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## PRESIDENTIAL ADDRESS, 1930.*

Mr. Chairman & Members of the Hong Kong University Medical Society.

Allow me to express my appreciation of the honour you have conferred in electing me the President of this Society. I am afraid I have not so far devoted any of my time to your interests, but hope to be of some help in supporting you in the future.

This evening I will not bore you with any abtruse medical topic—scientific lectures you have an abundance of. On such an occasion as this a lecture would be an unnecessary weariness to the flesh and would encourage slumber in the back rows if not actual flight.

I wonder how many of you have seriously asked yourselves why you decided to embark on a medical career.

Have you satisfied yourselves that the medical profession offers you a satisfying and helpful career?

Let me this evening endeavour to show wherein lies the attraction of the medical profession.

We all know the old platitudes and exhortations in which the student is reminded of the most noble of professions with unlimited scope for the exercise of altruistic faculties. The student is reminded that money reward should not be his first and chief consideration.

I regret to say that at the present time such ideals when regarded in the cold light of day and as detached propositions are apt to lose touch with actuality.

The student while contemplating the chance of ministering to the needs of others surely may reasonably consider his own need and may very properly ask on entering a medical career what return he may expect from his work—although a man ought to desire to serve

* This address was delivered by the President, Prof. W. I. Gerrard, at the General Meeting of the Hong Kong University Medical Society.

others it does not imply he ought not to serve himself. Now-a-days the struggle for existence becomes more and more acute. If any of you have embarked on a medical career with a view to making a fortune take my advice and search elsewhere. To those who are diligent and thorough there is a modest livelihood.

A medical career does offer a great opportunity for training the mind and manhood. It gives the student the capacity to see life steadily and to see it whole. Think of the wide education in appreciating evidence or testimony and in a much wider sense than in the profession of law for example or in any scientific profession other than medicine.

The field of enquiry in medicine is unrestricted. Evidence from all sources is freely welcomed. Our simple aim is discovery of the truth and any aid to such is of service. We allow no artificial values but each piece of testimony is considered on its own merits.

You will appreciate then what wonderful influences you live under. Influences which encourage and foster an open mind and freedom of inquiry. There is a constant stimulus to judge the worth of testimony.

Personal observations on patients must be complete and accurate. You must avoid being influenced by any desired or expected result. When you are in doubt let nothing tempt you as medical men to vote either "Aye" or "No." We recognise a loyalty to truth which urges us to withhold an opinion until further light is obtained.

In your career you will find yourselves surrounded by the unknown and uncertain and they will continually urge you to enterprise and effort. There are unlimited fields before you. Have no fear of being compelled to weariness in the profession you have chosen on the ground that there are no more worlds to conquer. You may experience failure but it will not be due to lack of opportunity.

You will receive a most generous training in intellectual honesty. This is of paramount importance to you and you will be able to confirm this later on in your careers. The intellectual honesty you cultivate will be of a high standard.

The wise doctor realises his limitations and incapacities but let me point out to you that the public attribute to him abilities and powers he does not possess and to which medicine makes no claim. You can see how under such an influence and pressure of practical events there may arise an inclination to admit or even to make unreal pretensions. You will appreciate how tempted is the doctor looked on as an oracle and with something akin to omnipotence, to avoid a doubting or hesitating attitude. Popular pressure has a definite tendency to make you depart from accurate statements in other words

—to be dishonest—and to give way to this temptation means entry on a dangerous and slippery slope. Here is a challenge to your intellectual honesty and the downward path once commenced is an easy one.

You must therefore learn to think honestly and speak honestly.

In the study of medicine you will find on the one hand the scientific problem with its cold, hard, diagnostic facts and on the other hand your patient, a human being. Do not forget that he has interests and longings which are part of the common lot. You are in constant touch with the sense of tears in human affairs. There is then for you a cultivation of understanding and sympathy. An appeal is made to the heart as well as to the head. There is pressed on your attention a wonderfully broad view of life such as no other scientific inquirer can experience. If you would be a good practitioner of medicine you must possess not only technical knowledge and skill but also a broad sympathetic and tolerant conception of life.

To the love of your profession you must add a love of humanity. You will find that your work, when you commence practice, is not a mere repetition of experiences which you have met with during your training. Continually new situations and fresh problems rise. You will have to deal with disturbances in individual men and women each of whom has personal peculiarities and idiosyncrasies.

Psychotherapy looms largely now-a-days in practice and you would be wise to devote more time in studying the mental outlook of your patients.

If you are wise you will avoid like the plague the ever pressing urge to specialise until you have had a sound general training. Remember that extreme specialism was one of the causes of the decay of medicine in ancient Egypt.

The public want doctors who can set broken limbs and cure stomach-aches.

Let me remind you of Osler's words—

"Every medical student should remember that his end is not to be made a chemist or a physiologist or an anatomist but to learn how to recognise and treat disease—to become a practical physician." In conclusion I would say that the great and good physician who has had a long career has a happiness in looking back over his life which no other man can rival. He at least has done positive good, relieved suffering, restored strength and renewed life.

# AFFECTIONS OF THE EYE IN GENERAL PRACTICE.

by

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## EXAMINATION OF THE EYE, IN DISEASES OF THE NERVOUS SYSTEM.

During the past few years, and while on the staff of the West End Hospital for Nervous Diseases, I have been greatly struck by the number of general practitioners who attend the Post Graduate Lectures at this Hospital. These men in general practice I discovered were exceedingly keen to keep their knowledge fresh and avoid being stale at their work. The majority of them showed the keenest interest in the lectures, and so I have determined to complete my series of articles by describing the methods of examining the eye in nervous diseases, and also the ocular manifestations of the commoner diseases of the nervous system.

### (1) EQUIPMENT.

I would suggest that the practitioner should equip himself with the following instruments:—

(*a*) A 13 dioptre lens two inches in diameter in a spectacle mount. This magnifying glass is of the greatest use for throwing light on the eye to observe the condition of the cornea; many foreign bodies in the cornea are missed by the omission of the use of such a lens; also to observe pupillary reflexes.

When light is focussed on the eye by means of this lens the pupil contracts; this is known as the direct light reflex. As the light is thrown on one eye, and if the pupil of the other eye be observed it will be seen to contract also, this is known as the consensual light reflex. Without throwing light into the eye if the patient directs his gaze to a point say eight inches away, again the pupils will be seen to contract. This contraction of the pupils occurs simultaneously with the act of accommodation. What then is the Argyll-Robertson pupil? When such a condition is present and light is thrown into the eye by means of the magnifying glass the pupils fail to contract, but with the light still concentrated on the eye and the patient is asked to look at a point eight inches away the pupil will now be seen to contract; there is then absence of light reflex but the presence of contraction while accommodating. The best method of observing the Argyll-Robertson pupil is to place the patient in a dark room, direct him to look at a point 20 feet away, and either by means of the lens or a small flash lamp direct the light suddenly on one eye. Looking at a point 20 feet away accommodation will not be exerted and the pupil fails to contract. While keeping the light on the eye

the patient is now told to look at your finger eight inches away from his face, the pupils will be seen to contract. Sometimes the Argyll-Robertson pupil is seen only on one side.

(*b*) The doctor should be in possession of an electric Ophthalmoscope, and he should remember that the most expensive will probably be the least useful. The one which I consider invaluable is the small electric ophthalmoscope with a prism reflector without an aperture, which is infinitely better than a reflecting mirror with a slit. The "May" Electric Ophthalmoscope is the one I prefer.

Looking back on one's student days and remembering the length of time it took to learn the use of the ordinary ophthalmoscope it comes as a revelation to see a student take this little electric ophthalmoscope and straightway examine a retina practically without any previous instruction. Every doctor should possess one, the battery can be replaced for a few pence, and the same battery can be used in the Ever-ready pocket torch. It is a pleasure to be able to go round a ward in hospital and examine fundi both with or without dilation of the pupils.

With a little practice it is not difficult to learn the appearance of a normal optic disc. The healthy disc may show a cupping in the centre from which the vessels gradually emerge. The surface of the disc is a delicate pink, the colour produced by the presence of minute vessels. In optic atrophy the surface of the disc is white due to the absence of these minute vessels. If the optic atrophy is primary as in tabes the edge of the disc is clearly defined, but if the optic atrophy has followed an optic neuritis or as it is better described "papillœdema" the atrophy is then known as secondary and the edge of the disc will be blurred and not clearly defined. In secondary optic atrophy if a physiological cup was present originally it is now filled in, and further, owing to the inflammatory condition of the nerve head the lymph sheaths of the vessels show fine white lines running along their course from the disc edge.

A papillœdema is recognised by greatly swollen veins, the surface of the disc is red and may even show minute hæmorrhages, while the edge of the disc can scarcely be determined. The whole nerve head is pushing forward into the vitreous, mushroom-like.

The stages of a papillœdema or optic neuritis vary from a slight blurring on one edge of the disc and somewhat swollen veins to an appearance totally unlike an optic disc, the œdematous and hæmorrhagic area into which swollen veins proceed and the half obscured arteries emerge. To focus the surface with an ophthalmoscope the observer's accommodation being at rest, it will require 3D., to see the vessels and the surface of the disc when swollen to the extent of 1 m.m.

(*c*) It is almost needless for me to remind my readers that a "Snellen's" Test-type should be hung in the surgery. If the room is not 18ft. from wall to wall, or corner to corner, then reverse types can be obtained, so that by looking into a mirror placed 10 ft. away the patient can read the test-type situated above his head.

(d) Lastly I would suggest the use of an inexpensive instrument, Bishop Harman's Scotometer with a perimeter arm. It is the cheapest instrument I know by which one can not alone record a patient's visual fields but can also record scotomata or blind areas and can measure an *enlarged* blind spot, that is the area corresponding to the optic nerve head.

(2) PITFALLS.

In examining eyes one must never forget that there is a blind spot in each eye; it is easily found. On a piece of writing paper mark a cross No. 1, also a similar cross No. 2, five inches away on the right of No. 1. Close the left eye, and with the right look at cross No. 1. Cross No. 2 cannot be seen, its image has fallen on the optic disc. A patient who had already suffered from a detached retina suddenly discovered the blind spot in the other eye, he came to me with fear and trembling thinking that the retina of the healthy eye was becoming detached also.

While taking a patient's field of vision the patient should not be tired, also it is almost impossible to get a consistent answer from an hysterical patient. Again, an optic disc looks much whiter by contrast in a dark brown eye, therefore, before taking the responsibility of declaring the presence of optic atrophy one should need to have had constant practice with the ophthalmoscope. Finally in young children with hypermetropic eyes the nerves proceeding from the optic disc to the retina show up so plainly that the mistake of calling such a disc a papillœdema is not infrequent. Sometimes these fibres do not lose their medullary sheath, and show as a flame-shaped white patch resting on the edge of the disc.

May I remind my reader that he should reserve his judgment on any departure from the normal disc until his diagnosis has been confirmed by one whose daily work it is both at hospital and private to appreciate what each small change seen by the ophthalmoscope signifies.

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## OCCULAR MANIFESTATIONS OF THE COMMONER DISEASES OF THE NERVOUS SYSTEM.

Referring back to Equipment I suggested a lens in a spectacle mount, as shown in illustration No. 1. Illustration No. 2 kindly lent by Messrs. Clifford Brown, Wigmore Street, W.1. is that of the "May" Electric Ophthalmoscope to which I also referred.

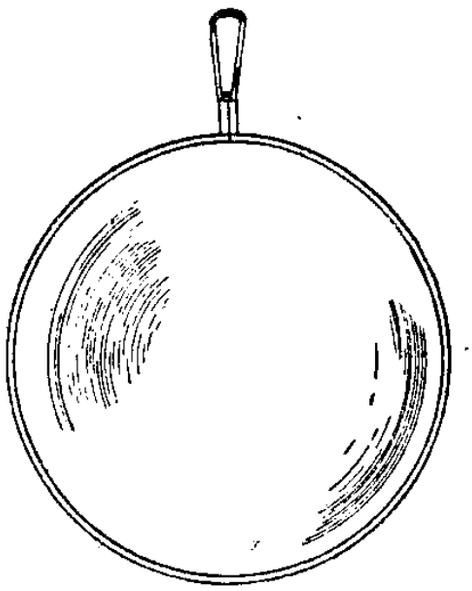


Fig. 1.

The practitioner should examine as many normal eyes as possible so that when the opportunity arises to examine a primary optic atrophy he will readily recognise the changed condition of the optic disc.

Possibly the two commonest diseases of the nervous system met with in general practice are Tabes and Disseminated Sclerosis. 20 per cent. of tabetics show optic atrophy. This primary optic atrophy is steadily progressive, the progress being indicated not alone by the whitening of the disc, but by gradually decreasing field of vision. The field of vision gradually shrinks, until at last the macula is involved, and total blindness ensues. Illustration No. 3 shows a typical contraction of the field of vision in an eye which has suffered from primary optic atrophy for almost a year. Such a patient will often ask "How long will it be until I am blind?" Although it might be taken that vision will last out another year, the two year rule does not always hold. I am quite certain that by the diligent use of mercurial inunction and potassium iodide, loss of vision can be delayed for at least another year.

It does seem a remarkable coincidence that if primary optic atrophy supervenes the patient does not suffer so severely from motor-paralysis, while in many cases where there is ataxy vision remains perfectly normal for a considerable time. The reason for this is clearly indicated by the pathology of such conditions and not by any mere coincidence.

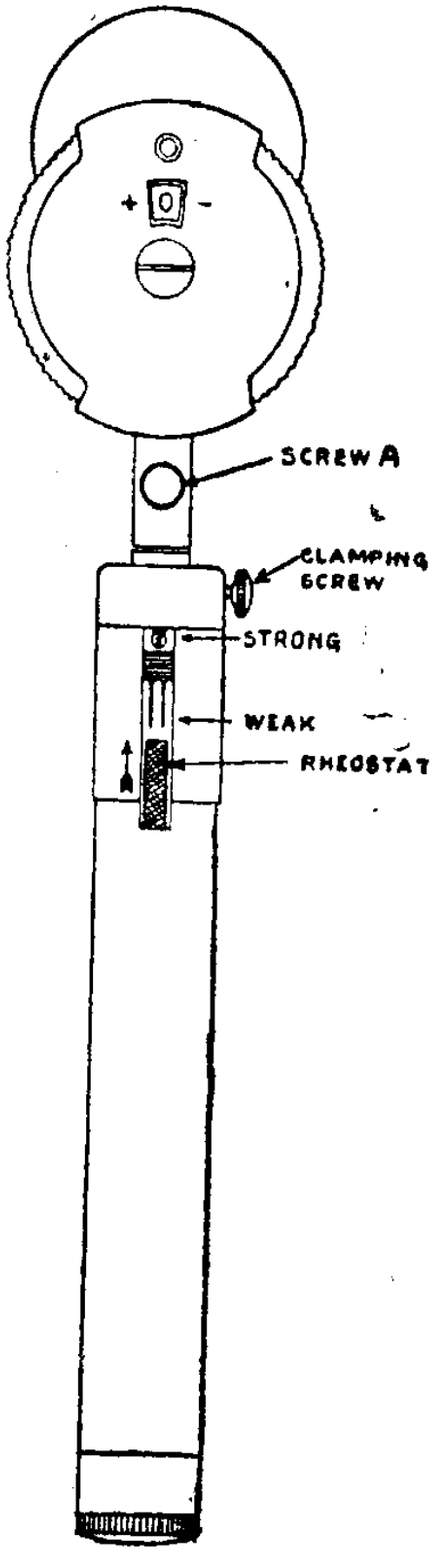



Fig. 2.

In disseminated sclerosis probably about 3 per cent. show complete optic atrophy, but there is an incomplete optic atrophy commonly present. This incomplete optic atrophy can be observed when examining the disc; the outer half of the optic disc, that is the part of the nerve conveying the nerves to the macula and peri-macular region, known as the papillo-macular bundle, is distinctly whiter than the inner half. Text books vary greatly as to the percentage showing

incomplete optic atrophy, some say 37 per cent., but my observations lead me to believe that over 70 per cent., would be nearer the truth. It can be easily understood that when only a part of the optic nerve has atrophied then only part of the retina will be insensitive, so that there will be blind spots or scotomata present. Very rarely is papillœdema seen in disseminated sclerosis.

In hysteria the disc has its normal pink appearance, but if the field of vision is recorded it will vary from day to day, showing that organic disease is not present.

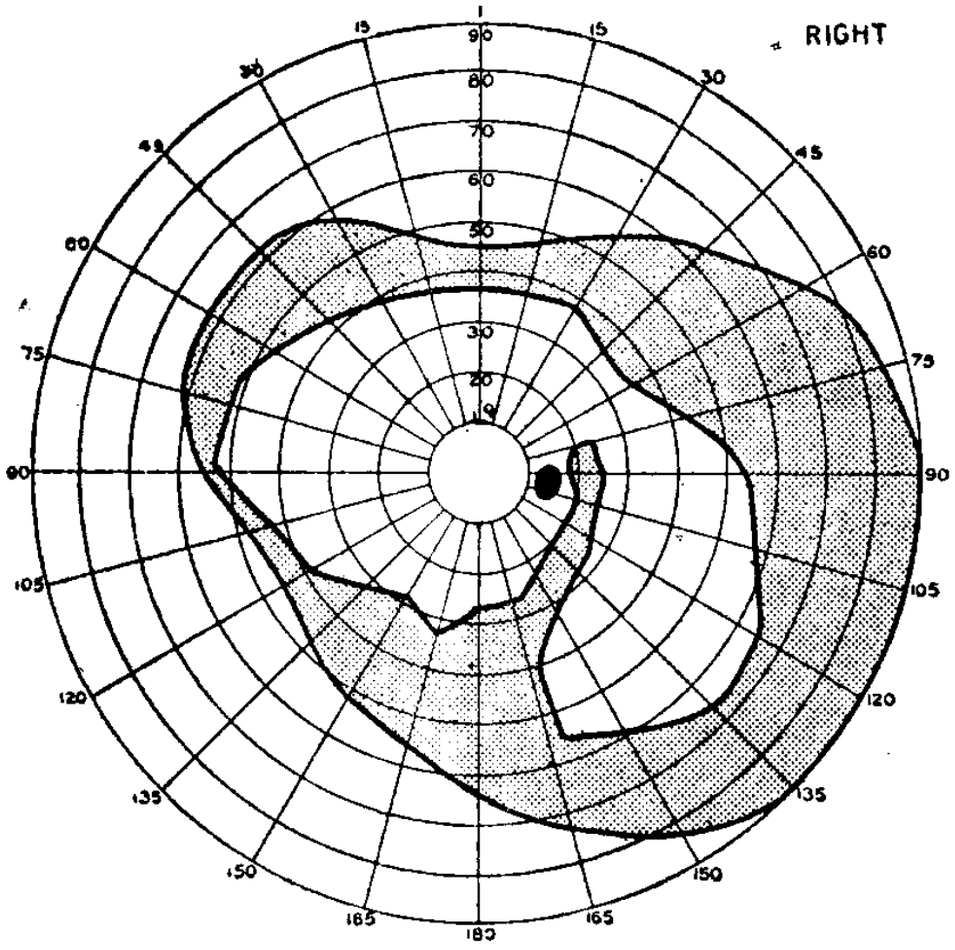
An hysterical patient attending the large Outpatient Department of an Eye Hospital was able to distinguish between two surgeons, the one who was attending her, and the other who was not, across the whole length of the room, while when asked to read the Test-type she could not see any of it, and when requested to walk up to the Test-type to see the largest letter she not alone missed the Test-type and the wall on which it was hung but was stopped from passing through a door which was open beside the Test-type. It is only in the case of an hysterical patient that such phenomena could be seen.

Ocular paralyses seen in tabes show the 3rd cranial nerve to be chiefly affected. The patient may suddenly complain of seeing double, it is the first and earliest onset of paralysis of one branch of the 3rd nerve, this may recover temporarily, and as a rule does not spread to the other branches until a complete 3rd nerve paralysis is found. Remember the anatomy of the 3rd cranial nerve. One observes that the lid is hanging down—ptosis. When the lid is raised the eye-ball is seen to be rotated downwards and outwards and on examination it is found that only the external rectus which is supplied by the sixth cranial nerve which turns the eye-ball outwards, and the superior oblique supplied by the 4th cranial nerve and which rotates the eye-ball downwards and outwards, these alone can move the eye-ball. On the other hand it is less frequently found that the sixth nerve is paralysed, so that when the unopposed action of the healthy 3rd or oculo-motor nerve turns the eye-ball in, there is convergent squint and the lid is unaffected. In disseminated sclerosis a single branch of the nerve is not at all so likely to be affected, associated movements are greatly interfered with, that is, the patient cannot move both eyes in a similar manner simultaneously.

Nystagmus or rapid to-and-fro movement of the eyes is fairly common in disseminated sclerosis. In hysteria paralyses of any kind are not observed.

Pupillary changes seen in tabes vary greatly, the commonest is the Argyll-Robertson pupil. Remember, this means failure of the pupil to contract to the stimulation of light, but contracts when the patient is endeavouring to look at a near point. Briefly, failure to light, present to accommodation.

Small pupils or miosis is another somewhat common pupillary change in tabes, but should my reader ever observe his guest at dinner to have such pupils do not on any account try to be clever like a consulting Physician who informed one of my patients under similar circumstances that he had such pupils. Sometimes the pupils are slightly irregular, and one and sixpenny pupils are seen, *i.e.*, one pupil being larger than the other. In advanced disseminated sclerosis miosis is somewhat common. Again in hysteria the pupillary reflexes are normal the pupil contracting to direct light reflex and the consensual reflex of the other eye is present also. The eye-sight in tabes gradually fails due to contraction of the field of vision, but in disseminated sclerosis vision may suddenly fall almost to complete absence and may just as suddenly return. This does not occur in tabes. The results of examination of vision in hysteria are utterly bizarre.




No. 3.

My reader should stop here and carefully re-read from the beginning of this article so that he will closely compare the above signs and symptoms with those found in general paralysis of the insane. Primary optic atrophy occurs in 8 per cent. of these cases, and although paralyses of the extra-ocular nerves occur the percentage in general paralyses of the insane is much smaller. Pupillary changes show that

50 per cent. acquire the Argyll-Robertson pupil others show paradoxical pupils, that is, the pupil is actually seen to dilate when light is thrown into the eye. Mind blindness occurs in these cases, which one would expect as the brain is chiefly involved in this disease. The extent of contraction of the fields of vision depends upon the extent of optic atrophy present.

In Hereditary Ataxy ("Friedreich's Disease") the nystagmoid jerks are probably due to the same lack of co-ordination which causes the other ataxic signs of the disease. True nystagmus is diagnostic of disseminated sclerosis, but nystagmoid jerks are not to be relied upon as they can be elicited even in the eyes of healthy people especially when they look to the extreme right or left.

In epilepsy during the normal state, the fundus of the eye is seen to be perfectly normal, although in a few cases the veins of the fundus are seen to be somewhat varicose. There is no paralysis in epilepsy but during the attack the pupillary light reflex is lost.

In Myelitis, although there is no direct communication between the cord and the optic nerves, yet the toxin which is attacking one can attack the other simultaneously, so that in a considerable number of cases papillœdema is found, and ultimately complete blindness may ensue. Sometimes, on the other hand, good vision actually results. If the myelitis affects the cervical or upper portion of the cord there may be pupillary changes due to the sympathetic fibres of the iris being affected resulting in unequally dilated pupils.

Syringomyelia. When the dorsal and lower cervical portions of the cord are affected there will be pupillary symptoms, the pupils may be unequally dilated, the smaller pupil will react to light, but does not dilate after the installation of cocaine. Cocaine is an extremely useful drug in determining lesions involving the upper dorsal and cervical portions of the cord. This drug stimulates the sympathetic nerves to the dilatator pupillæ, producing mydriasis, or dilatation of the pupil. In syringomyelia paralysis of the 4th and 5th cranial nerves are seen. Contraction of the fields of vision is found, but this is usually due to the hysterical condition of these patients.

Injuries of the Spinal Cord. The sequel to railway accidents found in many people is a condition known as spinal traumatic neurasthenia or railway spine. These patients often find difficulty in reading due to weakness of the accommodation. If an hysterical element is added the fields of vision will become contracted also.

Neurasthenia: In former times, before the war, this condition was found commonly enough among children. In these cases the vision may, or may not, be reduced, but they show a contracted field

of vision. The war has added to these cases large numbers of ex-soldiers. The same symmetrically-contracted field is found.

I may again remind my readers regarding paralysis of the Ocular nerves to enquire from the patient or from the patient's relatives when squint was first noticed. An eye may really have shown squint in childhood. The eyes may have become quite straight, but there is a hidden squint as manifested by examining the muscle balance with a Maddox rod.

Regarding the appearance of optic discs or pupillary changes, never try to examine such in an artificial eye.

# NASOPHARYNGEAL CARCINOMA WITHOUT CLINICAL ENLARGEMENT OF LYMPHATIC GLANDS IN THE NECK.

by

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In the Caduceus of May 1930 (Vol. 9, No. 2) Dr. Thomas, Dr. Hsiu and I wrote an account of nasopharyngeal carcinoma as seen in Hong Kong. I now wish wish to add another case to the collection recorded there. In that article on page 50 para. 4, last two lines we wrote "occasionally a large mass may project below the posterior margin of the soft palate before the cervical glands are enlarged." It might be objected that at least these cases might be sarcomas not

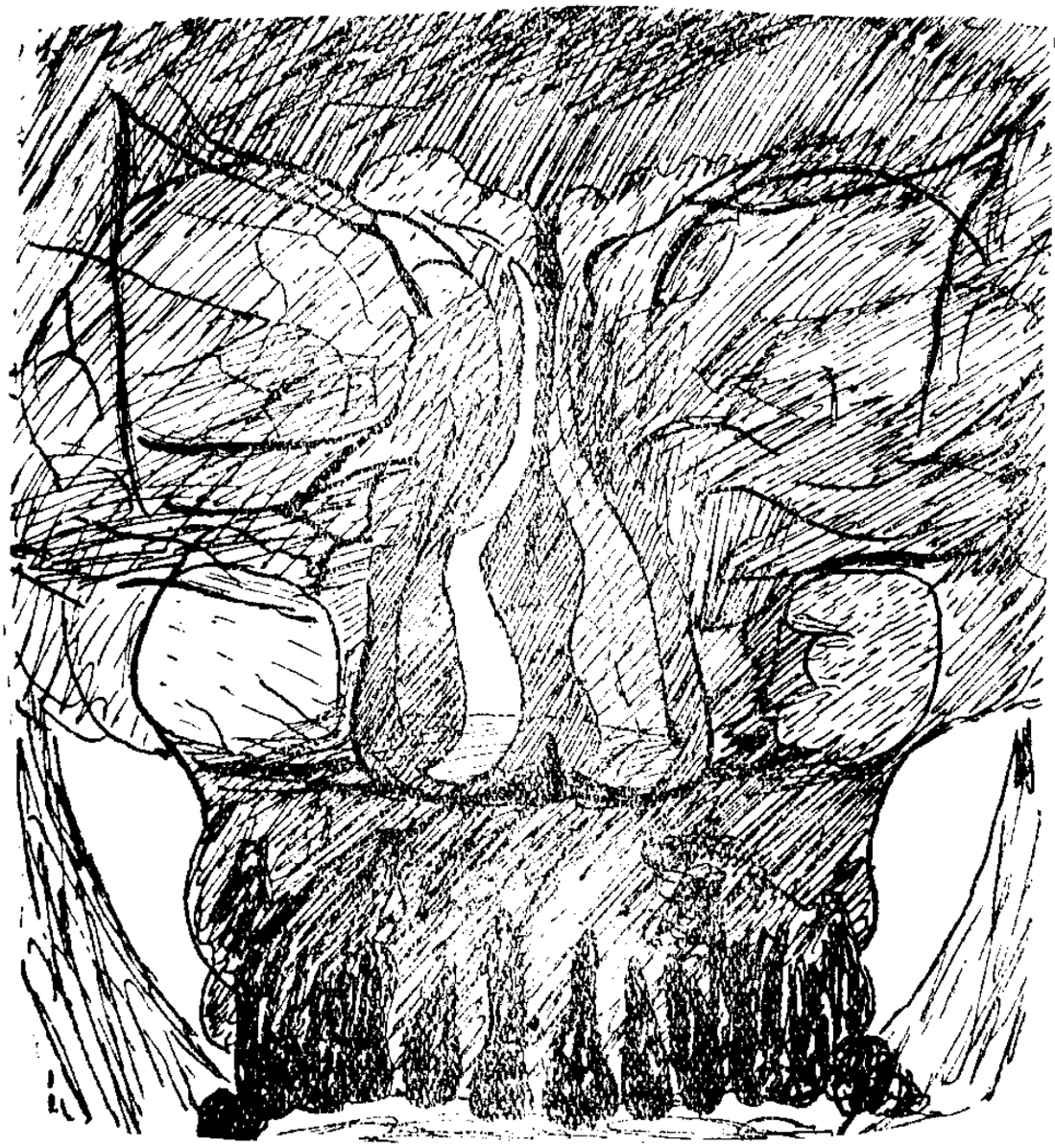

*Figure 1.* X-ray of face showing opaque left maxillary sinus and left nasal cavity. Case No. 308/30.

carcinomas, inasmuch as a large size of growth was unaccompanied clinically by enlarged lymph glands in the neck. The case here recorded showed an enormous growth in the nasopharynx, visible behind the soft palate when the mouth was opened and also spreading forwards two-thirds of the way along the left nasal passage causing opacity of the left nasal cavity and left maxillary sinus (Fig. 1) and eroding the floor of the skull (Fig. 2) without producing any recognisable enlargement of the glands in the neck. Yet this case proved definitely to be a carcinoma (Fig. 3).

The patient K—H—Case No. 308/30 was a woman aged thirty-four years who had first noticed symptoms fourteen months previously. The first of these was deafness and ringing in the left ear. Twelve months ago there was left nasal obstruction, with epistaxis. She began to have continual headaches.

On admission the patient presented an anxious expression, and being quite unable to breathe through her nose kept her mouth open.

The usual routine examination failed to show any involvement of the cranial nerves, or enlargement of cervical lymph glands. A polypus could be seen in the left nasal cavity and a large growth could be seen depressing the soft palate and projecting below its posterior margin more on the right than on the left.

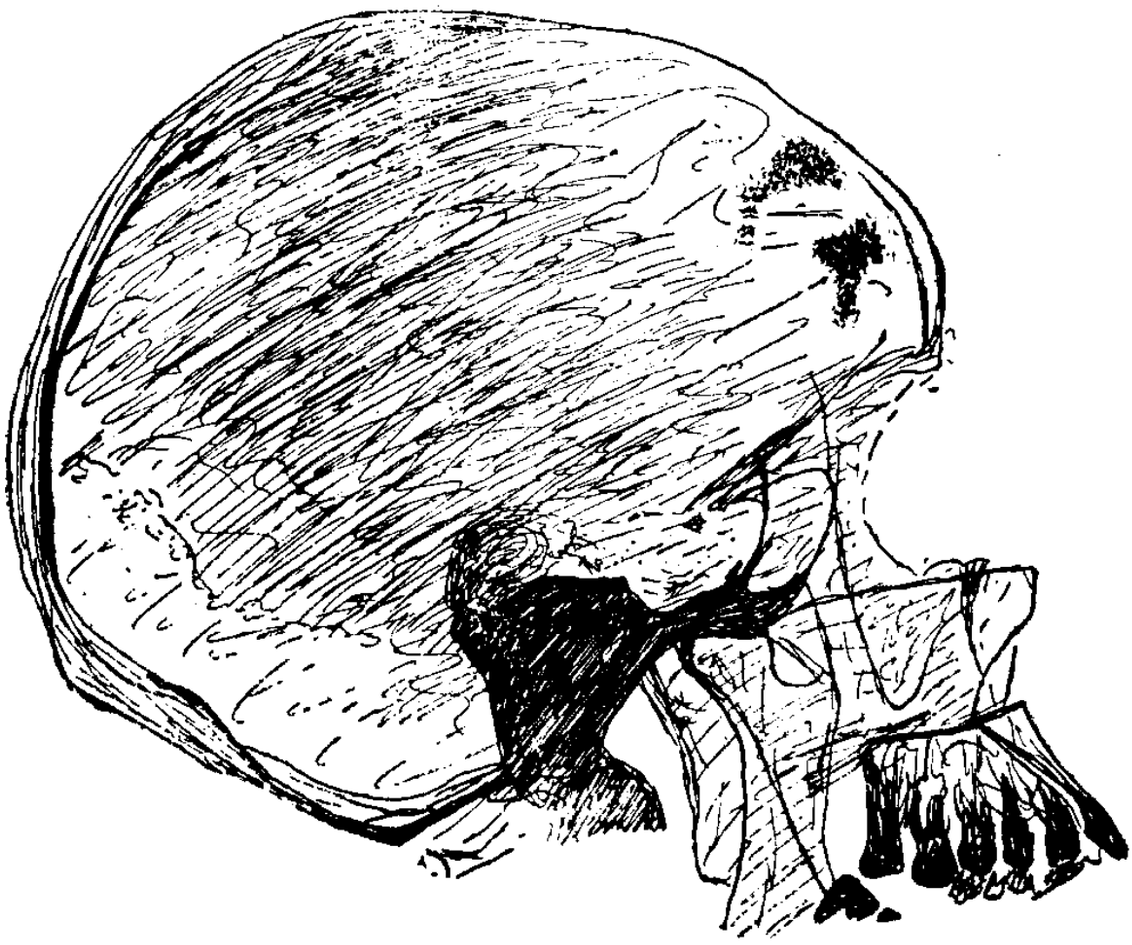

*Figure 2.* X-ray of skull showing absorbtion of the dorsum sellae. Case No. 308/30.

Middle ear deafness was present on the left side. Both sides of the nose were obstructed and, as already stated, the patient breathed through her mouth.

On 22nd September, 1930, the left common and external carotid arteries were ligatured, and such lymph glands (not abnormally enlarged) as were found in the carotid triangle were removed. The left superior maxilla was excised. This exposed a long runner of growth into the left nasal cavity lying free. The left maxillary sinus was full of mucus not growth. The extension of growth (after a piece had been removed for section) was destroyed by diathermy and then the growth in the nasopharynx was similarly cooked, but not very thoroughly as the patient's condition was not too good. The wounds were closed in the usual way.

On the 1st October, 1930, eleven six-milligramme tubes of radium wrapped in paraffin gauze were inserted into the nasopharynx, and left for 41 hours, that is a dose of 2,706 mg. hrs. was administered.

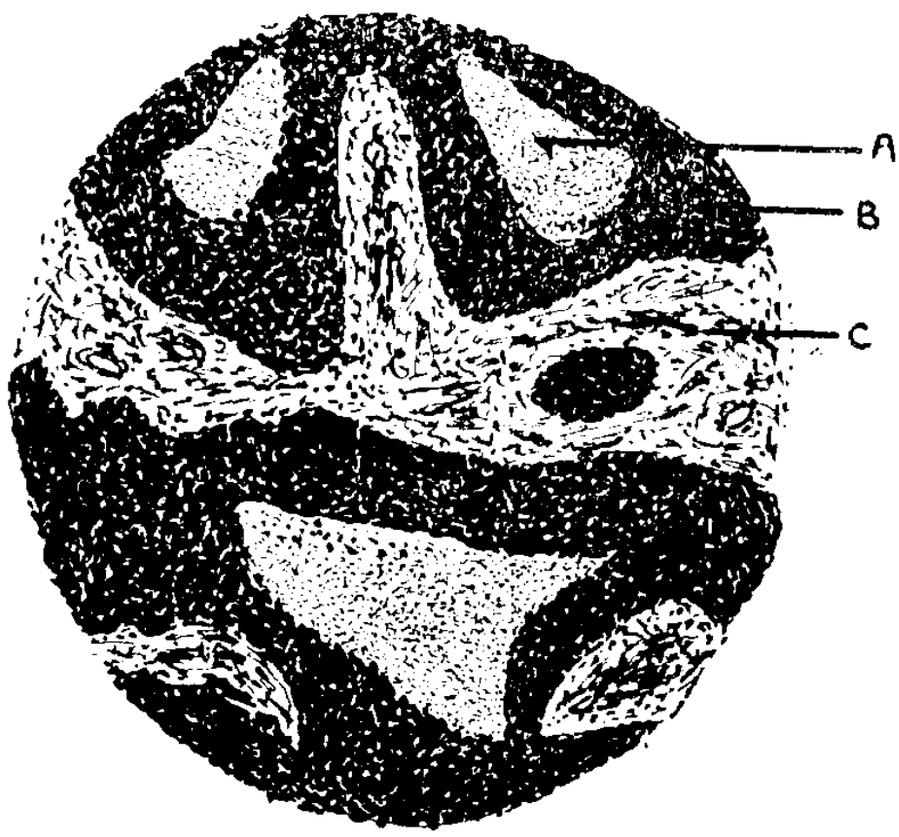


*Figure 3.* Micro-copic section (Microscopic Slide No. 1631) of the primary growth from the nasopharynx.

Case No. 308/30.

A. A central mass of dead malignant cells.

B. Carcinomatous cells.

C. Stroma.

On the 15th October, 1930, a further application of radium was made. Eleven six mg. tubes were left in paraffin gauze in the naso-pharynx for 50 hours that is a dose of 3,102 mg. hrs. was administered.

The patient's condition is greatly improved and she is now awaiting a Columbia paste collar for the neck and possibly further application to the nasopharynx. A moderate radium burn of the tongue has occurred.

# FRACTIONAL TEST MEAL ANALYSES.

by

Lindsay T. Ride and S. Y. Wong.

(From the Department of Physiology, The University, Hong Kong.)

During some routine fractional test meal experiments being carried out by one of us (L.T.R.) on Chinese students, it became desirable to estimate, besides the free hydrochloric acid, total acid and total chloride, the dilution of the gastric contents and the amount of $CO_2$ contained in each sample. For the dilution of the gastric contents a new method has been evolved, and for the $CO_2$ a slight modification has been made in the method of MacLean and Griffiths (3). These reasons have lead us to devote this paper to the description and discussion of the methods used in the fractional test meal investigations being carried out in this laboratory.

All the experiments have been carried out so far on healthy young medical students. In no case was a meal taken after 10 o'clock on the previous evening, and the investigations were generally begun about 8 a.m., each subject having been previously subjected to no further muscular exertion than that necessary to walk to the laboratory.

*The meal.*—The meal given was that advocated by Ryle (5) namely, two tablespoonsful of oatmeal in two pints of water, boiled down to one pint and strained through butter muslin. 50 c.c. of a 2% solution of arabinose was made up to 500 c.c. by the addition of this gruel (this procedure will be discussed fully below) and a measured amount of the mixture was given as the meal, sometimes 450 c.c., sometimes 475 c.c., the remainder being kept for the various analyses of the original meal. In some cases chloride in the form of the ammonium salt was also given with the meal and in such cases the chloride was added to the above amount of the pentose solution, and the resulting mixture made up to 500 c.c. with the gruel. By this means the strength of the pentose in the meal was always about 0.2% which was the figure desired for the estimation of the arabinose by our method.

The oatmeal breakfast was chosen because it was the original idea of this work to investigate the physiological constants of the Chinese and to compare them with the known constants of Europeans. It is obvious that the more nearly the European experimental conditions are copied, the more useful will the comparison be. Bennett and Ryle (2) in their series of English students used this meal. Apperly (1) has compared his results in Australia with those obtained in England, but in his paper the type of meal used is not stated. In order that the results might be strictly comparable it was decided to use the oatmeal. It is hoped later to publish the normal curves

obtained amongst the Southern Chinese and that these curves will be of use to clinicians; as oatmeal is procurable almost anywhere in these days, the tea and toast meal has no advantage over the oatmeal on this score.

*The tube.*—The tubes used were Ryle's modification of the Rehfuss tube, No. 7 catheter size, but in some cases tubes without the lead enclosed in the end were used and found entirely satisfactory. It is obvious however that where the position of the tube has to be ascertained by means of X-rays the tube containing the lead should always be used. The tube was swallowed with the minimum of excitement and gagging, and the ease with which the students performed this feat, even on the first occasion, was in most cases truly remarkable.

*Resting juice and samples.*—In every case the total amount of resting juice was withdrawn and accurately measured. Special care was taken to see that the amount of saliva swallowed was reduced to a minimum by providing receptacles into which the subject could expectorate. This precaution was found to be very important for it is very easy for 50 c.c. or more of saliva to be secreted per hour during such an experiment as this. The meal was given at about body temperature and taken as quickly as was consistant with comfort, and the time at completion noted. At quarter-hour intervals from this time, samples were removed through the tube by means of an all-glass syringe attached at the free end of the stomach tube. In each case the volume taken, generally about 12 c.c., was noted; a note was also made each time as to the ease with which the sample was obtained.

After each sample was removed, care was taken to introduce a few c.c. of air into the stomach in order to ensure that the contents of the tube were transferred back to the stomach; otherwise each sample would contain a few c.c. of the previous sample withdrawn.

If the stomach was not empty at the end of two hours after the meal was taken, the total amount of fluid in the stomach was removed and measured. In some cases the stomach was found to empty very rapidly and in these cases the opportunity was taken to investigate the effect on gastric digestion of a second meal taken soon after the first. These results will be embodied in a later paper, but it may be stated here that the resulting curves were remarkably constant. So evident was this, that we were able to take the curves of the first meals as a normal for the subject on that day, and, by giving a different meal the second time (e.g. adding ammonium chloride to the second meal), to deduce the effect of this added substance on the digestive juices of the stomach. The special technique needed to obtain the samples for $CO_2$ estimations will be discussed later under the heading of $CO_2$.

### ANALYSIS OF SAMPLES.

Each sample, including the resting juice, was examined by the naked eye for mucus, blood and bile, and for the detection of starch the iodine test was used. In every case the fraction was centrifuged and the supernatent fluid used for chemical analysis.

The *acids,* both free hydrochloric and total acidity, were measured by titrating with accurately made up N/10 NaOH. In the case of the former, dimethyl - amido - azo - benzene was used as the indicator and phenolphthalein in the latter. In a number of cases at the beginning of the series these estimations were also carried out using thymol blue as the common indicator (4), but it was found that although the first end point was very definite, the second one was more vague than when using phenolphthalein. Especially was this so when a large amount of ammonium chloride had been added to the meal. We therefore decided to abandon the thymol blue in favour of those indicators used by most other workers, having satisfied ourselves that the advantage of one indicator over two separate ones was negligible from the point of view of technique.

Whenever a new stock of N/10 NaOH was made up it was standardised against a stock N/10 solution of HCl specially kept for the purpose, and thus the results all through a long series extending over months were all strictly compared with the same standard.

The *total chlorides* were estimated by the method of Jocelyn Patterson (4); this method was found to be highly satisfactory, the end point being a very definite one, and in cases where only a small amount of the juice was available the method was very useful. Before each batch of samples was done the stock N/10 HCl was estimated by this method, and thus it was ascertained whether any correction was necessary to correlate the acid and chloride estimations, the correction always being applied to the chloride figures.

*Dilution.*—During our work it became necessary to try and find out how much of the stomach contents was due to the food introduced and how much to the secretions of the various glands of the upper part of the alimentary canal. In order to measure this, we decided to add to the meal some substance which could be easily measured quantitatively both in the meal and in the gastric samples. This substance had to be one which was not acted upon by saliva, gastric or intestinal juices in the stomach, and one which was not absorbed or secreted by the gastric mucosa. At length the one chosen was a pentose, arabinose. It had the additional advantage that one of us (S.Y.W.) had already published a colorimetric method for estimating it in urine (6), and this method was readily adaptable to the estimation in stomach contents. On the whole the method proved very successful, but it must be admitted that where there is a large amount of bile

present in the samples the method loses its accuracy and in some cases it becomes impossible to estimate the dilution in this manner at all.

The method used by us was as follows:—A small amount of the original meal was reserved each time for the preparation of the standard; this and samples of the stomach contents withdrawn at the different intervals were centrifuged to free them from suspended matter. 1 c.c. of each centrifuged sample was accurately measured and transfered into a large, clean, dry boiling tube (200 × 20 m.m.) graduated at 25 c.c., and each boiling tube was labelled according to the sample it contained. To each tube was then added from a 50 c.c. burette 5 c.c. of a 0.3% orcinol solution in glacial acetic acid, and from a 25 c.c. burette 1 c.c. of concentrated hydrochloric acid containing 0.1% $FeCl_3$. The tubes were then arranged in a circular copper rack specially made for the purpose, and the rack then placed in a bath of boiling water. The boiling tubes were kept in the boiling water for about ten minutes or until enough colour developed (the time needed for the development of sufficient colour varies with different samples, but as long as all the samples and the standard are boiled under the same conditions for the same length of time, no error is introduced) and the rack was then removed to a bath of cold water and the tubes brought to room temperature. The volume was now made up to the 25 c.c. mark by the addition of glacial acetic acid, and the contents of each tube thoroughly mixed by shaking. The colours were then compared in a Dubosq colorimeter, the standard in each case being set at any convenient level.

Owing to the gradual increase in dilution in succeeding samples, it was found that more accurate results were obtained by using each sample as the standard for its successor, the first sample therefore being the only one necessarily actually compared with the original standard. The dilution of the pentose in the original meal was taken as 1.00 and the dilution of each other sample expressed as the volume of that sample which contained the same amount of pentose as 1 c.c. of the original meal.

The reagents required are, (*a*) Orcinol solution and (*b*) Special hydrochloric acid.

(*a*) This is made by dissolving 0.6 gm. of the pure substance in 200 c.c. of glacial acetic acid to make a 0.3% solution. This solution keeps well in a glass-stoppered bottle for over two months without deterioration.

(*b*) This solution is simply a 0.1 per cent. solution of ferric chloride in concentrated hydrochloric acid.

Before use, this method was submitted to accuracy tests, and it was found to be accurate within 1%.

*$CO_2$ and Bicarbonates.*—These were measured by Van Slyke's method, the samples being obtained by means of the apparatus designed by MacLean and Griffiths (3). In our work however we modified the apparatus and procedure slightly, and as some of our conclusions depend very largely on these estimations, a close scrutiny of this part of the work is necessary.

In order to ensure that the percentage of $CO_2$ in the gastric contents is determined as accurately as possible, it is imperative that every drop of the fluid that has had access to the apparatus during the withdrawal from the stomach tube, should be passed over into the centrifuge tube C and measured. When for instance 6 c.c. of

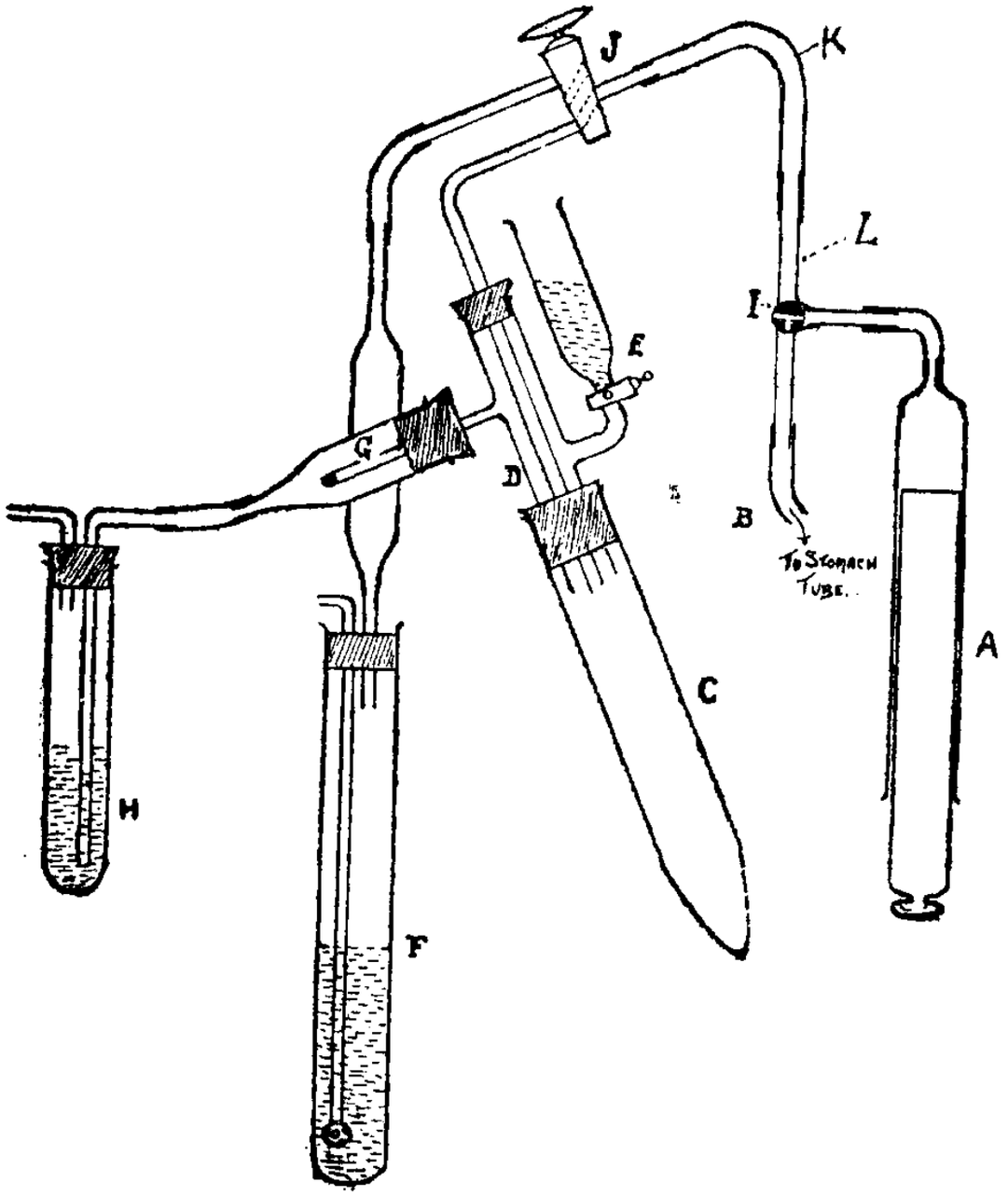


Fig. 1. Apparatus for obtaining samples of gastric fluid without loss of $CO_2$, being a slight modification of that of MacLean and Griffiths, Journal of Physiology, Vol. LXV, 1928, p. 67.

the fluid are withdrawn into the apparatus, each c.c. immediately begins to give off some $CO_2$ gas. All this gas is ultimately measured, but if only 5 c.c. of the fluid are passed over into the centrifuge tube C and measured, the calculated percentage of $CO_2$ gas is too high. By using the ingenious apparatus designed by MacLean, practically no $CO_2$ can escape determination, but we always found great difficulty in preventing some fluid form remaining in the bottom of the glass tube L near I (see the diagram of MacLean). We overcame this difficulty by placing at I (see fig. 1) a three way stopcock. The lower vertical exit from this stopcock was connected to the stomach tube B, while the middle or horizontal exit was connected by a piece of rubber tubing to the syringe A. By means of the upper vertical exit the stopcock and its attachments mentioned above were connected to the rest of the apparatus by another piece of rubber tubing K. The advantage of this was that the stopcock and its attachments could be unclamped from the retortstand supporting them, and raised above the level of J, thus considerably facilitating the emptying of the tube L. Furthermore the whole apparatus was arranged with a slight tilt as shown in the figure, thus further facilitating the complete drainage of the contents into the tube C.

By means of these methods the maximum amount of fluid which had passed through the stopcock I from B was able to be collected in C and measured.

In addition, $CO_2$ gas is very readily given off from solution on the reduction of pressure such as is brought about in the stomach tube during the withdrawal of the syringe plunger. The first sample thus brought over would tend to give inaccurate results for the $CO_2$. We tried to overcome this by using the following technique in every case where the carbon dioxide and bicarbonates were to be measured. The apparatus was first of all filled with $CO_2$-free air by bubbling the air through the tube F containing 40% NaOH; this was done according to the instructions given by MacLean. A glass syringe was now attached to the end of the stomach tube in the ordinary manner and a sample withdrawn. The stomach tube was immediately clipped near the end and the syringe detached so that its contents could be discharged into a marked centrifuge tube and used for the estimations of acids, chlorides, mucus, starch, blood and bile. It will be seen that at this stage the stomach tube is full of gastric fluid, but since none of this fluid has been exposed to the lowered pressure in the emptying tube or syringe, its $CO_2$ content has not been altered. The end of the tube was then attached to the apparatus at B, unclipped, and the fluid withdrawn into the syringe A which was left permanently attached to the $CO_2$ apparatus.

During this procedure the stopcock I was turned so that the syringe communicated with the stomach tube only. The stopcock

was now turned through 180 degrees so that the syringe was connected with the apparatus and cut off from the stomach tube. L was then unclipped and raised above the level of J and the fluid gently forced along to the tube C. The cock at J was now turned through 180 degrees and $CO_2$-free air drawn into the syringe; J was again turned through 180 degrees and the plunger of the syringe forced home steadily, the air being passed into the centrifuge tube C along with any fluid remaining in the apparatus at L. From C the air passes out of the apparatus via G and H in which latter tube it bubbles through 5 c.c. of N/2 NaOH where the $CO_2$ gas is caught and afterwards measured in the Van Slyke apparatus.

*Description of apparatus.*—(For a complete and detailed description of the apparatus, the original article of MacLean and Griffiths (3) should be consulted). A is an all-glass syringe attached to the horizontal limb of a three-way stopcock I, the lower vertical limb B being attached to the stomach tube, and the upper limb L by a rubber tube K to a double way stopcock J. Through J the tube L may be made to connect to the centrifuge tube C by means of a glass tube D of large bore. To one side of D is joined a reservoir containing paraffin oil which, by means of a tap, may be allowed to pass down into the centrifuge tube C. From the other side of D passes a glass tube with a Bunsen valve G, and this is connected as shown in the figure so that the air passing out of G bubbles through 5 c.c. of N/2 sodium hydroxide contained in the tube H.

The other passage from J is connected with a tube F containing 10 c.c. of 40% caustic soda in such a way that outside air entering the apparatus through J must first of all bubble through the caustic soda in F and thus be deprived of the $CO_2$ it contains.

*Methods of expressing results.*—In the case of the acids, the results were expressed as the number of c.c. of N/10 NaOH required to neutralise the acid contained in 100 c.c. of gastric juice, while the chlorides were expressed as the number of c.c. of N/10 chloride estimated as sodium chloride contained in 100 c.c. of gastric juice.

For the dilution, as explained above, the amount of pentose contained in a convenient volume of the given meal (usually 1 c.c.) was taken as the standard, and the volume of the sample which contained the same amount of the pentose was estimated; the dilution was expressed as the ratio of the estimated volume of the sample to the volume of the standard taken.

The $CO_2$ measured was the free $CC_2$ gas in the volume of the gastric juice passed into the centrifuge tube C, and was expressed as the number of c.c. at normal temperature and pressure calculated to be contained in 100 c.c. of the gastric juice.

The bicarbonate was expressed as the number of c.c. of $CO_2$ at normal temperature and pressure existing as bicarbonate in 100 c.c. of the gastric juice.

*Summary.*

1. Methods of routine fractional test meal analyses are described.

2. A method is described for estimating the amount of dilution which food undergoes in the stomach owing to the addition of digestive juices.

3. A method of double test meal investigation is described.

4. A slight modification of the method of MacLean and Griffiths for measuring the $CO_2$ and bicarbonate in the stomach contents is described.

5. The method of expressing the results of the various chemical analyses is given.

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We should like to place on record our thanks to the invaluable help rendered to us by Mr. D. F. Davies, B.A., Lecturer in Physics, who was responsible for most of the manufacture of the $CO_2$ apparatus.

# Review of Books

"*Rose & Carless' Manual of Surgery Thirteenth Edition 1930*," by Cecil P. G. Wakely and John B. Hunter, Bailliere Tindall & Cox.

Pages 1592 plus a 20 page radiographical supplement.

This volume measures 6½" x 9½" x 2¾" and weighs 6½ oz., and stays open very easily at any page. It is therefore by no means unweildly.

Surgery is continually advancing, usually the progress is especially marked a few sections at a time. These new editions of text books are thus not only fresh presentations of the science and act of surgery for the medical student, but they are also stock-takings of current surgical knowledge. Mr. Wakely writes in his preface, "It has "been my endeavour to bring the text completely up to date, and "the modern use of radium in the treatment of malignant disease "has received due recognition. The injection treatment of varicose "veins and haemorrhoids, the Winnett Orr treatment of compound "fractures and the tannic acid treatment of burns, are a few of the "new subjects which have been incorporated."

There are 664 illustrations and 19 coloured plates. These are all excellent and they show common conditions and are not illustrations of museum rarities, which are unsuitable in a general text book but which have from time to time appeared in students's manuals. We should have liked to have seen a list of illustrations and plates but failed to find one.

There is a radiographic supplement of 43 figures: if this is to include rare diseases such as Madelurig's deformity, apophysitis of the calcaneus and Kohler's disease the number of these figures should be increased.

The section on diseases of the appendix strikes us as unusually sensible. There is only the slightest reference to the condition of duodenal ileus.

The index is good.

We can strongly recommend this volume as the most up-to-date standard text book for students.

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"*Demonstrations of Physical Signs in Clinical Surgery*," by Hamilton Bailey, John Wright & Sons Ltd., Simpkin Marshall Ltd., Bristol, London.

Page 256, 306 illustrations, 1930.

This excellent little book should be in the hands of every surgical ward clerk and dresser as it is a stimulus and a guide to case taking

and we might add that it should be read by every student who is approaching his final clinical examination in surgery. The print is large and readable, the pictures very numerous, clear and to the point.

One hesitates to criticise where there is so much that is good, but it may be said that one would like to see the addition of a chapter on the chest. Other small points that have occurred to the reviewer in reading this work are as follows:—

1. The expansile impulse in varicose veins below the knee on coughing is a sign which is not only valuable for diagnosis but is also an argument for excision of the greater saphenous vein in the thigh as the essential measure in treatment in preference to injections or excisions below the knee.
2. Paralysis of the glossopharyngeal nerve can be tested for by seeing if the patient feels the touch of a bent probe on the posterior one-third of the tongue. One therefore disagrees with the statement on p. 57 that this nerve "cannot be tested."
3. The application of a glass slide to the sufface of a tongue lesion shows epithelial thickening by the whiteness induced.
4. The emptying of a cystic hygroma by steady pressure is a point worth recording as it serves to distinguish this tumour from a lipoma which it otherwise resembles.
5. The value of pallor of finger nails in distinguishing nerve shock from collapse due to haemorrhage might be further emphasised.

Notwithstanding these small points we can have nothing but praise for this work.

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"*The Treatment of Chronic Arthritis*," by A. H. Douthwaite, M.D., F.R.C.P. Modern Treatment Series. Jonathan Cape. London, 5/- Net.

Of the many editions of "The Modern Treatment Series" one of the best is "The Treatment of Chronic Arthritis by Dr. A. H. Douthwaite.

To the general practitioner "Chronic Arthritis" is a most unsatisfactory condition to treat. From the numerous and elaborate writings on this subject it has always been difficult for him to find a reliable and practical guide of how best to deal with cases of Chronic Arthritis.

In his useful small book Dr. Douthwaite has very rightly avoided discussion on the extremely varied conceptions of his subject. He commences with short notes on the Pathology of Osteo-arthritis, Rheumatoid Arthritis, Infective Arthritis and Gout.

The Clinical features and treatment of each condition are sparately given in a short concise manner. In treatment the general practitioner will find just what he needs—practical hints which are of proved value.

Dr. Douthwaite has produced an extremely useful short review in which the practising physician will find much real help in dealing with a very difficult condition.

W. G.

# Acknowledgments.

We beg to acknowledge with thanks the receipt of the following contemporaries :—

St. Mary's Hospital Gazette.

St. Bartholomew's Hospital Journal.

Manchester University Medical School Gazette.

The Hospital.

The Medical Times.

The Post Graduate Medical Journal.

The Queen's Medical Magazine.

The Birmingham Medical Review.

The Medical Journal of Australia.

University College Hospital Magazine.

Acta Physchiatrica Et Neurologica.

The Journal of Bone & Joint Surgery.

Cornell University Medical Bulletin.

Bulletin of The New York Academy of Medicine.

The Malayan Medical Journal.

The Japan Medical World.

The Tohoku Journal of Experimental Medicine.

Kyoto-Ikadaigaku-Zasshi.

Okayama-Igakkai-Zasshi.

Chiba-Igakukwai-Zasshi.

Idex Universalis.

The Japanese Journal of Experimental Medicine.

Instituto Medico Sucre.—Bolivia.

Chinesische Zeitschrkft Fur Die Gesamte Medizin.

Diagnose and Therapie.

Lingnan Science Journal.

The Institute for Med. Research F.M.S.—Bulletins.

Journal of the British Social Hygiene Council, Inc.

Juventud Medica Hondurena—Sociedad del Mismo. Nombre Tegucigalpa Honduras, C.A.

Taiwan Igakkai Zasshi.

La Universidad. San Salvador.