpectedly the surgeon is tempted to do this operation. I think that it is very dangerous under these conditions, unless it is combined with drainage of the bowel. I think that this operation without drainage in cases of acute obstruction is responsible for the distrust with which it is treated. In doing this operation I always make a large stoma in spite of the fluid contents at this point. I have seen contraction of the stoma at this point, and I think it possible that contraction is more liable to occur here than elsewhere. I think that the healing is interfered with by sepsis, and by the difference in thickness of the bowel walls.

A CASE OF FEMORAL EMBOLISM

By D. C. PORTER, M.B., *from the Royal Victoria Hospital, Belfast.*

THE patient, a female aged sixty-three years, was admitted to hospital on 19th February, 1933. She complained of shortness of breath on exertion, swelling of

PROGRESS.—The patient is doing well after his recent operation.

COMMENT.—I believe that this is a case of chronic primary intussusception. There is a tendency to regard all cases of this disease as secondary conditions. For instance, the common acute intussusception of infants is said to be secondary to an inflammation of a Peyer's patch. I think that this idea is pure speculation, and I cannot see how an investigator could possibly collect material to prove the theory. Primary intussusceptions occur at death. I recall a large intussusception in the dissecting-room which was undoubtedly primary, and I have seen a similar condition at operations. On one occasion when examining the small intestine for associated injuries in a case of ruptured spleen, I noticed two small intussusceptions, one of which was retrograde. I reduced these, and they re-formed at once. It struck me forcibly that there is something in the contraction of normal bowel to explain this phenomena. The patient was under gas and oxygen. I have noticed that in cases of this disease in children it is possible to deliver the tumour before complete reduction. I think that this shows that the peritoneal attachments of the ascending colon are abnormal. The view that the condition is primary fits in very well with the common site of the disease. Why it occurs at the age of nine months has not been explained. It may be that at that age the variation between the diameter of the large and small bowel is at the highest point. Why it is more common in males is also unknown.

One other fact of interest is the question of protrusion of the apex at the anus. The textbooks mention this as a sign, and students are inclined to doubt that this occurs. I think that the textbooks were written in days when intussusceptions were neglected. I once operated on a case of five days' standing, and I was able to feel the apex per rectum.

The operation of ileo-transversostomy is neglected to some extent by works on operative surgery. Many surgeons I have met treat it with distrust. I have done this operation as a first stage for an operable growth of the ascending colon. Obstructing growths in this region are fortunately rare, and when found unexpectedly the surgeon is tempted to do this operation. I think that it is very dangerous under these conditions, unless it is combined with drainage of the bowel. I think that this operation without drainage in cases of acute obstruction is responsible for the distrust with which it is treated. In doing this operation I always make a large stoma in spite of the fluid contents at this point. I have seen contraction of the stoma at this point, and I think it possible that contraction is more liable to occur here than elsewhere. I think that the healing is interfered with by sepsis, and by the difference in thickness of the bowel walls.

A CASE OF FEMORAL EMBOLISM

By D. C. PORTER, M.B., *from the Royal Victoria Hospital, Belfast.*

THE patient, a female aged sixty-three years, was admitted to hospital on 19th February, 1933. She complained of shortness of breath on exertion, swelling of

ankles in the evenings, and palpitation for several years. Ten weeks before this she suffered from an attack of influenza with vomiting, severe abdominal pain, and a temperature. After this attack her shortness of breath was more marked, so that she has been in bed almost continuously. One week previously, after being out of bed for a short time, she suddenly was seized with a severe pain, with a feeling of numbness and coldness in both feet. This rapidly spread upwards to the thighs, and remained for two days, when the pain on the right side went away, and that on the left side continued—being more severe on the inner side, from the calf down to the foot. She had no pain in her abdomen.

In her personal history, attacks of "rheumatism" for many years is the only outstanding fact.

There is nothing of interest in her family history.

On general examination she is of average build and well nourished. There is no anæmia, jaundice, or cyanosis. There is no glandular enlargement or œdema. Her skin is moist and smooth, and her joints are freely movable. Her left leg is cold and white. The skin over the heel and several toes has become black and discoloured. Pulsation cannot be felt in femoral popliteal, or dorsalis pedis arteries. There is no disturbance of the valvular mechanism of the veins. There is exquisite tenderness over the inner side of the calf down to the ankle, and there is also anæsthesia to pinprick over the calf.

Alimentary System.—This shows nothing of note, such as oral sepsis or tonsillar involvement.

Cardio-vascular System.—Radial pulse is not visible; rate is 84; irregularly irregular; volume small; tension moderate; B.P. : systolic 130, diastolic 70, and the artery wall is slightly hardened. The heart is enlarged transversely. The apex beat is visible and palpable five inches from middle line in the fifth interspace. D.A.C.D. $\frac{ii}{\frac{1}{2}\quad 5''}$ Sounds are slapping. Rhythm : heart is fibrillating. There are no murmurs, nor is there a pericardial rub. Blood coagulation time was found to be normal.

In the respiratory and nervous systems there is nothing to be noted, apart from the sensory disturbance in left leg already described.

This case gives a very complete little clinical picture, and one which is not very commonly seen.

The dominant features are : Firstly, the history of rheumatic pains. Then the following cardiac symptoms : breathlessness on exertion, swelling of ankles, and palpitation. Thirdly, a recent attack of abdominal influenza, which has possibly thrown some strain on a heart already considerably embarrassed, resulting in fibrillation. Thus endocarditis, mitral stenosis, and auricular fibrillation are the steps leading up to her present symptoms, which suggest the following sequence. An embolus composed of auricular blood-clot became free in the systemic circulation, worked its way round in the aorta until it reached the bifurcation, where, owing to the great decrease in calibre of the resulting common iliacs, the embolus was

checked, saddling over the bifurcation and causing the bilateral symptoms described. After a period of two days it was again dislodged, entering the left common iliac and causing a complete block.

In the absence of a recent acute endocarditis, an embolus of this size from the mitral or aortic valve is most unlikely.

Other conditions must be thought of in differential diagnosis. The sudden onset is sufficient to exclude an arterial thrombosis as is found in endarteritis obliterans and thromboangiitis obliterans. There is no evidence of any toxic condition causing increased blood coagulability, such a styphoid fever. Nor is it like a venous thrombosis, a much commoner condition, in which there is a large leg with swollen, hard, and painful veins, covered by a dusky skin, a condition which commences in one leg, with a possible extension to the other, and in which there is palpable arterial pulsation. Etiologically the case is, therefore, one of rheumatic heart disease.

Much work is being done on the etiology of this condition, the most promising being along two lines. The first of these is an investigation of the hygienic conditions under which this disease most commonly occurs, paying particular attention to factors such as climate, soil, density of population, and water supply. The second is in connection with the complement-fixation reactions of various strains of streptococci.

In prevention of rheumatic heart disease, and indirectly of embolic conditions, it must be remembered that the cardiac condition is not necessarily a complication of earlier rheumatic manifestations such as joint pains, chorea, and tonsillitis, and may appear in the absence of such. As Coombs has stated: "If we are to pin our faith to early diagnosis, let us lay stress on the need for a full physical examination of every child taken to a doctor for pallor and loss of flesh."

Palliative treatment was first tried. Morphia was given to relieve the pain. Heat, in the form of an electric cradle, was applied, also to relieve pain and to help in opening up collateral circulation. This proved of little value, the pain and discolouration continued, so that two weeks after the onset gangrene was inevitable. It was, therefore, decided to amputate the leg. Spinal anæsthesia was used. An attempt was made to amputate below the knee, but the anterior tibial artery produced only a trickle of blood when sectioned. It was then decided to amputate through the lower end of the femur. The amount of blood in the deep femoral vessels was small, and under little or no pressure. This suggested that the block of the common iliac artery was complete, and that any blood present was entering the femoral vessels by the inferior hypogastric artery and other anastamoses. This has proved to be an adequate supply for the remaining stump.

An alternative to amputation is embolectomy, which is reported to be satisfactory.

The prognosis is good so far as a single embolus is concerned. The danger lies in the possibility of succeeding emboli, either similar or secondary to the original one, which may affect more vital organs; in this case cerebral embolism, six months after amputation of the leg, was the cause of death.

OBITUARY

SIR WILLIAM WHITLA, M.A., M.D., D.SC., LL.D.

1851—1933

THE ULSTER MEDICAL SOCIETY has lost one of its most distinguished members in the death of Sir William Whitla. It mourns his loss not only as a benefactor of the Society in the gift of the Medical Institute, but as one who, until growing infirmity compelled him to retire to the seclusion of his home, was an active member in its deliberations. He was a former President of the Society, and few of its members added greater lustre to the School which it represents. As Sir William's death occurred after this Journal had gone to press, it was not possible to include in this number a full appreciation of his work. We hope, however, to publish such an appreciation in our next issue.

ULSTER MEDICAL SOCIETY

REPORT OF THE COUNCIL, SESSION 1932-3

THE Council begs to present the seventy-first annual report to the Society. The roll of the Society now stands as follows :

	This year	*Last year*
Honorary Fellows - - - - -	9	9
Life Fellows - - - - - -	11	5
Life Members (under old regulations) - -	2	3
Fellows - - - - - - - -	243	208
Members - - - - - - - -	59	63

During the session the Society lost by death :—Dr. C. J. Alexander, who became a Fellow in 1930; Dr. H. W. Bailie, Fellow since 1902; Dr. J. T. Creery, Fellow since 1903; Dr. Jas. Graham, Fellow since 1877, president 1899-1900; Dr. R. McCulloch, Fellow since 1916; Dr. Walter Smyth, Fellow since 1896; and Dr. J. E. Whyte, Fellow since 1902.

An unusually large number of meetings—thirteen in all—was held during the session, and a notable feature was the number of junior Fellows and Members who contributed papers. On several occasions two or more communications were made at the same meeting.

The annual dinner was held in the Medical Institute, and was again a most successful function.

The Hanna Golf Cup, which was up for competition for the first time, was won by Dr. J. C. Smyth after a tie between four Fellows. By the kindness of the Captain and Committee of the Royal County Down Golf Club, the original match was played at Newcastle, the tie being subsequently played off at Malone.

During the year an attempt has been made to develop the social side of the Society. A number of new easy-chairs, card-tables, etc., have been purchased for the library. The billiards-room has also been refitted and the table put in first-class playing condition. It is now possible to obtain light refreshments, and it is hoped that Fellows and Members will make use of the facilities offered.

Your Council has met on eleven occasions, and the following attendances are recorded :—The President, 10; Sir Thomas Houston, 1; Professor Fullerton, 9; Professor Young, 4; Dr. Bennett, 4; Mr. Calvert, 5; Dr. Coates, 8; Mr. Hanna, 2; Dr. Hunter, 4; Mr. Irwin, 5; Dr. Lee, 8; Dr. S. McComb, 1; Mr. Mitchell, 2; Mr. Wright, 0; the hon. librarian, 10; the hon. secretary, 9; the hon. editorial secretary, 7; the hon. treasurer, 9.

JOHN A. SMYTH, *Hon. Secretary.*

University Square, Belfast.

THE ULSTER MEDICAL SOCIETY

THE opening meeting of the Ulster Medical Society was held in the Medical Institute on 19th October, 1933. Professor C. G. Lowry, the outgoing president, presided, and introduced his successor, Professor W. J. Wilson, and then installed him to the chair. Professor Wilson then read his presidential address, which is published elsewhere in this number of the Journal. He preceded his address by a short account of those whom the Society had lost as the result of death.

The second meeting of the session was held on 2nd November. The president, Professor Wilson, was in the chair. Dr. Clearkin read a paper entitled "Random Recollections of Tropical Africa." He began this paper by a reference to the death of a contemporary, Dr. Young, while working with Dr. Noguchi in his investigations on yellow fever in West Africa. He gave an interesting account of the life and the difficulties of one working in the tropics, and in particular of the difficulties experienced in dealing with smallpox. He next passed to experiences during the war in German East Africa. When the British forces took over Dar-es-Salaam they found the sanitation deplorable and the water supply polluted. Dr. Clearkin showed many very interesting pictures of tropical scenery and native life.

The third meeting of the session was held on 16th November. The president, Professor W. J. Wilson, was in the chair. Dr. S. B. Boyd Campbell and Dr. T. H. Crozier read a paper jointly on "A Study of the Cardiac In-patient in the Royal Victoria Hospital, Belfast." This paper represented a considerable amount of research in the fate of these patients. It is published elsewhere in this number of the Journal.

The fourth meeting of the session was held on 30th November in the Medical Institute, with Professor Wilson, the president, in the chair. Mr. S. T. Irwin read a paper entitled "Cleido-Cranialis Dysostosis Hereditare." A synopsis of this paper will be published in a future number of this Journal.

A second paper was read at this meeting of the Society by Dr. R. S. Allison, on "An Investigation of Five Cases of Simple Achlorhydric Anæmia." These cases all had followed gastro-enterostomy performed for the relief of peptic ulcer. The paper is published elsewhere in this issue of the Journal. A considerable discussion followed, in which Dr. Dixon Boyd referred to the recent researches of Professor Beattie, a graduate of the Belfast Medical School, on the central connections of the vagus nerve in relation to the production of peptic ulcer. Dr. Lewis suggested that the estimation of pepsin in gastric analysis might prove of value in true achylia and achlorhydria due simply to neutralization. Dr. Boyd Campbell, Mr. Woodside, Mr. Irwin, and Sir Thomas Houston also took part in the discussion.

The annual dinner of the Society was held on Thursday, 7th December, in the Medical Institute. There was a large attendance of members and their friends, and a very pleasant evening was spent.

JOHN A. SMYTH, *Hon. Secretary.*

University Square, Belfast.

BRITISH MEDICAL ASSOCIATION
TYRONE DIVISION

A MEETING of the Tyrone Division of the British Medical Association was held in Omagh on 12th September. The chairman, Dr. McAllister, presided. Dr. W. Lyle referred to the excellent manner in which Dr. Gillespie carried out the duties of secretary, but owing to the trouble of transferring the accounts he suggested that he be appointed treasurer and that Dr. Martin be appointed secretary. This was seconded by Dr. McAllister, and passed. Dr. Murnaghan proposed that a letter of sympathy be sent to Mrs. Patrick on the death of her husband, who had been a prominent and active member of the division. This was seconded by Dr. McAllister. It was then arranged to have a complimentary dinner to Dr. Eaton on the occasion of his marriage, and a committee was appointed to make the arrangements.

The dinner was held in the Omagh Arms Hotel, and was attended by a widely representative number of members of the medical profession in the district, as well as many members of the legal and other professions. Dr. G. F. Leary, the vice-chairman of the Division, occupied the chair in the unavoidable absence of Dr. R. D. McAllister. Dr. W. Lyle proposed the toast of Dr. Eaton, and spoke of his high character and ability, both as a man and as a member of the medical profession. He wished Dr. Eaton and his bride every happiness and prosperity in their future lives, and asked him to accept a cheque as a token of their appreciation of his worth. The dinner was a highly successful one, and many able speeches were made, all expressing the high opinion in which Dr. Eaton was held by his fellow-practitioners. Dr. Eaton made a suitable reply of thanks.

A MEETING of the Division was held in the Tyrone Hospital on Thursday, 30th November, 1933. Dr. McAllister was in the chair. On the motion of Dr. Eaton, supported by Dr. Murnaghan, the following resolution was passed, and the secretary instructed to send a copy to the Ministry and another to the Branch:

"That a bacteriological examination in all cases of infectious disease should be done, both private and dispensary, at the expense of the Local Sanitary Authority, and sera provided free for the treatment of same."

A discussion took place regarding the establishment of a list of consultants, and the following names were considered to belong to that category in our area, and the secretary was instructed to submit their names to the Branch:—Dr. A. H. Eaton (surgeon and radiologist), Dr. J. W. Killen (oto-rhino-laryngologist), Dr. P. Rock (oto-rhino-laryngologist), Dr. R. H. E. Lyons (physician), Dr. J. A. J. Johnston (pathologist), and Dr. J. M. Johnston (mental specialist).

Dr. W. Lyle proposed, and Dr. Murnaghan seconded, that Dr. Eaton be re-appointed a representative on the Representative Body, and that the Fermanagh Division be asked to appoint a deputy and to notify the same. Dr. Lyle proposed, and Dr. Martin seconded, that a lecture on common skin diseases be given during

the month of January, and Dr. McCaw was to be asked to give this lecture. Dr. McAllister referred to the death of Lieutenant-Colonel Buchanan, Edenfel, Omagh, and a vote of sympathy was passed in silence.

Holmedene, Clogher, Co. Tyrone. J. R. MARTIN, *Hon. Secretary.*

BRITISH MEDICAL ASSOCIATION NORTH-EAST ULSTER DIVISION

THE Division met in the Coleraine Cottage Hospital on Friday, 13th October. The chairman, Dr. W. F. Evans, presided over a fair attendance, several members being on holiday. Dr. Evans read a paper on "A Recent Visit to Some German Spas." At the end of his paper a film was shown of the places visited, and included many pictures of the British doctors in the party, among whom were Drs. Evans, Allison (Coleraine), Hubert Dunn, Arthur Sinclair, Bodkin Adams, and George Rea. The party was organized and conducted by Herr Rober O. Rohme, the representative in London of the German Spas. Dr. Evans was thanked for his most interesting paper, and the matron and her staff were thanked for kindly providing tea beforehand. The usual silver collection was handed to the hospital.

The Division met in The Café, Coleraine, on Friday, 17th November. The chairman, Dr. Evans, presided, there being a good attendance. Dr. C. O. S. Blyth Brooke, Senior Tuberculosis Officer for County Antrim, read a paper on "The Early Diagnosis of Pulmonary Tuberculosis." The speaker dealt with many symptoms, such as cough, loss of weight, persistent hoarseness, amenorrhœa, which should lead to a careful examination of the chest. He also referred to the great value of radiology. He pointed out that no single sign or symptom should be taken as conclusive, but that a consideration of every aspect of each case was necessary. A report that a sputum was positive was not in itself conclusive evidence of the presence of tuberculosis. Dr. Brooke drew attention to the harm that was done when a healthy patient was mistakenly labelled as tubercular. He stressed the importance of slight rises in temperature and pulse-rate. A series of X-ray pictures of chests showing different stages of tuberculosis was shown, and was followed with much interest.

In proposing a vote of thanks, Dr. Bateman, Tuberculosis Officer for County Derry, asked that the chest should be carefully examined in all cases of vague ill-health, and remarked that too many cases had passed beyond the curable stage when first seen.

The vote of thanks was seconded by Dr. Boylan, and passed unanimously. The usual silver collection for medical charities was taken.

LONDONDERRY MEDICAL SOCIETY

THE first meeting of the Londonderry Medical Society for session 1933-4 was held in the City and County Infirmary at 4.30 p.m. on Friday, 20th October, 1933.

Dr. W. Rankin was elected president for the ensuing session, and after con-

sidering general business to do with the secretary's report, and the election of office-bearers, he proceeded to give his presidential address. Dr. Rankin took as his subject "Forty-five Years in Dispensary Practice." In his preliminary remarks Dr. Rankin drew attention to the fact that forty years ago he occupied a similar position as president of the Londonderry Medical Society, and then went on to contrast the state of medical affairs in a country district then and now.

Perhaps the most interesting part of his address dealt with the advent of anti-diphtheria serum. He had had the misfortune to have to deal with a very severe epidemic of diphtheria in the Killeagh district (near Derry) in the year 1889. He spoke of the absolute reign of terror which was imposed on a whole countryside, of the subterfuges which good people in their ignorance resorted to, to defeat any attempt at isolation of infected cases. An account was then given of the next major epidemic some years later, and of the first case to be treated with anti-toxin, which, to those accustomed to seeing such cases invariably die, seemed little short of a miracle. Dr. Rankin also dealt with midwifery work during the past forty-five years, and spoke very feelingly of the stout rearguard action which the 'Sairey Gamp' type of handy-woman put up, and expressed doubt as to whether she was yet quite overthrown.

The second meeting of the Society was held in the City and County Infirmary at 8.15 p.m. on 17th November, 1933. There was almost a complete attendance of members to welcome Mr. Lowry, who delivered a lecture on "Modern Methods in Securing Amnesia and Analgesia in Labour." He dealt in turn with the following five methods, viz. : (1) Morphia, mag. sulph. and rectal ether method; (2) Scopolamin, morphia, amnesia; (3) Hyoscine amnesia; (4) Nembutal and chloral; (5) Chloroform capsules. The technique of each method was given in full, the indications and contra-indications for the application of each, their advantages and disadvantages, and a demonstration given of the apparatus and substances required for each method. As a corollary subject, Mr. Lowry spoke about the necessity of paying particular attention to the methods employed for the resuscitation of newly-born infants. What has been done recently in this respect is to bring modern methods for the treatment of surgical shock to bear on the problem, and to abandon the somewhat crude rough-and-ready methods hitherto employed. At the conclusion Dr. J. N. McLaughlin proposed, and Dr. Allison seconded, a vote of thanks to Mr. Lowry for his kindness in coming to lecture to the Society. This was passed with acclamation by the members present.

The fourth annual dinner of the Society was held in the Northern Counties Hotel, Londonderry, on 25th November, at 7.30 p.m. This function was very well attended, some sixty, including members and their guests, being at the tables. The toast, "Prosperity to the Londonderry Medical Society," was in the hands of Dr. A. H. M. Eaton, of Tyrone County Hospital, who claimed that the Society was the second oldest in the Province, dating back to the year 1885, and except for the War years has been in being ever since. This toast was replied to by the president. The toast of "The Guests" was proposed by Dr. J. Matson, who welcomed the guests one and all, but made particular reference to the presence of

Mr. Hunter, president of the Northern Ireland Branch of the Dental Association; Sir Thomas Houston, Dr. S. B. Boyd Campbell, Mr. J. Michaels, and Mr. Rankin.

19 Clarendon Street, Londonderry. J. A. L. JOHNSTON, *Hon. Secretary.*

BRITISH MEDICAL SOCIETY NORTHERN IRELAND BRANCH

THE opening meeting was held on 23rd November. Professor W. W. D. Thomson presided, and introduced his successor, Dr. John Armstrong of Ballymena, and formally installed him as president. Dr. Armstrong then gave his presidential address, entitled "Two or Three Things." He began by paying tribute to the presidential addresses of his predecessors, especially those of Professor W. W. D. Thomson and Dr. T. Killen, and then proceeded in a humorous speech to describe some of his own experiences. He recorded the history of the rite of circumcision from earliest times, and as practised still among East African tribes. He expressed the opinion that this operation and the removal of tonsils and adenoids were far too frequently performed, often without justification. He stressed the fact that the work of the general practitioner was being encroached upon from many sides, and that he was denied access to hospitals to a large extent. He urged upon all practitioners the necessity of continuous post-graduate study, and the specialization in some subject, however small. Professor R. J. Johnstone proposed the vote of thanks, and Dr. J. C. Loughridge seconded. Dr. Armstrong briefly replied.

Elmwood Avenue, Belfast. C. J. A. WOODSIDE, *Hon. Secretary.*

LISBURN AND DISTRICT MEDICAL GUILD

THE October meeting was held in Dr. Peatt's of Lisburn. Dr. Colquhoun, the president, was in the chair, and the speaker was Mr. Purce, F.R.C.S., of Belfast. The subject for discussion was "Pituitary Tumours." Mr. Purce said that the tumours of the brain which most readily yield to operative treatment are those affecting the pituitary gland. Anatomically the pituitary is divisible into three parts—the pars anterior, the pars intermedia, and the pars posterior. But physiologically and pathologically the first two need only be mentioned. The anterior lobe controls growth, sex, and the ovarian hormone. The posterior lobe controls metabolism principally. Glandular dysfunction gives rise to acromegaly and the adiposo-genital syndrome. The general symptoms, continued Mr. Purce, are headache, often accompanied by photophobia, and visual defects as pressure on the optic chiasma is produced. Examination of the optic discs shows a condition of primary optic atrophy. Primary optic atrophy is characteristic of pituitary disease. Occasionally naso-pharyngeal symptoms occur, such as epistaxis. To differentiate between the acromegalic and the adiposa-genital tumour it should be remembered that glycosuria is common in acromegalic, and uncommon in adiposo-genital. The acromegalic is wakeful and irritable, while the adiposo-genital is sleepy. The treatment of pituitary tumour is by operation. There are two routes of approach, (*a*) the nasal and (*b*) the frontal. The frontal route is the better when noticeable pressure

symptoms are absent. But in cases where there is definite sellar distention with visual disturbance, the nasal route is to be preferred. This method of approach can be very difficult in cases where the nasal septum is malformed. The mortality is not high, and meningitis as a complication does not often occur, especially if the frontal approach is used. A discussion followed, and thanks were returned to Mr. Purce by Dr. Johnston, seconded by Dr. Peatt, for his valuable paper.

The November meeting was held at the Queen's University, Belfast. Dr. Colquhoun, the president, occupied the chair. Dr. R. H. Hunter gave an address entitled "Clinical Applications of Anatomy." He began with an illustrative case. A man was brought to the U.V.F. Hospital, complaining only of fainting attacks, lasting about ten minutes, both on lying down at night and rising in the morning. The patient was a well-developed, healthy man, free from any organic disease of heart, lungs, kidneys, or nervous system, and it was suggested that he was a case of psycho-neurosis. Close examination, however, showed a slight ptosis of the upper eyelid, slight retraction of the right eyeball, and a contracted pupil, which did not react to light. A history was then found of a penetrating bullet in the neck, and an X-ray examination revealed a bullet lying in front of the transverse process of the second cervical vertebra. The anatomical connections then made the diagnosis clear. The upper pole of the superior cervical ganglion had been sectioned by the bullet, cutting off the connections of the sympathetic plexus around the internal carotid artery, thus giving rise to the ocular signs, and to the loss of control of the cerebral branches of the artery, which produced the "fainting attacks" with change of posture. Dr. Hunter then showed, by means of diagrams drawn in coloured chalks on the blackboard, the anatomical bases for the series of symptoms which arise in succession in cases of pituitary tumours. Pressure on the optic chiasma causes blindness of the inner half of both eyes, pressure on the oculomotor nerve causes external squint by paralyzing the muscles of the orbit, except the rectus lateralis and the superior oblique, and pressure on the inner surface of the temporal pole of the cerebrum causes hallucinations of taste and smell. Pressure extending to the floor of the third ventricle then causes stimulation of the centres for sleep, micturition, and temperature producing drowsiness, polyuria and high temperature, which end in death. The question of visceral pain was then discussed, and the nerve connections between the four great sphincters of the gut, pyloric, ileo-cæcal, cæco-appendicular, and that of the muscle of Oddi. These connections serve to explain the correlated spasm produced in all of these positions when any one of them is thrown into spasm by inflammatory or other cause, e.g., the spasm of the pylorus produced by gall-stones in the bile duct, or by irritation of a chronically inflamed appendix. Chains of symptoms can thus arise referrable to parts of the digestive tube other than the part where the actual physical changes are present. Many other examples of the anatomical bases of signs and symptoms of disease were discussed, and Dr. Hunter showed beyond any reasonable doubt that an intelligent application of the facts of anatomy can be of great assistance to the clinician in the understanding of many obscure conditions.

Railway Street, Lisburn. J. W. Peatt.

BOOK REVIEWS

THIS PANEL BUSINESS. By A. G. P. London : John Bale, Sons & Danielsson, Ltd., 1933. pp. 364. Price 10s. 6d.

AFTER reading this volume, one comes to the conclusion that a better title would be "This Panel Bungle." Everyone connected with it appears to bungle his job. Doctors, insurance companies, patients, etc., all seem to abuse of its privileges, and all would appear to have the same motto : "Ninepence for Fourpence."

The first part of the book opens with a chapter on "The Plight of the Medical Profession To-day," and here one might call in question the authority from which information is derived, namely, the daily press. An article in one of these papers on "Lean Days in Harley Street," by a "Physician," does not impress one as a reliable source. Large portions copied verbatim from such periodicals are represented as summing up certain present positions.

More impressive authorities are quoted in other parts of the book, and it is of importance to practitioners to know, for instance, that in 1931 there was one doctor in the British Isles to each 884 patients, whereas in France the figure is 1,690, Germany 1,560, and so on.

Abuses in the National Health Insurance scheme are reviewed throughout the ensuing chapters, and to the uninitiated such revelations are almost unbelievable. "A panel certificate may be regarded as so much money, even if it is only so much money as sickness benefit." The amusing story is related as told by a panel doctor, at the annual conference in 1930, of two men who wished to attend a cinema or football match, but had no money. It occurred to them that they could raise money by going to the panel doctor, from whom they could get a certificate. This procured, they went to a bookmaker or some such person, who advanced them five shillings!

Most of the better-known public medical services are dealt with, such as the Hospital Savings Association, Medical Contributory Service, friendly societies with "Closed Panels," and the British Medical Association "Open Panel for Consultants." The impression one gets in studying these is unmistakable, and can be summed up in the one word, "Beware."

Considerable thought has been devoted to the question of extending the panel to include "dependants," and the writer advises against this encroachment.

The book can be recommended to all interested in panel work of any sort, and certain aspects of this business have been brought to light which are as serious for the practitioner as they are arresting.

Constructive ideas are summed up in the last chapter, but I am afraid all will not meet with general approval.

A SHORT HISTORY OF OPHTHALMOLOGY. By Arnold Sorsby, M.D., F.R.C.S. John Bale, Sons & Danielsson, Ltd., 1933. pp. 103. Price 3s. 6d.

DR. R. H. HUNTER, in 1925, had a small volume on the history of anatomy published by the Oxford House. The success of this book soon resulted in a second edition being called for, and the publishers, realizing the demand for short introductions to the more detailed histories of the medical specialities and ancillary sciences, have now brought out a series of such introductions. Volumes on surgery and dentistry have already been added to the one on anatomy, and the new volume on ophthalmology is a worthy successor to those written by Sir d'Arcy Power, Miss Lindsay, and Dr. Hunter.

Mr. Sorsby has written a book which has suffered surprisingly little from the necessary limitations of space. There are separate chapters on the anatomy, the physiology, and the pathology of the eye, and a very interesting account of British ophthalmology has been added. The introduction gives an excellent background of general medical history to the details of the history of ophthalmic specialization which follow.

This is a valuable addition to a series which is deserving of considerable success.

BOOK REVIEWS

THIS PANEL BUSINESS. By A. G. P. London : John Bale, Sons & Danielsson, Ltd., 1933. pp. 364. Price 10s. 6d.

AFTER reading this volume, one comes to the conclusion that a better title would be "This Panel Bungle." Everyone connected with it appears to bungle his job. Doctors, insurance companies, patients, etc., all seem to abuse of its privileges, and all would appear to have the same motto : "Ninepence for Fourpence."

The first part of the book opens with a chapter on "The Plight of the Medical Profession To-day," and here one might call in question the authority from which information is derived, namely, the daily press. An article in one of these papers on "Lean Days in Harley Street," by a "Physician," does not impress one as a reliable source. Large portions copied verbatim from such periodicals are represented as summing up certain present positions.

More impressive authorities are quoted in other parts of the book, and it is of importance to practitioners to know, for instance, that in 1931 there was one doctor in the British Isles to each 884 patients, whereas in France the figure is 1,690, Germany 1,560, and so on.

Abuses in the National Health Insurance scheme are reviewed throughout the ensuing chapters, and to the uninitiated such revelations are almost unbelievable. "A panel certificate may be regarded as so much money, even if it is only so much money as sickness benefit." The amusing story is related as told by a panel doctor, at the annual conference in 1930, of two men who wished to attend a cinema or football match, but had no money. It occurred to them that they could raise money by going to the panel doctor, from whom they could get a certificate. This procured, they went to a bookmaker or some such person, who advanced them five shillings!

Most of the better-known public medical services are dealt with, such as the Hospital Savings Association, Medical Contributory Service, friendly societies with "Closed Panels," and the British Medical Association "Open Panel for Consultants." The impression one gets in studying these is unmistakable, and can be summed up in the one word, "Beware."

Considerable thought has been devoted to the question of extending the panel to include "dependants," and the writer advises against this encroachment.

The book can be recommended to all interested in panel work of any sort, and certain aspects of this business have been brought to light which are as serious for the practitioner as they are arresting.

Constructive ideas are summed up in the last chapter, but I am afraid all will not meet with general approval.

A SHORT HISTORY OF OPHTHALMOLOGY. By Arnold Sorsby, M.D., F.R.C.S. John Bale, Sons & Danielsson, Ltd., 1933. pp. 103. Price 3s. 6d.

DR. R. H. HUNTER, in 1925, had a small volume on the history of anatomy published by the Oxford House. The success of this book soon resulted in a second edition being called for, and the publishers, realizing the demand for short introductions to the more detailed histories of the medical specialities and ancillary sciences, have now brought out a series of such introductions. Volumes on surgery and dentistry have already been added to the one on anatomy, and the new volume on ophthalmology is a worthy successor to those written by Sir d'Arcy Power, Miss Lindsay, and Dr. Hunter.

Mr. Sorsby has written a book which has suffered surprisingly little from the necessary limitations of space. There are separate chapters on the anatomy, the physiology, and the pathology of the eye, and a very interesting account of British ophthalmology has been added. The introduction gives an excellent background of general medical history to the details of the history of ophthalmic specialization which follow.

This is a valuable addition to a series which is deserving of considerable success.