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*RADIUM, ITS HISTORY, PHYSICS SOURCE AND ACTION.

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The public interest aroused by the announcement of the discovery of X-Rays by Professor Rœntgen in 1895, familiarised the scientific world for the first time with a type of radiation that was capable of penetrating objects opaque to light. The interest of this announcement was at its height when the news of another discovery came from the continent, this time from France, and that was the discovery that certain substances possessing the power of radio-activity were also capable of penetrating objects opaque to light. This discovery, though not at the time attracting any popular interest, was however a discovery of great importance, namely the discovery of radio-activity which led to the discovery of radium and radium salts.

On February 24th 1896 Becquerel communicated to the Acadamie des Sciences his observation that salts of uranium could affect a photographic plate in the same way as ordinary sunlight even if the photograph was enclosed in light proof paper which completely separated the sensitive film from the uranium salt. In the first instance a flourescent uranium compound, potassium-Uranyl sulphate was used, and it was thought that the phenomenon was in some way associated was flourescence. Further experiments however demonstrated that this was not the case and that non-flourescent uranium compounds exhibited the same property which was subsequently shewn to be possessed by metallic uranium itself.

Exactly 14 days after Becquerel's first announcement he reported that the uranium salts with which he had been working could, in

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addition to acting upon a photographic plate, cause the discharge of a gold-leaf electroscope. If these discoveries made but comparatively little impression upon the general public this was by no means the case with the scientific world and the attention of physicists and chemists was promptly aroused to the investigation of the new phenomena. From a purely scientific standpoint the discovery was even more remarkable than Rœntgen's since in the case of X-rays there was a physical source of energy in the electrical apparatus to which the Crookes tube was connected while in that of radio-activity these extraordinary properties were located in an apparently inert substance.

Soon after the announcement of Becquerel's discoveries Schmidt and M. Curie found that thorium, like uranium, possessed the property of acting upon a photographic plate and causing the discharge of an electroscope. They then initiated a series of investigations upon the properties of minerals in which uranium and thorium occurred.

We will only deal here with the experiments upon minerals of which uranium was a constituent since it was as a consequence of this work that the discovery of radium was afterwards achieved. The researches were mainly carried out by the electric method and before they had been long in progress a further new and extraordinary fact emerged. Samples of a uranium ore called pitchblende from the mines in Austria were found to be at least four times as active as uranium itself. Further investigations shewed a similar anomaly in the case of other natural ores of uranium. Artificially prepared compounds and mixtures with apparently the same chemical composition as the natural ores did not show this hyperactivity but exhibited photographic and electrical properties in accordance with the amount of uranium they contained. The conclusion obviously followed that the natural products contained some very highly active "impurity" and to the tracking down and isolation of this "impurity" Professor and Madame Curie devoted themselves.

The Austrian Government placed at their disposal about 1 ton of the uranium residues from the Joachimsthal mines. These residues which had been left after the extraction of uranium from the natural mineral pitchblende consisted mainly of the sulphates of lead and calcium together with a great variety of other compounds and were found to be extraordinarily radio-active. Clearly as most of the uranium originally contained in the native ore had already been extracted the marked radio-activities could not be attributed to the uranium and the way was open for dealing with the highly active "impurity" which Professor and Madame Curie eventually isolated and named "Radium." Radium salts were thus first isolated in a pure condition in 1903 and radium element itself was only isolated in 1911.

The discovery of radium salts on account of their furnishing an extraordinarily intense source of radiations gave great impetus to the study of radio-activity and it was soon apparent that the radiations far from being homogeneous differed markedly as regards their penetrating power. Later they were found to fall into three distinct groups of which the second group was broadly about 100 times as penetrating as the first, and the third about 100 times as penetrating as the second. The ratio of the penetrating powers of these three groups thus being roughly 1, 100, 10,000 or over. Rutherford gave the name of Alpha, Beta and Gamma rays to these three groups respectively. As will be seen directly they differ fundamentally not only in their penetrating powers but in their very nature.

Radio-Activity.

It is difficult to give a complete definition of radio-activity and this is the best one that I have seen.

Radio-activity is defined as the spontaneous disintegration of an element in the process of which the atomic nucleus ejects helium nuclei or single negative particles or both together. In many cases the process is accompanied by the emission of radiation. It is these products referred to that are described by Rutherford as Alpha Beta and Gamma rays. Radio-active bodies are thus a spontaneous source of energy a fraction of which is localised in these rays.

Radium.

This is a brief description of what radium is:—

Radium is a rare radio-active chemical element with a symbol Ra, belonging to the group of alkali earth metals which comprises the elements barium, strontium, calcium and magnesium. As a disintegration product of uranium radium is never found in a natural state apart from its parent element. They always occur together geologically in the definite ratio of 1 part of radium to each 3,400,000 parts of uranium. Uranium has been found to exist in a number of different ores such as pitchblende, carnotite, uraninite, autunite and the richest deposits now being worked in the Belgian Congo consist of veins of pitchblende, gummite, curite, torbernite and kasolite.

The atomic weight of radium is 226 as compared with lead which is 207.2. Its chemical behaviour is identical with that of barium forming a series of analagous salts, bromide, chloride, sulphate, carbonate, etc. In its metallic state radium is a pure white metal, photographs can be taken from the radiations emitted from it but it is never used in that form because it changes quickly when exposed to air and reacts with water decomposing it into hydrogen and oxygen with the production of radium hydroxide, hence it is always prepared and used for therapeutic purposes in the form of radium salts.

Alpha, Beta and Gamma Rays.

1. The Alpha rays or particles.

These are the most easily absorbed of all the radiations from radium, being stopped by a sheet of paper or a few centimetres of air. They strongly affect a photographic plate, have marked electrical properties and are able to cause flourescence. These Alpha particles are shot out with enormous velocity at 18,000 miles per second and although small it must be remembered that they have atomic dimensions and 1 grm. of radium gives off 37 thousand million helium particles every second. They represent about 92% of the total energy of radio-active bodies. The initial velocity of a bullet fired from a modern rifle is somewhere about 2,000 feet per second, so that these Alpha particles are being shot out from the radium, hundreds of times quicker than the highest velocity of any material hitherto known either in the earth or space, which position had hitherto been held by certain shooting stars with velocities from 30 to 40 miles per second.

In view of this fact it is not surprising that the Alpha particle is the most powerful object relative to its size yet known to science. It was by its means that Rutherford was able in 1919 actually to disrupt the nitrogen atom with the liberation of the hydrogen atom, thus the alchemists dream came true, but not in the direction he expected.

2. *The Beta Rays or Particles.*

To this second type of radiation which is about 100 times as penetrating as the alpha type, Rutherford gives the name Beta rays. These as already mentioned consist of atomic particles of negative electricity and each has a mass about 1/1850 of that of a hydrogen atom. They are therefore similar to the particles forming the cathode stream but the Beta particles from a radio-active body have higher velocities than we are able to obtain in the X-ray tube. These negative electrons have a velocity varying from 60,000 to 180,000 miles per second. Beta rays are readily deflected by a magnetic field and have marked action on the photographic plate but their electrical effects are less pronounced than those of the Alpha rays.

3. *The Gamma Rays.*

These are the most penetrating of the three types of radiation referred to, about 100 times as penetrating as Beta rays and are called Gamma rays, and are the rays that are mostly used for the treatment and cure of disease. They are identical in character with the X-rays and are not deviated by the magnetic field. They are never emitted alone by any radio-active substance but always together with Beta rays. Unlike Alpha and Beta rays which are material particles Gamma rays are high frequency vibrations. They travel at the rate of 186,000 miles per second which is the speed of light. When passing through

the tissues of the body the Gamma rays give rise to secondary Beta rays which possess therapeutic value but which may also cause burns.

Radium Emanation (Radon).

In addition to the three types of radiation Alpha, Beta and Gamma emitted by Radium it also gives off a heavy radio-active gas known as radium emanation or radon. This radium emanation is a heavy gas belonging to the helium-argon group. Like all the rest of the members of the group it does not form compounds, but unlike the rest of the members of the group it is intensely radio-active. It is well to emphasise that the term radium emanation or radon is the name of this one particular gas and of none other, otherwise much confusion may be caused.

It has been previously stated that the radio-activity of radium is due to the spontaneous disintegration of the radium atom. Just as radium is a disintegration product of uranium so radium in its process of decay forms a series of subsidiary substances, the first of which is known as radium emanation or radon.

This emanation is a comparatively short lived gas, its growth and decay proceed at a precisely equal rate, both processes being completed in a cycle of 30 days. During the first 24 hours after purification radium emanation loses approximately at least 16% of its radio-activity in 3.58 days it loses ½ and in 8.8 days 4/5 of its radio activity. Radium emanation is greatly used especially in America in treating disease. It has the following advantages:—

1. Security.—There is little danger of loss through accident, fire or theft as the radium is kept in a safe and the gas obtain therefrom by means of a tube passing through the safe wall.

2. Small monetary value of the capillary glass tubes with the contained emanation.

It has however the following disadvantages:—

1. Specially trained technicians are necessary. The collection and purification necessitate intimate knowledge of the physics of radium and the emanation cannot be worked except by a skilled technician.

2. The collection of the radom or gas is the most dangerous as regards the operator of all radium work.

3. Short life.—Modern technique more and more calls for lengthy applications and the rapid disintegration of the emanation offers a very serious objection to its use, in so far as the resulting radiation is not constant in intensity. Emanation is now only used in small number of large Hospitals which have at their disposal considerable quantities of radium and the present day tendency is to prefer the use of radium salt to emanation except for research work.

Present Sources of Radium.

Up to the end of the year 1922 about 4/5 of the world's total production of radium was produced in the United States from American ores. Since then however the Belgian output is consistently increasing until now 95% of the worlds demand is supplied from Belgium. The best pitchblende or uranium radium ore is found in the Belgian Congo and this ore is first packed in sacks at the mine and then conveyed overland a distance of 1,600 miles to Beira whence it is shipped to the reduction plants at Colen in Belgium. The treatment consists in grinding the ore to a suitable degree of fineness and leaching the ground ore with acids to bring the radium into a form in which separation from the other metals may be readily accomplished. It then goes through a very complicated and difficult chemical dissolution and chrystalisation requiring accurate chemical control at every stage of the process especially the final series of fractional chrystalisations. The final product very often practically pure radium bromide had to be separated by this complicated process from several million times its own weight in ore. No other chemical process can compare with this extraordinarily fine concentration. To produce 1 gm. that is 15.432 grains of radium, it requires 500 tons of ore treated with 250 tons of chemicals and the ore has got to be brought all the way from the Belgian Congo to Belgium. That is one of the chief reasons why radium is so expensive. It is however only 60% of the cost in 1922 as the Belgian ore contains so much more radium and that is why the other factories in America, Austria and Germany could no longer compete commercially. There is one factory working still in England called the South Terras Mine, which is situated on the summit of a hill in Cornwall on the Great Western Main line and it is thought that this factory will be able to produce radium at the same price as that produced in Belgium.

General Principles of Radium Therapy.

The effect of irradiation of tissues is at present imperfectly understood. From histological studies of irradiated tissues it has been recognised from the earliest days of radium therapy that cells in mitosis are more sensitive to irradiation than cells at rest. Dominici shewed as early as 1907 that cells are more sensitive to irradiation the more nearly they approach the embryonic state. Other investigators have shewn that the chromatine is the part of a cell most sensitive to irradiation. These and other studies demonstrated that different cellular organs respond differently to the same dose of irradiation. A definite law has now been established which is that the sensitivity of cells to irradiation is in direct proportion to the reproductive activity of the cells. The action of radium on cells or tissues may be summarised as follows:

1. *Excitation of Activity.*—Numerous experiments by different workers during the last 20 years have given such contradictory results that it cannot at present be asserted or denied that radium, even in very small doses, produces an excitatory effect on tissue or stimulates growth.

2. *Inhibition of Activity.*—This has been established quite definitely both by histological studies of irradiated tissues and by observation on tissue culture in vitro, it finds also proof in various clinical manifestations.

3. *Destruction of Tissue.*—This was the first known effect of radium on tissues. Becquerel when investigating the properties of radium carried a small amount about in his pocket and later produced a very severe burn on his own body near that area. From this it was shewn the possibilities of irradiation and has gradually led to the present radium therapy. This destructive action of radium is subdivided by Regaud into 2 types, the diffuse cytocaustic action and selective cytolethal action. The first of these is really a radium burn and is obtained by the action on the tissues of feebly penetrating rays acting a sufficiently long time. It is a lesion producing necrosis of all tissues affected without any selectivity. The second or cytolethal action is obtained from an equal quantity of radium provided that by means of suitable screenage, rays of greater penetrating power alone are used. The screenage arrests alpha and beta rays and the effect obtained by gamma irradiation is essentially selective. It affects certain cells whilst others appear to be immune from it. It is not limited to the surface of the irradiated area but extends deeply into the tissues.

Effect of Radium on the Skin.

1. Erythema.—When a sufficiently big dose of gamma rays has been administered to the skin a series of changes is observed. After 3 or 4 days the irradiated area becomes red and a sensation of heat and irritation is experienced that is known as the erythema dose and is used as a basis for doses by radiologists. In practice however it is found that in the treatment of a malignant growth by surface application the erythema dose is not sufficient to produce the optimum results and a larger dose is compatible with safety. The erythema is generally followed by pigmentation and epilation.

2. Peeling dose.—If irradiation is prolonged beyond the stage of erythema the skin becomes darker, deep red or purple in colour, and on the 10th day blisters appear and this is followed by peeling. About the 15th day the superficial layers of the skin have fallen off leaving a moist smooth pinkish grey surface in places covered with fibrin but never oozing blood. Regaud calls this reaction acute selective radio-dermatitis. Its use is an index of dosage for radium. The skin heals fairly rapidly in from 2 to 4 weeks according to the

extent of peeling by peripheral proliferation of epithelium which gradually covers the raw surface. The skin when healed is pink, soft and healthy and the whole process is painless. To obtain this reaction with impunity it is essential to irradiate the tissues very slowly at a minimum distance of 15 mm. from the skin and to screen the radium sufficiently to cut off all the alpha and beta rays.

3. Radium burn.—If a considerable dose of irradiation by means of insufficiently screened radium is administered rapidly a very acute reaction results. At the end of the third day the skin becomes red œdematous and painful blisters form rapidly, and when peeling follows the surface exposed is grey or green, œdema and pain increases and a slough forms which takes months to separate. This is spoken of as radium necrosis. It is due to faulty technique and ought never to happen. The ulcer which follows the suppuration of the slough takes months or even years to heal.

Effect of Irradiation on Malignant Cells.

We all know malignant tumours are characterised by rapid development of their cells which in certain characteristics resemble those of embryonic tissue. They respond to irradiation more rapidly than normal, cells, the higher the degree of differentiation of a cell the more sensitive it is to irradiation. Very complete histological investigations in cases of cancer of the cervix uteri treated by radium have been carried out in many places. These investigations shew that mitosis disappears immediately after irradiation but reappears a few days later in abnormal forms. The following abnormalities are noted:—Irregularity in the arrangement of chromosomes, disorganisation of the spindle, multipolar division. This abnormal activity ceases about the 6th day and is followed by disintegration of the cell. Canti's cinema film shows better than any description the arrest of mitosis produced by radium in normal and malignant cells.

Effect of Irradiation on the Stroma.

The stroma plays an important part in the response of the tumour to irradiation. It has been shown by histological study of irradiated malignant growths that the stroma is a restricting influence on the proliferation of cells. Three types of reaction have been described:—

1. *Efficient Reaction.*—This is characterised by the presence of normal blood vessels, the appearance of plasma cells and fibroblasts and the disappearance of small round cells. This terminates in fibrosis.

2. *Deficient Reaction.*—This is characterised by œdema of the stroma, the presence of polynuclear neutrophil cells and abnormally thin blood vessels.

3. *Indifferent Reaction.*—This is usually a mixed histological picture containing features of No. 1 and No. 2. The conclusion has

been drawn that the response of the tumour to irradiation depends not only on the effect on the cells but equally on the effect on the stroma. A good result may be expected in those cases where disappearance of mitosis and cellular disintegration is unaccompanied by changes in the stroma. A bad result may be expected if the stroma is affected although the cells remain unchanged. It is not possible to give an accurate prognosis in cases where the disappearance of cells is accompanied by marked changes in the stroma. Later observations on biopsies in cases of lingual cancer support these views and the prognosis is found to be bad in cases where the tissues are œdematous.

Methods of Irradiation.

The object of Radium treatment is to administer a lethal dose to each cell of the tumour. A sub-lethal dose produces inhibition of the growth for various periods of time, often as long as 2½ years. The difficulty of course is to give every cell comprising the neoplasm a lethal dose and tumours of large size and in certain positions present very special difficulties.

Four methods are usually employed:—

1. *Cavitary Method.*—This is applicable in certain cases of oral rectal or vaginal cancer. The radium is introduced through the natural opening and maintained in position by various forms of holders.

2. *Interstitial Irradiation.*—This method consists in the introduction of radium needles or tubes or radon seeds suitably screened preferably by platinum around and into the tumour. It is most suitable for those growths which are of small size and easily accessible to manipulation. The use of platinum needles of suitable length and strength and provided with trocar points and eyelets has become the method of choice for treatment of lesions of the tongue, floor of the mouth and certain types of cancer of the breast and of secondary nodules after amputation of the breast. The needles are held in position by means of sutures or ligatures and are retained for periods of 10 days or even more and are withdrawn at the end of the treatment by the thread attached to the eyelet. The advantages of this method in suitable cases are (1) possibility of calculating the dose carefully and accurately (2) homogeneous irradiation (3) prolongation of period of irradiation.

3. *Surface Application.*—By surface application is meant the application of radium at a short distance from the skin. The method of applying radium directly to the skin has been discarded because the cutaneous reaction occurs before the optimum doses of irradiation to the underlying growth has been given. In some hospitals 15 mm. is the standard distance, in others 30 mm. and in still others 1 cm. The substance employed for this method is called Columbia Paste and consists of bees-wax, hard paraffin and fine sawdust. It possesses the following advantages:—

(a) It does not give rise to secondary radiations.

(b) It gives a diffuse superficial distribution of the rays which is homogeneous.

(c) It is easily malleable at a temperature which is tolerated by the skin and is sufficiently hard at body temperature to keep its shape.

(d) It is easily kept clean and is fairly light in weight.

This method is eminently suitable to cervical secondary deposits, carcinoma of the breast, mediastinal or pulmonary new growths, brain tumours and intra-abdominal neoplasms. Surface application has enormously extended the field of usefulness of radium therapy. It is however a wasteful form of applying radium as a great deal of irradiation is lost, but it possesses many advantages. It requires no anæsthetic or operative procedure except in certain cases of pharangeal growth and in cerebral cases. It can be prolonged for a sufficiently long period to give the biggest possible dose to tumours situated deeply and large areas can be irradiated at the same time.

4. *Distance Irradiation.*—This method is in use in Brussels and Paris, London and certain places in America and uses large quantities of radium, as much as 5 or 7 gm. at a distance of 10 cm. or more from the skin. The patient receives 2 to 3 hours of irradiation daily for a period of 2 to 3 weeks and multiple ports of entry are made use of so as to minimise the quantities of rays absorbed by any one area of skin. It has the following advantages:—

(a) Greater penetration of the rays is obtained.

(b) Dosage can be increased very considerably without damage to normal tissues.

(c) Treatment can be divided into daily sittings of shorter duration.

(d) The total treatment can be spread over longer periods of time.

The disadvantages of the method are economical only, namely enormous expense for the acquisition of enough radium to make a bomb and the installation of a special room and apparatus to use it. It is claimed however that the method has given results which outweigh all consideration of cost.

.I would like here to remind you, and I always like the opportunity of doing so, wherever I go, that though radium still produces a beneficial result in advanced cases of cancer it is just as important in radium therapy as in Surgery to get the cases early. The earlier you get the case the more likely is the chance of a cure, as for example 70% free

from all symptoms of cancer of the cervix in the early cases after five years as against 40% still free from symptoms in the little more advanced groups.

For years Surgeons have been preaching, and rightly so, that from a surgical standpoint it is the early cases only that can be really benefitted by surgery and the same gospel is being preached as regards radium. Radium treatment is not to be looked upon as a last resort in hopeless cases when no other means of treatment are available but is to be looked upon as the most powerful weapon at our command in fighting cancer in the early stages.

I am not going to deal this afternoon with the general question of Radium Therapy, but for the benefit of those who have not heard the recent views as to the value of radium in treating cancer I would just point out and reaffirm against most strongly that we have in radium a most powerful weapon to fight the enemy of mankind, cancer. It does produce disappearance of the active growth and tumour in many cases and a cessation of symptoms such as pain, hæmorrhage, etc. and in cases where it effects no actual cure there is the prolongation of life in most cases, and further it is able to help many cases that Surgeons would not attempt to operate on. It causes little or no mutilation to the parts treated, there is very little risk of life in most cases in applying it, and it is painless to the patient in most cases, though many needles pushed into the tongue cause discomfort amounting to pain. It obviates the necessity for a prolonged surgical operation that is often much dreaded and especially so by our Chinese patients, and the risk to life during and following some major surgical operation done to cancer is infinitely greater than any form of irradiation with radium.

There are certain sites where radium seems to give very much better results than surgery such as cancer occurring in the face, tonsil, tongue and soft palate, and it is being more and more used in these sites. There are also some non-cancerous conditions that can be treated successfully with radium. Keloids can usually be made to disappear. Many forms of nævi, though the Port Wine Skin stain are not so easy to treat. Fibroids of the uterus are often successfully treated with radium and uterine hæmorrhage whether due to fibroids or to a fibrosis of the uterus or of idiopathic origin, can almost always be completely controlled.

Some skin diseases are also amenable to radium treatment. Blood diseases such as Leukæmia have been treated but reports are rather contradictory. Toxic goitre has also been treated and in some cases reacts well, in others there is no beneficial result.

NOTES ON THE METHODS OF OCULAR EXAMINATION.

By LAW NAI KOEY.

The study of the methods of examination of the eye is of utmost importance and is the only hope for the student ophthalmologist to arrive at his correct diagnosis, (the complications, and sequelæ likely to follow from any particular ailment or wounds). Ocular examination is conducted on different principles employed in ordinary surgical and medical diagnosis. It is only after the diagnosis of the eye disease is made, that the principles of medicine and surgery may help to the institution of successful treatment.

I take for granted that the reader has a good knowledge of anatomy, histology, and physiology of the eye, so that I may proceed with my subject without further revision of them.

Almost nothing will be left out by the observant surgeon if he examines methodically, investigates into the history, and carries out the usual routine examination. Eye diseases can be grouped for the purposes of diagnosis, into 2 divisions :—

1. Ocular diseases with some external evidence of affection in portion of the eye.
2. Ocular diseases with no detectable or visible evidence. This may be subdivided into (*a*) Errors of refraction (*b*) Intraocular diseases.

I. *Examination for Diseases of the Eye with some External Evidence.*

Palpate the supraorbital ridge for any swelling which may be (1) inflammation or tumour, (3) following diseases of the sinuses in the neighbourhood of the orbital cavity or (4) inflammation of the periosteum. Swelling of the interior of the orbit will not allow the finger being passed into the orbit between the margin and the eyeball.

The palpebral fissure ought to be examined for any difference in shape, any paralysis of the obicularis oculi as in facial paralysis, and position of the eye such as squint.

Inflammation of the lacrymal gland is very tender and hence the finger cannot easily be passed between the orbit and the bulbus oculi at the outer side of the upper orbital margin.

Proptosis sometimes may be present. It may be elicited in the following way. Standing behind the patient, the surgeon lifts the upper eye lids with his forefingers and after having asked the patient to look straight in front of him, the surgeon compares the affected eyeball with the normal one to see if there is more projection of the front of the cornea beyond the level of the upper margin of the orbit. If the cornea in the affected eye projects farther than the other, there is proptosis.

Shrinking of the eyeball, or fracture of the lower floor of the orbit will produce enophthalmos, which can be demonstrated by placing the edge of the piece of thick paper against the upper margin of the orbit above and the processus zygomaticus of the maxilla below. Then compare the proximity of the cornea to the edge of the card on the two sides, the existence of enophthalmos can be proved.

When any weakness of the muscles is suspected or when patient complains of "double vision," test the movement of the eyeballs by asking the patient to follow the finger which is moved about through various parts of the field of vision.

Examine carefully with a magnifying lens along the edge of the the lids for any lashes which may be growing inwards and for any signs of inflammation. Ptosis may be an early sign of progressive weakness of the muscles, or it may be a sign of oculo-motor paralysis.

There are two methods in affecting the eversion of the upper lid. (*a*) The two-handed method is carried out thus. Put the thumb of one hand on the upper margin of the orbit, then with the index finger and thumb of the other hand grasp the eyelashes, and by means of them roll the edge of the upper lid over the thumb, whose tip projects beyond the margin on to the eyelid. (*b*) The Single-handed method is the easier way. Ask patient to look down. Use the right hand for the left eye and the left hand for the right eye. Place the tip of the forefinger on the outer third of the upper lid, and the thumb on the outer part of the lower lid. Then push the edge of the lower lid under that of the upper. The thumb is then transferred on to the conjunctival surface of the upper lid. By pulling forewards and rotating the upper lid round the edge of the forefinger, the upper lid becomes everted. The first finger can then be placed on the edge of the conjunctival surface of the upper lid, and by slight pressure against the eyeball, the lid can be kept everted as long as is necessary for a satisfactory examination.

Examination of the conjunctival surface of the lower lid is simple enough; ask patient to look upwards, and place the forefinger on the skin close up to the lashes and pull downwards.

Next examine the lacrymal passages as to their patency. Investigate the punctum, the lacrymal sac and duct and the canaliculi by syringing some water through the punctum into the lacrymal sac and duct, when if the duct is normal, the fluid will pass readily into the floor of the nose and down into the pharynx.

Subconjunctival ecchymosis and local or general injection may be seen at the ocular conjunctiva, which maybe the site—for growths such as pinguicula, pterygium and cysts. Localized or general œdema of the ocular conjunctiva can be demonstrated by pressing the lower

lid up against the eyeball, when the jelly—like appearance of the mucous membrane is more marked. In gonorrhœal conjunctivitis and in orbital diseases, the general œdema of the ocular conjunctiva is an important sign. The ocular conjunctiva is never so much swollen in acute conjunctivitis, although the vessels are fully dilated with scattered hæmorrhages.

Affections of the sclerotic are shown as inflammation, granules and so forth, in different parts though usually near the limbus. They are of purplish colour and the vascularity in these cases is characteristic. The conjunctiva can be moved over it without altering the intensity of the congestion, which shows that it is a deep affair. Thus it is distinguished from purely surface conjunctival affections of a similar nature such as phlyctenular conjunctivitis. The nodules are often very tender. Thinning of the sclera in any part manifests as a dark-coloured patch due to the pigmented choroid visible through the attenuated sclerotic; this is a sign of long standing pressure on the sclerotic which this structure is unable to resist. This is usually found in old glaucomatous eyes.

Ciliary injection consists of a ring of injected ciliary surrounding the limbus or sclera. The cornea, the iris or the ciliary body or all of them may be the sites of inflammation.

The cornea will appear dull in parts or patches where there is an ulceration, or infiltration. Any ulceration or corneal abrasion will be stained a green colour if a drop of 2% solution of fluorescein were to be instilled into the eye, and washed out with a little warm boracic lotion afterwards. If the epithelium is intact, there will be no staining and this proves that whatever flammation is present is situated in the deep strata of the cornea. Then examine the cornea with the corneal magnifying lens under oblique illumination, when additional signs may be found.

The reaction of the pupils to light and accommodation should be tested separately in each eye. In a normal eye, the reaction of the pupil is both direct and consensual and also to accommodation. Cover the eye that is not under examination. A brisk contraction ought to take place whenever light is admitted to the uncovered eye that is under examination; then by uncovering the opposite eye, a further slight contraction ought to occur showing a normal consensual or sympathetic reaction. Then examine the accommodation by getting the patient first to look at distant objects and then a near object. There may be five abnormalities. (1) No direct reaction, but consensual reaction is present. This indicates defective light conduction in the eye and in some sensory tract. (2) No consensual reaction but direct reaction is present. This shows defective light conduction in the opposite eye. (3) Neither direct nor consensual reaction. This means that the pupil is prevented from contracting by adhesions of the iris

and after the use of mydriatics, or that the light conduction on both sides is defective. (4) Reaction to accommodation but not to light. (5) Failing to maintain the contracted iris, when eye is exposed to oblique illumination. This may indicate the onset of optic atrophy, retrobulbar neuritis, glaucoma, detachment or degeneration of the retina, and so forth.

In-equality of the size of the pupils is usually pathological but it is well to remember that it may be congenital. Dilatation of pupil usually means either occulomotor paralysis, or irritation of the cervical sympathetic while contraction points to adhesions the sympathetic or irritation of the 3rd nerve. Inequality of the pupils may be the first sign of optic atrophy, of glaucoma or of degeneration of the retina.

The pupillary border must be observed as to its regularity or position. Old iritic adhesions, glaucoma, and perforations of the cornea may modify the regularity and position of the border of the pupil.

The colour of the iris when compared with that of the other eye should more or less the same as to their colour and pattern, otherwise it is more likely to be pathological than congenital. In iridocyclitis, there is the absorption of the stroma pigment which leads to the loss of pattern and the colour of the iris is lighter; in glioma of the retina, or choroidal inflammatory deposits which are tending to break down in the interior of the eye, the iris is semi-translucent in appearance.

The actual size of the pupil, even though the same in both eyes is important. In syphilitic and tuberculous iritis definite nodules are sometimes seen over the anterior surface of the iris. Gaps in the iris are generally congenital.

The relation of the plane of the iris to the back of the cornea is the depth of the anterior chamber of the eye. This must be noted, since in glaucoma, and physiologically in old people, the anterior chamber is shallower, while a deep anterior chamber indicates probable myopia, old cyclitis, dislocation or absence of the lens.

The presence or absence of a cataract can be ascertained only after the following examination of the lens have been carried out. (1) By oblique illumination (2) By reflected light in the dark room (3) by the direct method of ophthalmoscopy. In the dislocation of the lens, the suspensory ligaments are ruptured. The iris will be tremulous when patient moves the eye, and the anterior chamber will appear to be deeper than normal.

The methods used in looking for opacities in the vitreous are the same as those for the lens, if there is hæmorrhage into the vitreous, it is so full of blood that no red reflex can be seen at all.

II. *Examination for Disease With No External Evidence.*

Under this heading we group those patients who complain of

imperfect sight in one or both eyes and there are no external signs. These may be caused by, as we have mentioned in our early classification of the ocular diseases, (*a*) an error of refraction, or (*b*) some intraocular disease or both.

We must then prove the patient's history regarding his vision by recording the vision in each eye separately with those distance types, and note the sight. Should the patient be unable even to see hand movements, he must be taken into the dark room, and light thrown into the eye from an ophthalmoscopic mirror. If he still cannot perceive the light the vision is recorded as " no perception of light."

The tension of the eye is then taken. The intraocular tension may be taken in terms of millimetres of mercury but to demonstrate this, special apparatus is required and the technique should be only performed by experts. Hence the tactile sensation with the fingers should be cultivated.

Retinoscopy with or without a mydriatic is used to assure that the defective vision is due to a refractive error. The use of homatropine and atropine carries some dangers but one soon learns to withhold it in what circumstances. The approximate correcting glass can be found, and if improvement is great, it is justifiable to assume that the case is one of refractive error alone. The defective sight is cured by wearing appropriately prescribed glasses and the symptoms are relieved.

The examination of the fundus must be carried out in a dark room by means of ophthalmoscopy. Here the student will not be able to diagnose all the diseases of the fundus of the eye unless he has had a year or two special training on ophthalmology. Hence I can only describe the method and I am not going to speak on the differential diagnosis, etc. through the ophthalmoscope.

When light is reflected into the eye from the mirror of the ophthalmoscope, the reflex from the fundus is red in colour, but if in any part of the fundus, one sees a black, grey, yellow or white, one perceives that there is something abnormal in the inner part of the oculus.

There are two methods of using the ophthalmoscope and it may suffice here to mention the two methods rather than to describe them, because one can only be able to manage the ophthalmoscope when one has practiced with it for some considerable time—the two methods are 1. Direct examination and 2 the Indirect. The latter is most useful for obtaining a general idea of the fundus, and in cases of high degree of myopia, as well as when there are blur media. The direct method is used when greater magnification is desired and then the fundus can be examined in more detail, such as for the amount of œdema of the disc in optic neuritis; for the degree of projection forwards in tumours, etc.

Some idea of the field of vision can be obtained with a small white 1 cm. square of white paper mounted on a black holder, while other costly instruments e.g. various forms of scotometer and perimeter are used by the eye-specialists.

Lastly, the projection of light gives some knowledge as to whether the state of the retina, or sometimes, the iris with the pupil has been drawn out of position so that there is no longer any pupillary aperture through which a view of the fundus can be obtained. Reflect light into patient's eye in various directions from an ophthalmoscope or a strong electric hand-torch and then ask patient to show where the source of light comes from. When he is unable to project it, some part of the retina is not functioning and when he is unable to perceive light in a part of the field, then that eye is said to have " no perception of light."

I shall now consider the Rontgenology of the Orbits.

In children they are relatively large as compared with other parts of the body. Normally they are asymmetrical. In taking the profile views of a single orbit, the focal distance should be as short as possible. Absorptive and atrophic alterations of the walls of the orbit, such as circumscribed and diffused hyperostosis of the orbit are the results of inflammation or tumours. Malignant tumours may be recognised only in favourable cases; but osteomata can easily be diagnosed owing to their density. Calcified internal carotid artery had shown in X-Ray pictures as coil-like or horse-shoe form (or in indistinct streaks) which remained unchanged for years. If on taking the X-ray picture of such a case in profile the shadows appear even more distinctly in the sella turcica space. Fractures of the orbit can be seen only in good negatives. In examining orbital margin be sure of recognising the fronto-zygomatic suture and the optic foramen whose average physiological size is about 5.4 m.m. in a male adult. If the optic foramen is too large we may suspect that the tumour has penetrated into the optic canal; while on the other hand, a deformed or a definitely smaller optic foramen may be regarded as the following possibilities—inflammation and disease of the optic nerve, elevation of the skull and atrophy of the optic nerve.

In photographing for metallic splinters in the eyeball, one has to bear in mind that the metallic particles are about 10 times denser than bony fragments.

To locate the foreign body inside the bulbus oculi a profile negative should be taken with changed in the direction of the eye. If the foreign body is inside the bulb two shadows of foreign bodies are then cast on the plate; if it is outside the eyeball only one.

I am much indebted to Dr. S. N. Chau, for his invaluable advice, criticism, and correction of this paper.

CHRONIC SUPPURATIVE FRONTAL SINUS.

Lois Todd.

1931.

Before giving an account of the report of a chronic suppurative frontal sinus, it is desirable to examine the anatomy of these two sinuses. A revision of the anatomical aspects will enable one to appreciate more fully each step taken in the operative treatment of the same.

According to Gray's Anatomy the frontal sinus is rudimentary at birth. Further development takes place soon after birth as an upward prolongation of the frontal recess situated in the middle meatus. After the absorption of the cancellous tissues between the two tables of the frontal bone, the cavity extends backwards, upwards and lateralwards, for a variable distance and later becomes situated behind the supraciliary arch. Between the 7th and 8th year the frontal air sinuses become evident and only reach complete development after puberty.

The two frontal sinuses as we find them, when they are present, in the adults vary in size and shape. Logan Turner gives the following measurements as found in Gray 1. (1926) for an adult sinus of average size: "height, 3.16 cm.; breadth, 2.58 cm.; depth from before backwards, 1.8 cm." These are only average measurements. In fact they vary in size in different persons and are larger in men than in women. According to the observations of the Surgical Department of this University, it seems that the average Chinese adult frontal sinus is smaller than that of the European. Thus there appears to be a racial difference in the size of these sinuses as well as individual.

Gray's Anatomy described the shape of the two frontal sinuses as "irregular cavities," separated by a thin bony septum which often deviates from the mid line and Logan Turner depicted the same as "somewhat pyramidal." The latter did not mention the situation of the vertices of these pyramidal cavities. It seems that the only solution for this difficulty is to make a study from real specimens. But time is not at the writer's disposal, and the following description is that of one specimen only. Therefore any generalization is impossible.

With the kind permission of Professor Shellshear of the Anatomy Department and Professor Digby of the Surgical Department, a skull and instruments were obtained for the investigation of the frontal and maxillary sinuses. Advantage was taken of the approximate surface marking of the frontal sinuses. To mark out the position, three points are taken: one at the nasion, a second in the middle line 3 cm. above the nasion, and a third at the junction of the lateral with the intermediate one-third of the supra-orbital margin. Since the Chinese frontal sinuses seem to be smaller, with a gouge and mallet a small opening was made about 1 cm. above the nasion and ½ cm. lateral to the mid line. This point fell on the medial end of the supraciliary

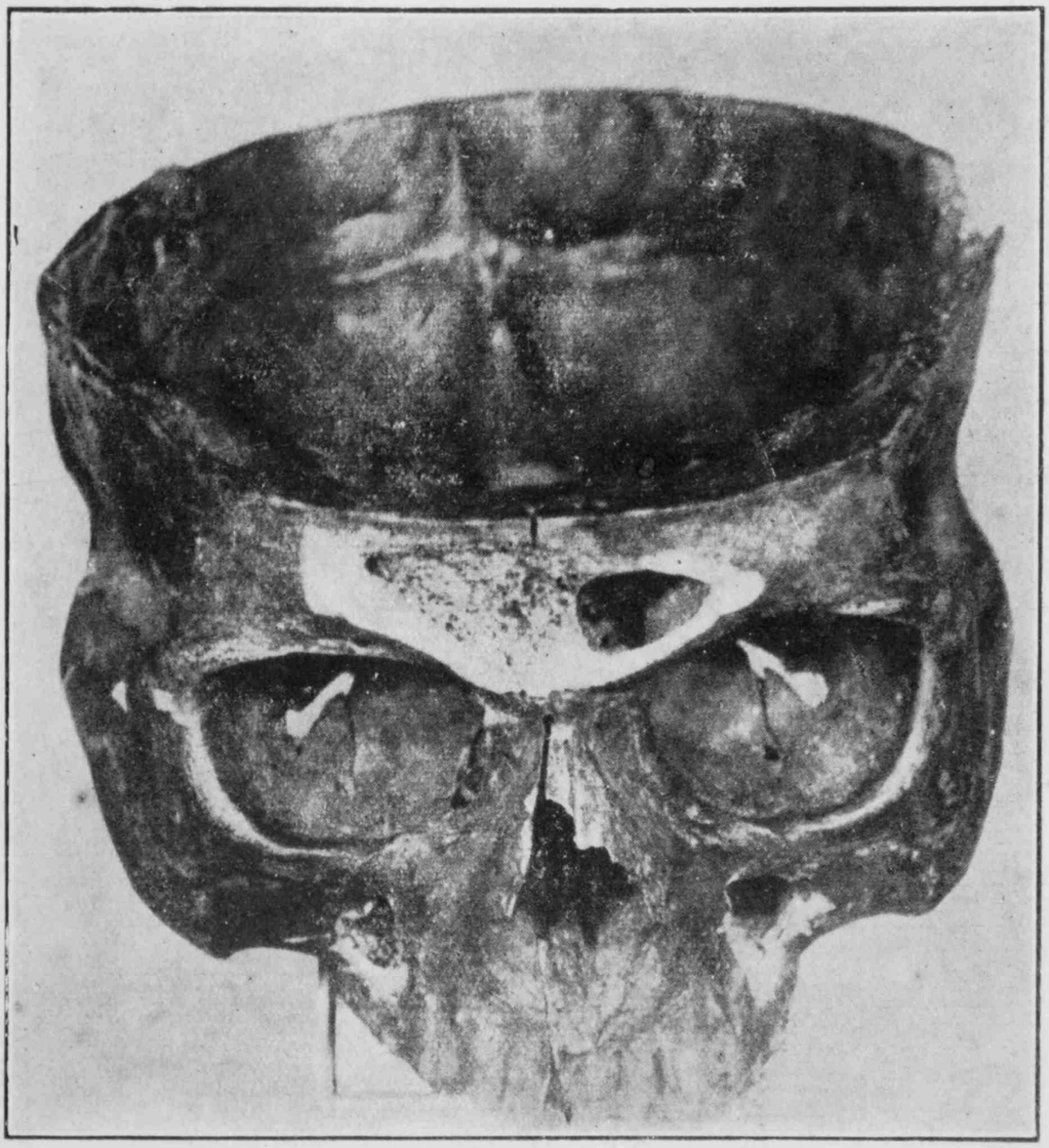


Figure 1.

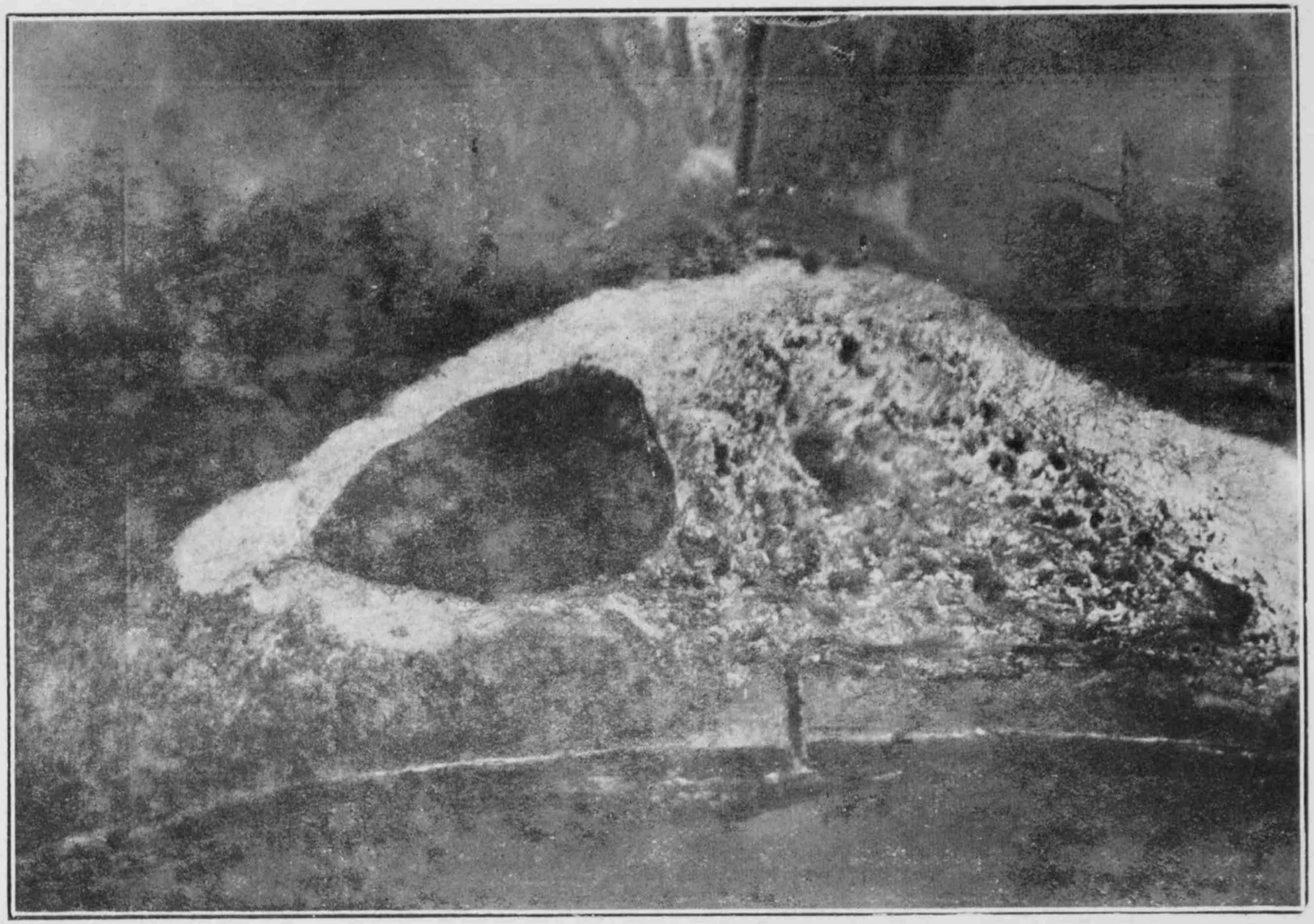


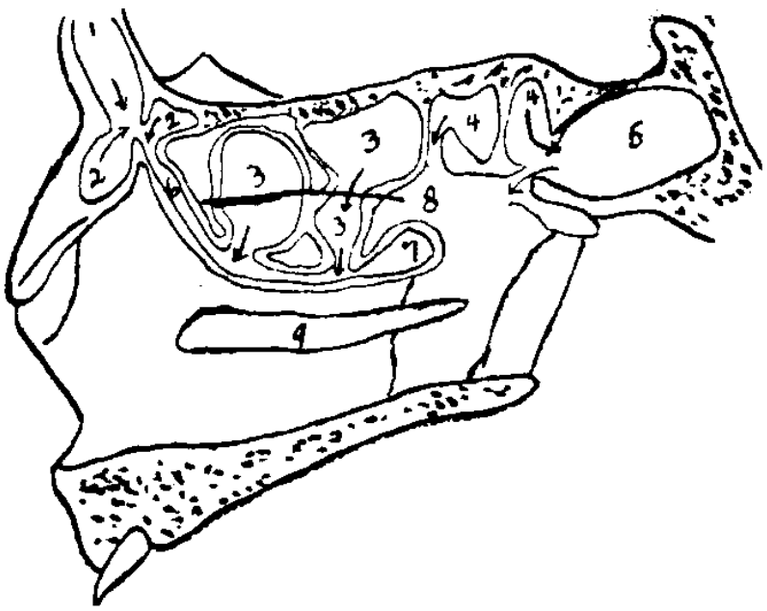
Figure 2. An enlarged photograph of the region of the frontal sinuses shown in Figure 1.

arch. At random the right frontal sinus was first explored. After the outer table of the frontal bone had been taken away, cancellous bone came into view. (See Fig. 2). As the opening was gradually being enlarged, no cavity was seen. Only cancellous bone could be found. Even when a large triangular area of cancellous bone, measuring 2.5 cm. in height, 1.8 cm. in breadth, and .7 cm. in depth from before backward was removed, still there was not any sign of the sinus. At this point the inner table of the frontal bone was exposed. The ostium or the opening of the sinus into the fronto-nasal duct was sought for in vain. In other words the left frontal sinus is absent in this case. Professor Shellshear confirmed this finding. Throughout the above process care was taken not to take away the septum which should be a thin slip of compact bone. Without the guide of an X-ray picture of the skull as to the position of the septum, an attempt was made to go into the left frontal sinus, with the hope of discovering the septum from the opposite side. An opening was made through the medial end of the left supraciliary arch, and, when a small portion of the outer table of the frontal bone was removed, a cavity presented itself. There was absence of any cancellous bone.

The accompanying picture of the skull employed for this investigation shows the rough cancellous surface of the inner table of the frontal bone on the right side and the left frontal sinus. (Fig. 1). The maxillary sinuses were also opened.

The left frontal sinus thus exposed is really somewhat pyramidal in shape (Logan Turner), with its vertex pointing lateralwards. It has three walls, anterior, posterior or cerebral, inferior, or orbital, and one base the septum. The anterior wall is vertical, convex and triangular in shape. It is the outer table of the frontal bone which is thick and compact. The thickest portion of this wall is the supraciliary arch. The posterior wall is concave and tends to slope from above downwards and backwards. It is the inner table of the frontal bone and the cranial cavity lies immediately behind it. The inferior or orbital wall is also concave, curving medially from above downwards and backwards. This is the thinnest of the three walls and overlies the cavity of the orbit laterally and the anterior ethmoidal cells medially. A very thin layer of compact bone forms the septum and it begins to deflect to the left side about 1 cm. above the nasion. The posterior wall, the inferior wall and the septum converge toward the ostium from above downwards and backwards. When a piece of wire is introduced into the ostium through the external opening of the sinus, it comes out by the way of the fronto-nasal duct or infundibulum and presents itself at the anterior end of the hiatus semilunaris, its normal opening.

The following picture is the medial aspect of the lateral wall of the nasal cavity. It shows the drainage of the paranasal sinuses.



1—Frontal sinus.
2—Fronto-ethmoidal cells.
3—Anterior ethmoidal cells.
4—Posterior ethmoidal cells.
5—Sphenoid sinus.
6—Infundibulum.
7—Ostium of masillary antrum.
8—Attachment of middle concha.
9—Attachment of the inferior concha.

* Parker page 150.

The approximate size of this sinus compared with the measurements given by Logan Turner is as following: —

	Turner's measurements.	*Measurements of the left frontal sinus of the specimen.*
Height	3.16 cm.	1.8 cm.
Breadth	2.58 cm.	1.6 cm.
Depth from before backward	1.8 cm.	1.3 cm.

According to these figures the left frontal sinus of this specimen is smaller in every way than that given by Turner.

This picture, Figure 2, shows in more detail the absence of the right frontal sinus and the shape and size of the left one.

REPORT OF A CHRONIC SUPPURATIVE FRONTAL SINUS CASE.

Name—H. S.
Sex—Female.
Age—35.
Ward & Bed XVIII, 138.
Race—Chinese.
Occupation—Spinner.

Surgeon—Prof. Digby.
House Surgeon—Dr. Karangia.
Dresser—Mr. K. V. Krishna.
Ward Clerk—Miss Lois Todd.
Date Adm.—April 4, 1930.
Date Disch.—June 11, 1930.
Number in Annual register—1906/30.

Chief Complaint.—Pain over the region of the right frontal sinus.

Duration of Same.—4 years.

Constitution on admission:—

Albuminuria.—Slight trace. No casts.

Glycosuria.—Nil.

Heart.—Normal.

Lungs.—Normal.

Abdomen.—Not distended.

Anæmia.—Not anæmic.

Pupils.—The right one reacted to light more readily than the left.

Teeth.—The lower molar teeth of both sides are carious.

Knee Jerks.—Present.

Pulse.—84 per minute.

Temperature.—98.2° F.

Rate of respiration.—18 per minute.

CONDITION ON ADMISSION.

The region over the frontal sinuses showed the absence of any abnormal bulging. She complained of pain over the region of the frontal sinuses and there was pus like discharge from the right nostril. Upon examination there was absence of nasal polypi. She had no complaint of any ear trouble.

HISTORY

1. Family History.—Patient's father is still living and healthy. Her mother died after giving birth to a child many years ago. She has a younger sister who is in Singapore and is quite healthy. Her youngest sister died very young.

2. Personal History.—Patient married 16 years ago. She has three children who are in good health. Her husband died 9 years ago.

3. History of Present Complaint.—Five years ago patient for the first time experienced attacks of chill and slight fever. Soon these attacks became chronic and she had intermittent attacks of the same of three years' duration.

Four years ago she suffered from a rather severe attack of pain over the region of the frontal sinuses. A few days later there was some yellow and sticky discharge from her right nostril.

Nine months ago patient had another attack of severe pain over the region of the frontal sinuses. But this lasted for only a few days.

The present pain over the frontal sinuses began 20 days ago. The pain has been most severe early in the morning and less felt after 2 p.m. daily. Accompanying this pain there was pus like discharge from the right nostril.

PRE-OPERATIVE TREATMENT.

April 4—Calomel gr. iii.

„ 5—X-ray taken. Film No. 346.

Report :—

Frontal sinus—" Right suspicious."
Ethmoids.—" O. K." (Normal).
Maxillary sinus.—" Right opaque."

April 5—The outline of the right frontal sinus is hazy and not so well defined as that of the left. A noticeable difference is seen between the two maxillary sinuses. The right one is opaque. (See Fig. 3). The operative treatment of both the right frontal and maxillary sinuses will be found in this paper.

April 7—Mist. Sennæ Co.

„ 8—Haust Sed. one fluid ounce. 9 a.m.
Right eye brow shaved.
Skin prepared.

„ 9—Enema.
9.50 a.m. H. I. Morphia gr. ⅙ and Atropine gr. 1/100.
Morphia given to lessen surgical shock. Atropine decreases secretion and so it makes it easier to adminster anæsthetic, especially when ether is given. Ether increases secretion along the respiratory tract.
Temperature normal.

Examination of urine :—

1. Sugar—nil.
2. Albumen—nil.

PREPARATIONS FOR OPERATION IN THE OPERATING THEATRE.

(April 9).

1. Patient lay on her back with head half extended. This position prevented blood from running into the trachea and thus respiration was not hindered and anæsthesia could be administered with less interference due to obstruction.

2. Application of biniodide lotion to face. This partially sterlized the skin of the face.

4. Sterilized towels were used to cover up patient.

a. One was spread under the head, covering up the table, while the head was being held up.

b. One folded diagonally was used to wrap round the head which had already been covered with a rubber cap. The towel was kept in place with two clips.

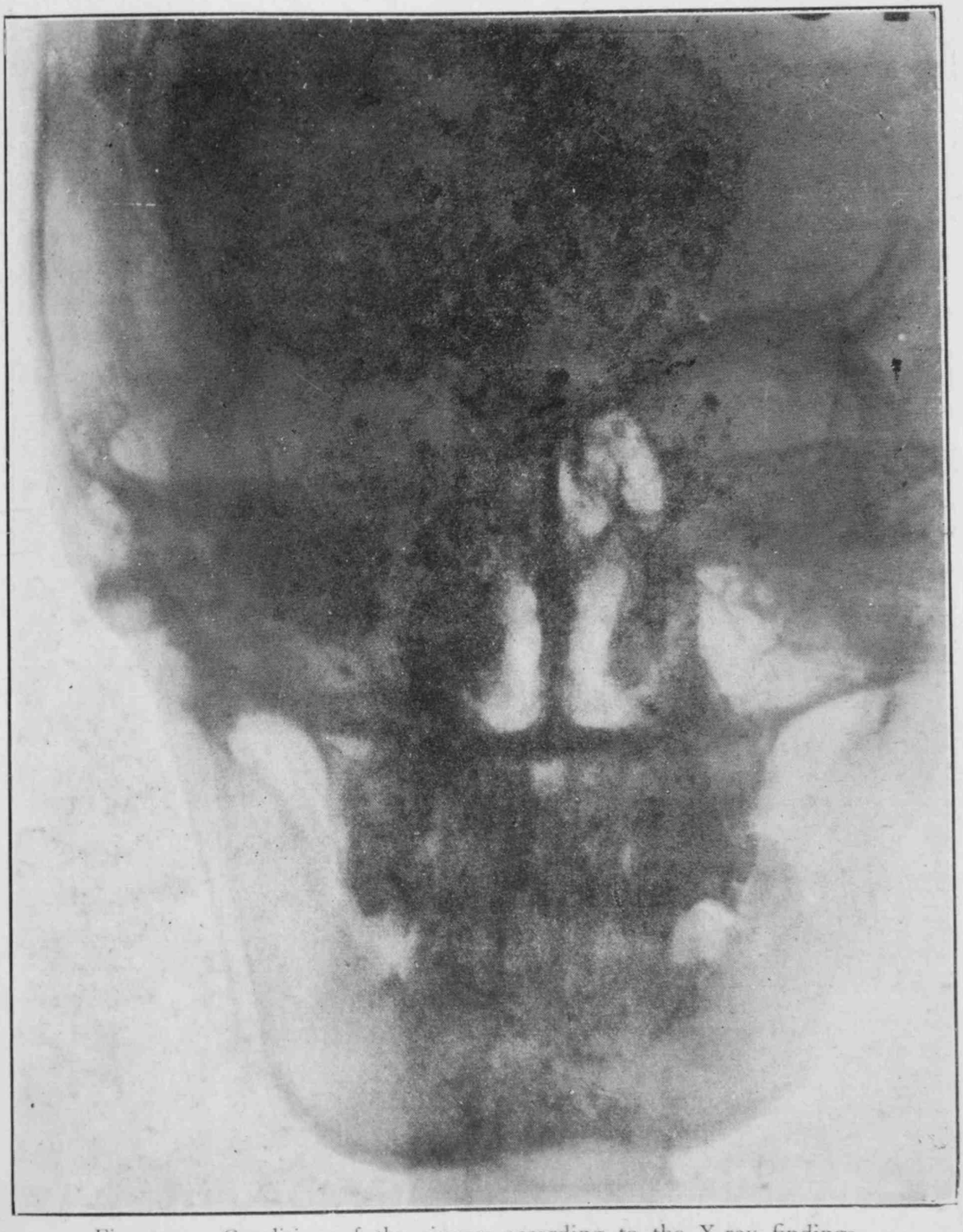


Figure 3. Condition of the sinuses according to the X-ray findings.

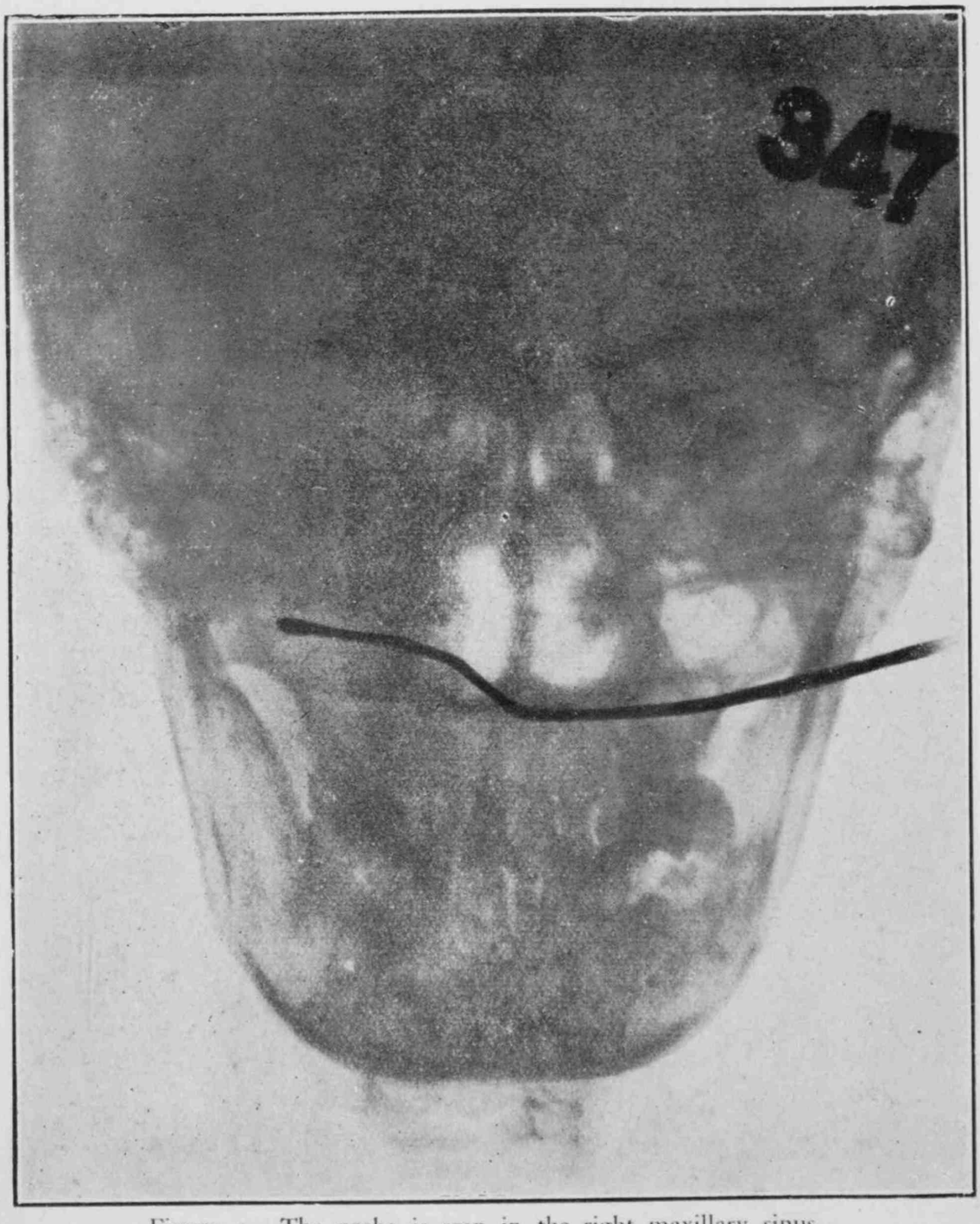


Figure 4. The probe is seen in the right maxillary sinus.

c. Two more towels were used to cover the trunk as high up as the neck.

Adminstration of General Anæsthetic.—Complete anæsthetic state was reached within 15 minutes. Gag kept mouth open.

Warm ether vapour was given by means of a tube. The method of its adminstration consisted of four principal parts viz., an electric pump, an ether bottle, a warming chamber, and a tube. These were connected up according to the above order. When the switch of the pump was on, air was being pumped into the ether bottle. A piece of glass tubing led the air below the surface of ether in the bottle. Before leaving the warming chamber, the vapour became warm, suitable to be inhaled by the patient while the tube was placed way back in the mouth.

Ether is quite irritant to the respiratory mucous membrane. If it were administered in its cold state, there would be a greater danger of causing respiratory diseases.

The size of the pupil was examined frequently by the anæsthetist because during the different stages of anæsthesia the pupil showed different sizes.

1st stage—pupil dilates.

2nd stage—pupil constricts.

3rd stage—pupil widely dilated.

The patient's pulse was counted from time to time and state of respiration was watched throughout the operation.

METHOD OF OPERATION: EXTERNAL OPERATION WITH INTRANASAL DRAINAGE.

Killian's Method.

1. *Preparation of Nose for intranasal drainage.*

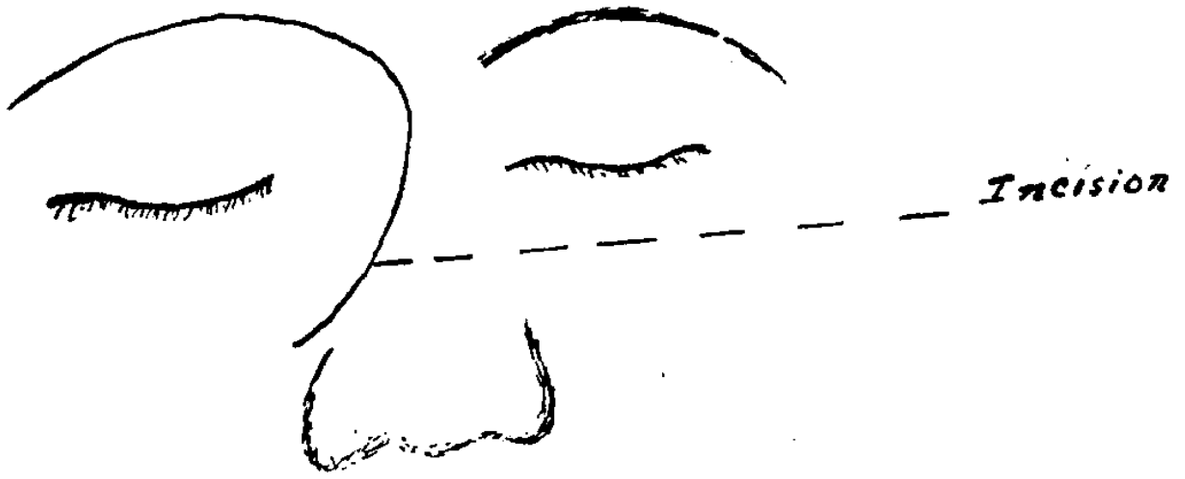
The right nasal cavity was packed with long strips of gauze, soaked in adrenaline solution (1 in 1,000, made by adding 10 min. of adrenaline to 1 ounce of normal saline). Ear forceps were used for packing. The adrenaline would constrict vessels therein and diminish hæmorrhage during the subsequent operation.

After about 5 minutes the gauze was removed. The anterior portion 1 by .2 cm. of the middle concha was partially severed with a pair of curved scissors. This piece of bone was then taken out with a snare and forceps. The cavity was repacked with adrenaline gauze as there was a little bleeding in spite of the above precaution.

2. *External Operation.*

Skin incisions: A curved one was made along the eyebrow, extending from the side of the nose to the lateral end of the eyebrow.

The second incision was the continuation of the first but it was made along the side of the nose, curving outwards below the medial canthus of the eye.



These incisions divided the soft tissue and the following vessels and nerves:—

Arteries—Frontal branch of ophthalmic.
Supra-orbital branch of ophthalmic.
Frontal branches of superficial temporal.
Angular artery—terminal of external maxillary.

Nerves —Supra-orbital.
Supra-trochlear.

The cut ends of the vessels were caught with pressure forceps and ligatured with fine plain catgut.

The upper and lower flaps were separated from the subjacent periosteum by cutting at right angle to bone with knife and burrowing with forceps. The edge of the upper flap was folded upwards and outwards and clip forceps were used to clip this fold from the inside to avoid undue scarring of skin. The lower flap was retracted upward for ¾ inch above the line of incision.

Periosteal Incisions:

a. A periosteal incision was made above the supra-orbital ridge, extending from the lateral end of wound to the glabella. The periosteum above this line was raised by an elevator. With the soft tissue this was retracted upwards.

b. Another periosteal incision was made along the side of the nose, just below the supra-orbital ridge. The periosteum of the nasal portion of the frontal bone was detached with an elevator. The attachment of the pulley of the superior oblique to the orbit was preserved.

Openings Into the Frontal Sinus and the Right Nasal Cavity.

Figure 5. The lateral view of the frontal sinuses. The height is shown.

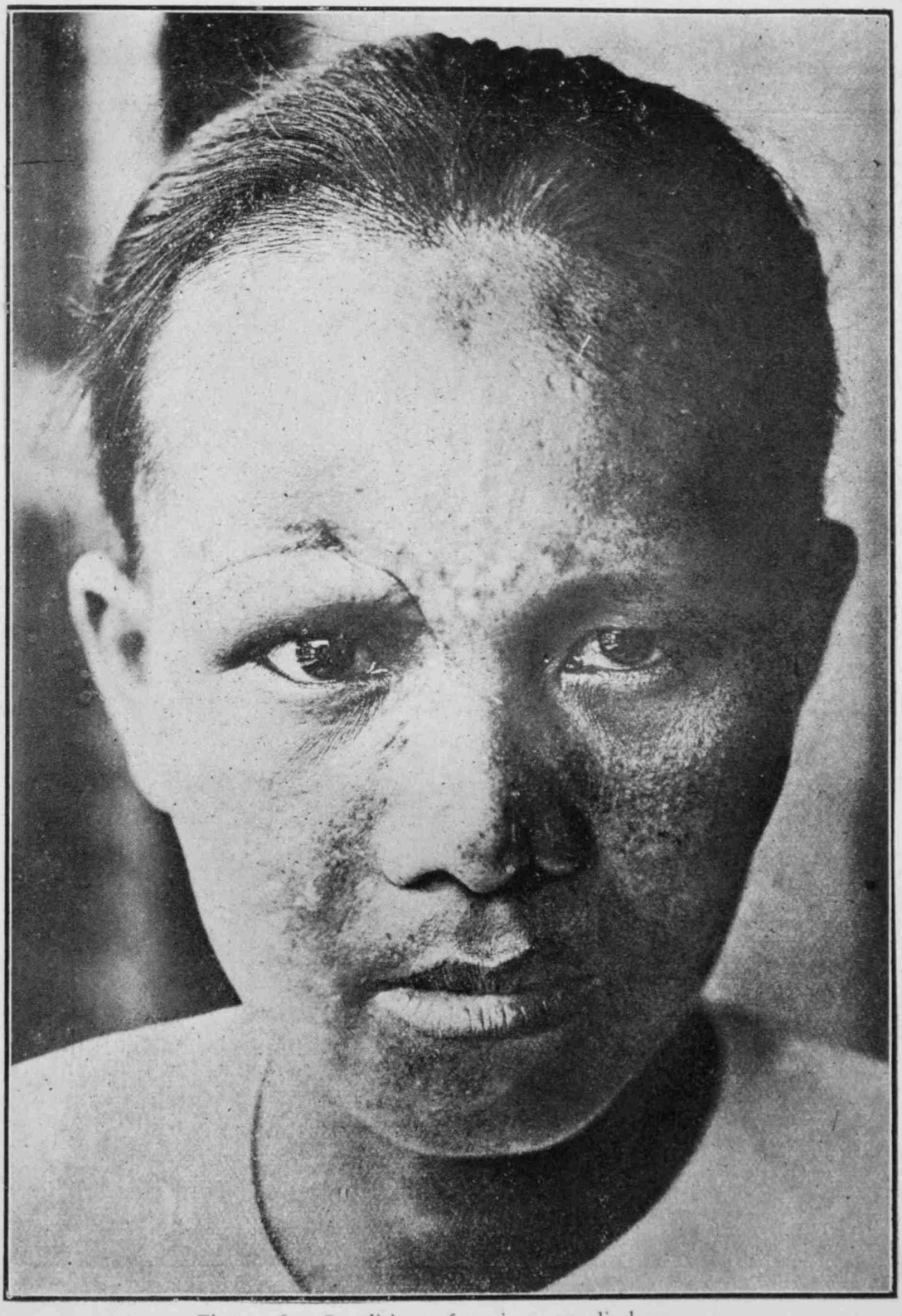
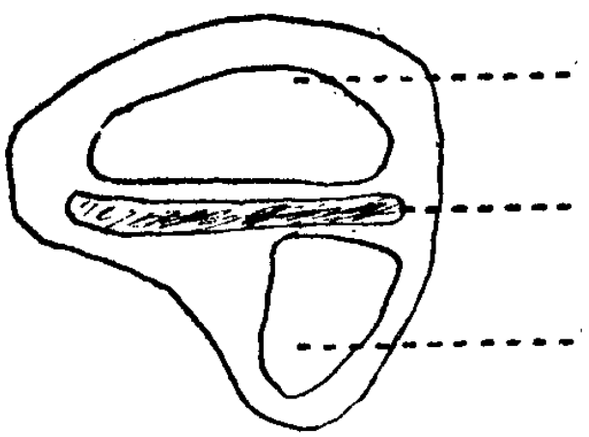


Figure 6. Condition of patient on discharge.

a. Upper part of the frontal sinus.—A small area above the supra-orbital ridge and about an inch from the mid line was first opened with a chisel and mallet. Soon as a bit of bone was taken out, pus oozed out. It was light yellowish and thick. Pulsation could be seen. This must have been due to the congestion of the mucous membrane. Gradually the opening was made bigger with the chisel and mallet until it assumed the shape of crescent, measuring 1¼ inches long and ¾ inch at its widest point. The entire cavity of the sinus was cleaned with gauze swabbing. A small recess was found at the lateral end of the cavity, just below the supra-orbital ridges. This was cleared by means of punch forceps. Protector was used from time to time to prevent damage to the posterior wall of the sinus as the brain was immediately behind it. The septum was carefully protected too. Any perforation meant that the left sinus had to be opened as well. Damage of the posterior wall might have set up fatal meningitis.

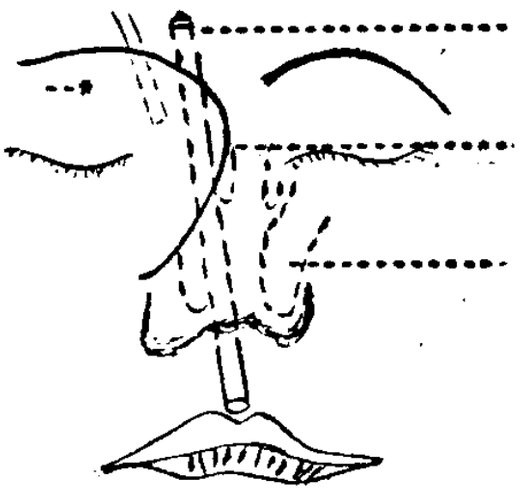
b. *Nasal cavity, lower part of frontal sinus and anterior ethmoidal air cells.* Part of the nasal part of the frontal bone and the nasal process of the maxilla were chiseled away just below the medial end of the supra-orbital ridge. The opening had the shape of a right triangle, with the shortest side upward. The openings into the upper and lower part of the frontal sinus communicated with each other. Two separate openings were made because by so doing the supra-orbital ridge was preserved and deformity lessened when the wound healed.

A probe was used to investigate the communication between the sinus opening and the nasal cavity. When the passage was large enough a rubber tube—⅓ cm. in diameter was passed from the nose into the sinus opening. Half an inch of the tube was left external to the nostril and stitched to the inside of the edge of nostril. This prevented the drainage tube from slipping down.



N.B.—The thin layer of bone forming both the floor of the frontal sinus and the roof of the orbit was entirely removed by the cautious use of sliding punch forceps.

Strip of rubber tube for draining external wound.



CLOSURE OF WOUND.

The sinus cavity should have been washed with saline. Some orbital fat bulged up to fill the cavity. No stitching of the periosteum was required. Silkworm gut was used to stitch up wound. A strip of rubber tube about 1¼" long was inserted at the medial end of incision for drainage. Painted with iodine. Dry dressing applied. Bandaged.

Time required for the entire operation was from 10.35 to 12.10 or one hour and 35 minutes.

DAILY RECORD OF TREATMENT AND PROGRESS OF THE CASE.

April 10—Patient was quite drowsy.
Temperature 102° F. at 4 p.m.
Prof. Digby inspected the wound.
No diplopia was complained of. The bony attachment of the superior oblique tendon had undoubtedly been removed, but its periosteum was still attached to the preserved orbital margin.

" 11—Prof. Digby dressed the case. The small rubber tube which drained the external wound was removed, boiled, then soaked in 10% mercurochrome and replaced to its former position. Wound was painted with 10% mercurochrome. A small amount of pus was found when the upper right eye lid was carefully lifted. Warm boracic lotion was used as eye wash. Dry dressing applied.

" 12—The above dressing repeated except that the small drainage tube was removed.

" 13—Eye lid was less swollen and red. Patient still complained of head ache and dizziness.

" 14—Tinkling sensation felt over the skin of the bridge of the nose.

„ 15-17—No complaint.

„ 18—Stitches removed. As the stitch over the medial part was removed, pus oozed out. 2% iodine applied. Dry dressing.

April 20—Upper right eye lid still swollen.

„ 23—Absence of pus for the first time since the 18th instant.

„ 24—Wound dry. Boracic fomentation applied.

„ 28—Patient had a chill for about 20 minutes and after that she felt warm throughout the night.

„ 29—Patient complained of general discomfort. Suffered from a cold and head ache.

May 1—Patient complained of aching pain over the medial end of eye and the temporal region. There was still discharge of pus from the right nostril. Prof. Digby examined the disc of the right eye with ophthalmoscope and could find no sign of papillœdema. Therefore there is absence of cerebral complication.

„ 2—Discharge of pus from the right nostril continued. Wound clean.

„ 5—General condition—good. Absence of discharge from the right nostril. Pain felt over the right side of the nose upon pressure.

„ 7—Medial end of wound—rather painful. No more discharge of pus.

„ 12—Patient complained of throbbing pain over the medial end of the wound.

„ 21—In view of the fact that the right maxillary sinus is opaque according to the X-ray finding, the suppurative condition of the right frontal sinus has been a chronic one, and the pain felt over the medial end of the wound has been rather persistent recently, operation on the right maxillary sinus and ethmoidal air cells was decided upon.

The pre-operative treatment consisted of enema given early in the morning and hypodermic injection of ⅙ grain of morphia with 1/100 grain of atropine given a half of an hour before operation.

Since the skull for the study of the frontal sinuses was still at the writer's disposal, advantage was taken to get information of its size and shape. The following description of the anatomy of the maxillary sinus is that of the specimen.

N.B.—Whenever the treatment and condition of the case have been the same, daily entry of the same has been omitted.

ANATOMY OF THE MAXILLARY SINUS.

The maxillary air sinus is a large four sided pyramidal cavity, found within the body of the maxilla which is situated below the orbit and beside the nose, forming part of the bony walls of these cavities, and the alveolar process of which forms its own floor and carries the teeth. Logan Turner gives the following measurements for an adult sinus of average size: "vertical height opposite first molar tooth, 3.5 cm.; transverse breadth 2.5 cm.; antero-posterior depth, 3.2 cm." Its vertex extends laterwards into the zygomatic process for a variable distance. It has three walls and a base corresponding to the orbital, anterior, infratemporal and nasal surfaces of the body of the maxilla respectively. The orbital wall is very thin and almost horizontal. It is slightly concave and sloping upwards, backwards and medialwards. The infraorbital canal which transmits the infraorbtial nerve and vessel grooves it from behind, forwards and outwards. The anterior wall is vertical and convex due partly to the depression of the canine fossa. In this specimen the wall is very thick, varying from 1 cm. to .3 cm. The thickest portion situates just above the alveolar process. Therefore this wall is not so thin as the description given by Gray 1. (1926). The infratemporal wall is compartively thick. It lies in a vertical plane, directing forwards and outwards. It is smooth. The base of the sinus is very thin and forms the lateral wall of the nasal cavity. It is perforated by a large aperture in the disarticulated bone. But it is much diminished in size as we find it in the skull by the uncinate process of the ethmoid bone and the descending process of the lacrimal bone above, the maxillary process of the inferior nasal concha below, and the vertical part of the palatine bone behind. Through this opening the sinus communicates with the nose at the posterior extremity of the semilunar hiatus. Turner gives an excellent description of this base. "The medial or nasal wall, the base of the pyramid, is subdivided into an upper and lower segment, demarcated from each other by the plane of attachment of the inferior concha. The lower segment, osseous throughout, forms the lateral wall of the inferior nasal meatus. The bone is thinnest immediately below the attachment of the concha, and in the situation offers least resistance to the passage of the trocar when the sinus is explored through the anterior naris. The upper segment of the nasal wall is the lateral boundary of the middle meatus, osseous anteriorly but membranous in its posterior half. The opening of the sinus (ostium maxillare) is situated in the middle meatus, and lies immediately beneath the roof of the antrum, unfavourably place for drainage of the cavity in the erect posture. When viewed from the nasal aspect the ostium is seen in the lowest part of the infundibulum. One or more accessary ostia are sometimes found in the membranous part of the meatal wall; they are placed posterior to, and at a lower

level than, the normal ostium, thus favouring drainage in a backward direction when the cavity is infected." (Turner p. 14).

The floor of the two maxillary sinuses of this specimen are different. The right one is smooth but the left one shows two transverse bony ridges; the anterior one extends forwards and lateralwards and the posterior one backwards and outwards. If this condition is found in a suppurative maxillary sinus, it is obvious that they serve to collect pus and prevent free drainage even when external opening has been performed. For this reason irrigation is imperative as a step in post operative treatment. The root of the second pre-molar tooth is seen embedded in the cancellous portion of the anterior wall. This shows that an infected tooth may be the cause of suppruative maxillary sinusitis. The lowest part of the floor of the sinus is 1 cm. below the level of the floor of the nasal cavity. The anatomical relationship of the floors reveals clearly that external drainage is of foremost importance in treating maxillary sinusitis. The aim of the operation on the right maxillary sinus, as here reported, was therefore to permit of free external drainage.

May 19. OPERATION ON THE MAXILLARY SINUS.

Surgeon—Prof. Digby.
Assistant—Dr. Hsui.
Anæsthetist—Dr. Shi.
Dresser—Mr. Ho.
Wardclerk—Miss Todd.

X-Ray Finding.—Please refer to Fig. 3.

Position.—Dorsal with head half extended.

General Anæsthesia.—Warm ether vapour was given by means of a tube through the mouth which was kept open with a mouth gag and a cheek retractor. Patient was under complete anæsthesia within 13 minutes. Pulse was good throughout the entire operation.

Aseptic Field.—Application of 2% alcoholic solution of iodine to the skin of face and neck sterilized it partially. Sterilized towels were used to cover the patient except the field for operation which was the greater portion of the face.

Local Anæsthesia.—About 15 c.c. of Barker's solution with adrenaline (10 minims of adrenaline to 1 oz. of Barker's solution), was injected into the gum covering the right maxilla. The eucaine in the Barker's solution would lessen the possibility of shock in the subsequent incision on the gum and the adrenaline diminishes hæmorrhage.

Eamination of the Right Nasal Cavity.—A long nasal speculum was used and then a part of pressure forceps was inserted into the

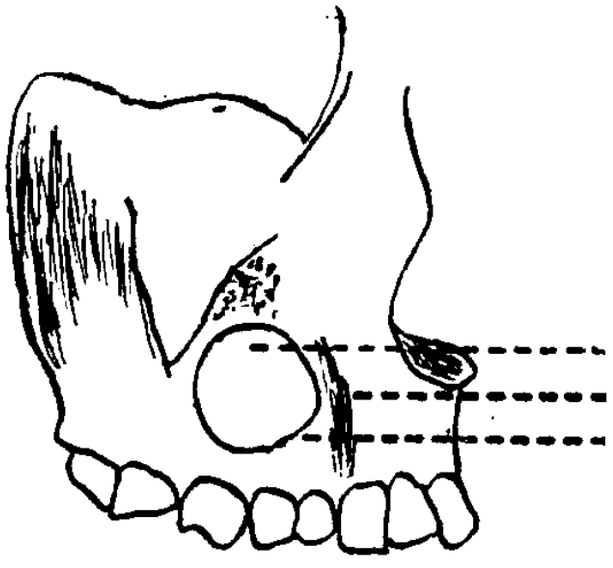
same as far back as the posterior opening of the nasal cavity. The forecps gave some bearing as to the direction of the floor of the nasal cavity.

Muco-Periosteal Incision.—The cheek was retracted and an incision about 4 cm. long was made from the lateral incisor to the first molar on the right side of the maxilla, just below the line of reflection of the mucous membrane from the cheek to the gum. The incision was carried down to the bone and the periosteum was detached upwards nearly to the level of the infra-orbital foramen with an elevator.

EXPOSURE OF THE CAVITY OF THE SINUS FROM THE LATERAL WALL.

The outer surface of the lateral wall of the sinus was exposed by the preceding step. The fossa, lateral to the canine ridge was the canine or pre-molar fossa. To expose the cavity the bone lateral to the canine ridge and forming the pre-molar fossa was removed with gouge and hammer and then punch forceps. After the removal of bone the cavity was laid open freely and the opening measured about 1¼ cm. in diameter. Careful examination of the cavity revealed the absence of pus.

The following sketch shows the lateral opening into the sinues:—

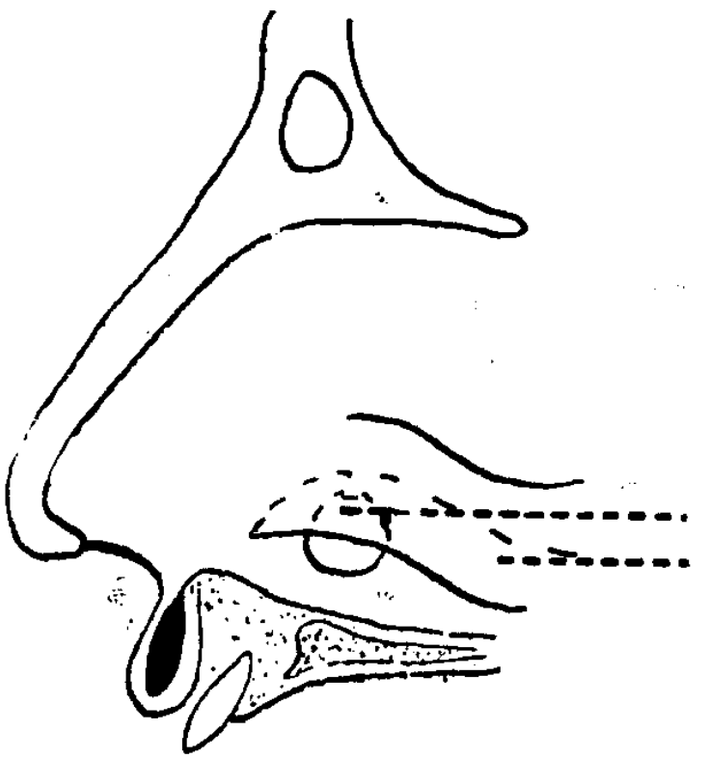


ESTABLISHMENT OF FREE DRAINAGE INTO THE NOSE THROUGH ITS MEDIAL WALL.

A curved trocar was introduced into the sinus through its medial wall just below the inferior concha. As the medial wall was much thicker than normal, a mallet was necessary in helping to push the trocar through the thick bone. After the trocar had gone through the medial wall, the pointed end of the trocar could be seen in the cavity of the sinus through the opening on the lateral wall. To assure free drainage the lowest edge of this opening was made to the level of

the nasal cavity. Even then the opening is above the floor of the sinus.

The bevelled end of a rubber tube about 3½" long and ½ cm. in diameter was introduced into the sinus and the free end was allowed to come through the right nostril. At the level of the nostril a silk worm gut stitch was passed through the rubber tube and the free ends of the gut were fixed to the face with plaster. Thus the tube was kept in place without slipping.



OPERATION ON THE RIGHT ETHMOIDAL AIR CELLS.

As the patient had been complaining of tenderness over the medial end of the wound from the last operation, i.e. operation on the right frontal sinus on April 9th, 1930, this operation was done to assure the actual condition of the ethmoidal cells.

The incision was made along the medial end of the old incision and was carried down to the bone. The periosteum was detached with an elevator and the former opening through the nasal process of the frontal bone was exposed. This orifice was made larger with punch forceps. Pus could not be found. Before closing the wound, a piece of loose bone was noticed. It seemed to be the medial portion of the orbit. Since it might become septic, it was removed. The wound was closed with interrupted stitches of silk worm gut. Iodine and dry dressing applied.

DAILY TREATMENT AND PROGRESS OF THE CASE.

May 22—Wound was cleaned with 4% boracic lotion. Then 10% mercurochrome and dry dressing applied. Both eyelids

and right side of face were œdematous. But patient could open eye and no other signs of inflammation could be detected.

" 23—Highest temperature during the day 101.8 F. Patient took the drainage tube out without informing any one. Boracic lotion dressing and 10% mercurochrome applied.

" 24—Irrigation of the right maxillary antrum with warm normal saline. Only some blood was washed out.

" 25—Irrigation with warm normal saline. No pus. Temperature 100.2 F.

" 26—Patient noticed less discharge from the right nostrial, and could open the right eye more widely. Right side of face less œdematous. No movement since day before yesterday.

" 31—X-ray taken with a probe inside the right maxillary antrum through the nasal opening. This step was taken because it was not sure whether the irrigation had been done properly or not during the previous days. Film No. 347. Report—" The probe was found in Maxillary sinus." The accompanying photograph, Fig. 4, and Fig. 5, show the probe in position and also the height of the frontal sinuses, which is much smaller than that shown in Fig. 7 and Fig. 8 of an European in the following pages.

CONDITION ON DISCAHRGE :—

Recovered.—Patient was free from headache and discharge of pus from the right nostril. Deformity is not marked as shown in Fig. 6. Part of the right eye brow had grown since the operation.

COMMENTS.

1. May not the frontal sinuses be entirely absent?

2. Had an X-ray been taken of the skull what would be the appearance of the absent right frontal sinus which was filled with cancellous bone?

3. Had this skull been that of a live patient and the transillumination test performed, how would the absent right frontal sinus have appeared—red and clear or dark?

The writer is not qualified to answer the first question. However, this quotation suffices in answering it. " One or both frontal sinuses may be absent (in 17 per cent. of European crania)." It is interesting to note that each frontal sinus may be sub-divided by incomplete bony partitions which may be either vertical or horizontal. Turner mentioned the presence of the former and there was a case with a false floor to the frontal sinus in the Government Civil Hospital, operated on by Professor Digby recently. According to the preceding

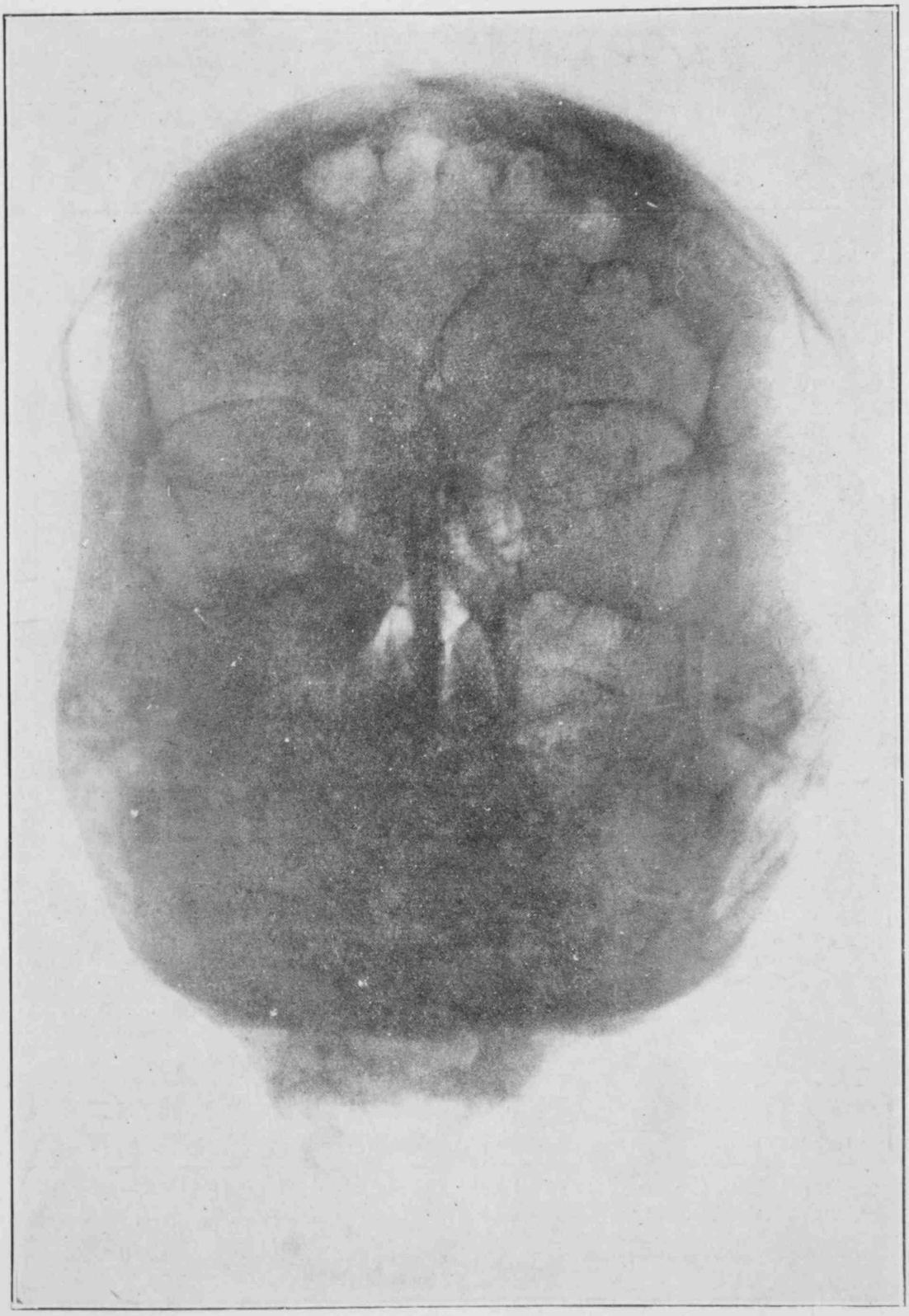


Figure 7. This shows the antero-posterior view of the large frontal sinuses of an European. (By kind permission of Prof. Shellshear) the deviation of the thin septium to the left is marked.

Figure 8. This is the side view of the frontal sinuses seen in Figure 7. They extend upwards for a considerable distance.

report on the operation of the right frontal sinus, a recess was found. From these facts, it is obvious that the frontal sinus is not free from abnormalities. For this reason one is obliged to be open minded and to be on the look out for the same during the various steps in an operation of a suppurative frontal sinus.

The answer to question 2 is one for the radiologist.

The answer to the third question would seem that the absent frontal sinus would appear dark. Since the maxillary sinus is never absent, one can rely more on the transillumination test as a guide to the diagnosis of the case.

Since the supraciliary arch does not bear any definite relationship to the size of the frontal sinus, there is individual difference and there seems to be a racial difference in the size of the sinus according to the observations of the Surgical Department of this University (for an example illustrating this statement please refer to Fig. 7 and 8 of the large frontal sinuses of an European and compare them with that of the case), it is obvious that only an X-ray picture can give us the real size of the sinuses. For this reason an X-ray picture should be taken before any operative treatment, for the sake of finding out the true state of the sinuses as well as their size. The deformity will be rather great if the entire anterior wall of a large frontal sinus is removed. If one is obliged to do so, the patient should be first informed.

With this Chinese patient there was little difficulty in the re-appearance of the eye brow which was shaved as a pre-operative treatment. According to Carson, the advice is to leave the eye brow and not to shave it.

Effort was made to follow up the case after eight months since the operation. The patient was sent for according to the address given on admission, but the residents denied the existence of such a person. The lack of co-operation on the part of the patients often makes it next to impossible for one to follow up cases after they had been discharged from the Hospital.

ACKNOWLEDGEMENT.

The writer wishes to express her gratitude to Professor Shellshear for his ever ready help in the matter of material and references. In spite of his many duties, Professor Digby has given numerous instructive points on this case of frontal sinus. His conscientious and constructive criticism had made the writing up of all of the reports on operations a pleasurable intellectual pursuit while the writer was a Surgical Ward Clerk. Without his kind permission for the use of the instruments, the investigation of the sinuses would have been almost impossible. To him she is much indebted. It is only with the

permission of Prof. Shellshear and the prompt co-operation of Mr. Anderson of the Anatomy Department that all the figures of this paper have been made possible. The above report on the operative treatment and the X-ray films of the frontal and maxillary sinuses which Dr. Hsui of the Surgical Department had kindly allowed the writer to use, are duplicates.

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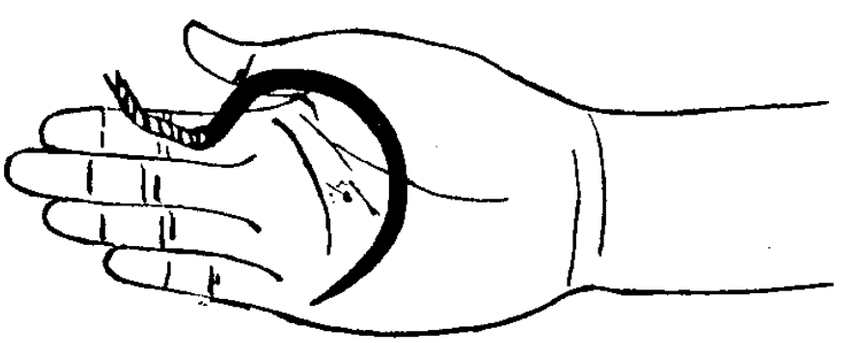
A CASE OF NEGLECTED TRANSVERSE PRESENTATION WITH A PROLAPSED HAND.

Submitted by F. S. Fernando (with the kind permission of Prof. R. E. Tottenham).

So far as my limited reading knowledge is concerned, I think this case is worthy of clinical consideration. I have not come across a report wherein Cæsarean Section had to be performed as a result of excessive scar tissue formation and adhesions in the vaginal walls. Therefore, I hereby submit the following report for its clinical value.

General History of the Patient.—The patient was a married woman 37 years old. She came from Cheung Chau, an island about 20 miles by sea from Hong Kong where there is no immediate medical assistance available. She had six previous labours, the last pregnancy was six years ago. The following account of her previous labours is of interest:—

1st Pregnancy—5 months, miscarriage.
2nd ,, full term baby, lived for some years.
3rd ,, full term baby, with difficult labour, terminated by a hook.*
4th ,, miscarriage.
5th ,, ,,
6th ,, ,,



* Illustration shows the kind of hook used as mentioned above. The hook as compared with the size of the palm of the hand.

Her period of amenorrhœa dated back since April 1930, and her labour started at the above place on the 8th of January, 1931 at 6.00 p.m. There she was attended by a Government midwife, who finding difficulty with the case took her over to the Tsan Yuk Maternity Hospital where she was admitted on the 10th of January at 5.30 p.m., being two days in labour. The membranes ruptured ten hours before admission. Her condition on admission was good, her temperature was 99.4° F. and pulse rate was 100. The pelvic measurements were: Interspinous—8½ inches; Inter-cristal—9¼ inches; External conjugate—6½ inches.

Examination of Patient.—On examination, the right arm of the child was prolapsed. The arm had turned purple, and the skin had ulcerated at various spots. There was foul discharge coming from the vagina which might have been a sign of decomposition. By abdominal palpation the diagnosis was a transverse presentation. No Bandl's ring palpable. There was no fœtal heart sound heard.

Treatment.—Two attempts at Decapitation were made. The first attempt was performed by Prof. Tottenham. He made a vaginal examination, but found out that it was impossible to pass in a whole hand owing to the presence of scar tissues and adhesions in the vaginal walls. The os which could hardly be distinguished from its surroundings, was also adherent to the vaginal walls and rigid, and this could barely admit half a hand. The diameter of the true conjugate was also lessened by the scar tissues. A large urethro-vaginal fistula was also present. The above condition, therefore, inhibited any internal manipulation.

The second attempt was performed by Dr. Samy as he has smaller hands, but this was also unsuccessful.

The final step taken was to perform an Abdominal Cæsarean Section, which was done partly classical and partly extra-peritoneal.

THE OPERATION—Obstetrician—Prof. R. E. Tottenham.
Assistant—Dr. D. K. Samy.
Anæsthetist—Dr. S. K. Lam.
Extra Assistants—Two Hospital Sisters.

Under general anæsthesia a mid-line incision was made from below the umbilicus extending about 5 inches down towards the symphisis pubes. The subcutaneous fat was cut through and the aponeurosis of the recti muscles exposed. The muscles separated and the peritoneum divided. The utero-vesical fold of peritoneum was cut across and the bladder was then sponged and pushed down and separated from the lower uterine segment. The bladder was difficult to push downwards owing to scar tissue. A lower segment incision was made, and this had to be extended somewhat higher than usual, as the incision was limited downwards by the scar tissue. After opening the cavity of the uterus, there was not much bleeding and the child was easily extracted by the leg. The cord was clamped and cut, and the placenta and membranes were manually removed. The child was still born, a female of 3¾ pounds weight. It should be noted that the child could not have been a full term, although the mother's history is of 9 months pregnancy.

Closure of Wound.—The uterus was closed with interrupted catgut sutures. The peritoneum was sewn together with continuous stitches, as well as the recti sheath. The skin was closed by interrupted

subcuticular stitches and then interrupted silkworm gut, and tension stitches were put on. A piece of gauze was left inside to drain the anterior pouch.

Post Operative Treatment.—Twenty-four hours after the operation there was no rise of temperature, so the gauze drainage was removed. The wound was dressed with ordinary dressing. The lochia was normal.

January 12th.—The second day after operation the temperature rose to 101° F. and pulse 110. On examination of the wound there was a purulent discharge coming out. Hot moist dressing was then applied. Lochia was normal.

January 13th.—After several applications of the hot moist dressings, the temperature subsided to 98.4° F. and pulse 90. The lochia was normal. Since this day up to the day of discharge which was on the 31st January, patient had no rise in temperature and pulse gradually settled down to normal.

January 14th.—Blood for Wassermann re-action taken.

January 18th.—The abdominal skin stitches were removed.

January 21st.—Wassermann report negative.

Condition on Discharge.—January 31st—The wound healed up very nicely. The patient's general health was excellent. Temperature was 97.4° F. and pulse rate 64.

Discussion.—In the first place I should like to quote some of the important indications for Cæsarean Section from Tweedy and Wrench's text-book on Obstetrics:—

"(1) In the case of an elderly primigravida with a *living* child;

(2) In marked degrees of contracted pelvis;

(3) If there is reason to believe there is septic infection, an extraperitoneal operation would then be indicated.

Aside from the above I would mention an indication for Cæsarean Section from J. W. Williams' text-book on Obstetrics:—

Atresia following cicatricial contractions of the cervix and vagina.

Contra-Indications.—(from J. W. Williams' text-book on Obstetrics).

(1) Except in the presence of an absolute indication, Cæsarean Section should never be performed when the child is dead or in serious danger.

(2) When the mother is infected, in poor condition, or among surroundings which render an aseptic operation impracticable. In such circumstances, craniotomy is the operation of choice,

and Cæsarean Section should not be undertaken unless a living child is earnestly desired, and then only after the risks incident to it have been clearly explained to a responsible member of the family.

(3) When the patient has been long in labour or subjected to repeated vaginal examinations by those whose technique is questionable even though no signs of infection are apparent at the time. If, however, the operation should be decided upon in the presence of such risks, the body of the uterus should be removed after delivery of the child.

From the first contra-indication we can see that Cæsarean Section should never have been performed in our case as the child was dead long before the operation, but due to the scar formation in the vaginal walls and the adherent and rigid os inhibiting internal maniputations, Cæsarean Section was the only resource to save the mother. It should be noted, however, that the indication for Cæsarean Section in our case followed that of J. W. Williams, i.e., atresia following cicatricial contractions of the cervix and the vagina.

An open question with regard to sterilization now follows. In our particular case owing to the fact that no permission was obtained from the patient or her relatives with regard to sterilization, no such procedure was done, besides she has no living children.

I believe that even then, sterilization either by hysterectomy or ligature of the tubes should have been done for three reasons:—

(1) It is quite clear that any future full term pregnancy will not pass through the rigid os and vagina;

(2) The patient is from a place where there is no proper operative measures available at hand and as we know every hour's delay after the onset of labour in Cæsarean Section leaves greater risk to the mother.

(3) The six previous labours lead us to believe that our patient is not at all too fertile, as I may call it, as out of the six pregnancies, she had four miscarriages, one short-lived full time baby, and another full time pregnancy with difficult labour which terminated by a hook.

The above points therefore, favour the question of sterilization, and in my opinion it should have been done with the case.

(*References:*—Tweedy Wrench & Solomons—Practical Obstetrics
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Acknowledgments

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Tohoku Journal of Experimental Medicine.
The Bristol Medico Chirurgical Journal.

Notes and Comments

We print below a list of the new appointments made to fill the posts as House Officers at the Government Civil Hospital from July 1st to December 31st, 1931. We are also publishing a complete list of the examination results of the Degree Examinations held this month, and in doing so we take this opportunity of offering those successful candidates our heartiest congratulations.

HOUSE OFFICERS:

Clinical Assistant to the Medical Unit.	Dr. Pau Choi Chee
Clinical Assistant to the Surgical Unit.	Dr. Lim Ek Quee
Clinical Assistant to the Obstetrical & Gynæcological Unit.	Dr. Lam Shiu Kwong
Honorary Clinical Assistant to the Surgical Unit.	Dr. Cheung Shiu Fan
Honorary Clinical Assistant to the Obstetrical & Gynæcological Unit.	Dr. Cheng Sui Yue
House Physician	Dr. Sze Tsung Sing
House Surgeon	Dr. Peter Pau
House Obstetrician	Dr. Bessie Chen
Out-Patient Officer	Dr. Jap Boon Koey

The following have completed the FINAL M.B., B.S. EXAMINATION:—

Chen—Miss Bessie
Cheng Sui Yue—Miss
Kho Khong Kha X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee
Ng Yeok Boon

The following have pased in MEDICINE in the FINAL EXAMINATION:—

Chen—Miss Bessie
Kho Khong Kha, X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee

The following have passed in SURGERY in the FINAL EXAMINATION:—

Chan Wah
Chen—Miss Bessie
Cheng Sui Yue—Miss
Enok, V.
Kho Khong Kha X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee
Ng Yeok Boon
Yip Yuet Fong

The following have passed in OBSTETRICS & GYNÆCOLOGY in the FINAL EXAMINATION :—

Chen—Miss Bessie
Cheng Siu Yue—Miss
Enok, V.
Kho Khong Kha X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee

The following passed in MEDICAL JURISPRUDENCE & PUBLIC HEALTH :—

Chan Shing Chue
Cheng Hung Yue—Miss
Fernando, F. S.
Khoo Fun Yong
Khoo Keng Wah
Law Nai Koey
Li Ching Wa
Tan Liang Hwat
Yeoh Huan Eng
Yuen—Miss Hilda

Chan Wah
Chandulal, M. B.
Chen—Miss Bessie
Enok, V.
Kho Han Po
Kho Khong Kha, X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee
Teo Soon Wan

The following passed in PATHOLOGY :—

Chan Shing Chue
Cheng Hung Yue—Miss
Ip Ching Yue
Khoo Fun Yong
Li Ching Wa
Ling Ke Dieh
Tan Liang Hwat
Tseng Wah Kit
Yeoh Guan Eng
Yuen—Miss Hilda

Chan Wah
Chen—Miss Bessie
Enok—V.
Kho Khong Kha X.
Krishna, K. V.
Lam Shiu Wah
Lim Ek Quee
Teo Soon Wan.

The following passed in JUNIOR PATHOLOGY & PHARMACOLOGY :—

Lee Shiu Kee

The following passed in PHARMACOLOGY :—

Cheng Wing Kwai
Chew Poh Heng
Chung Hon Kwan
Lam Kow Cheong
Lai Fook, W.
Lau Man Hin
Leung Kin Hon
Ng Yeok Kin
Quek Cheng Kim
Rodriques, A. M.
Tan Wee Han
Teo Ban Hin
Wong Shing Hang
Wong Siong Hing

The following passed in JUNIOR ANATOMY & PHYSIOLOGY :—

Chau Woon Nin
Cheng Wing Kwai
Chung Hon Kwan
Lau Yong Boon
Lew Khoon Shin
Leung King Hon
Lo Chong Fie
Quek Cheng Kim
Rodriques, A. M.
Tan Wee Han

The following passed in ELEMENTARY ANATOMY & PHYSIOLOGY :—

Alvaros, R. E.
Leong, R.
Ong Ewe Hin
Souza, O. I. de

The following passed in ORGANIC CHEMISTRY :—

Kho Pek Po
Shum Ip Kwong

The following passed in PHYSICS :—

Kwok Ku Chang
Moonshi, A. J.
Tan Boon Piew
Teng Pin Hui
Yang Ke
Yong Pung Fook

The following passed in INORGANIC CHEMISTRY :—

Koppe, E.
Kwok Ku Chang
Yang Ke

The following passed in BIOLOGY :—

Kwok Ku Chang
Lim Yew Poh
Silva, P. M. N. da
Yang Ke
Yong Pung Fook

Review of Books

"*A Short Practice of Gynæcology*": By Henry Jellett, M.D., F.R.C.P.I. and Richard E. Tottenham, M.D., F.R.C.P.I. Sixth Edition, 1930. Price £1 1s. 0d. 4-coloured plates and 360 illustrations (many in colour). Publishers—J. & A. Churchill, London.

This is the sixth edition of a most excellent text book, and it has just been published in London. It is thoroughly up-to-date and, in addition to its previous well-known features, it includes succinct references to the latest advances in gynæcology. For instance, we all know that the technique of radium administration is constantly changing from year to year, and in this book we have presented in compact form the latest methods of European radium clinics for the treatment of malignant disease of the uterus. So, too, Blair Bell's lead treatment is briefly and adequately discussed.

A good account of cystoscopy is wisely included, both the ordinary cystoscope and Kelly's specula being dealt with. The list of "indications for cystoscopy" might be extended; but it may be argued that it would be beyond the scope of a text book of gynæcology to go further into the realm of the urinary surgeon. Some reference might have been made to boilable cystoscopes.

The outstanding feature of this text book is its sound and trenchant teaching. The accounts of operations are models of clearness, and are accompanied by delightful illustrations. We enjoyed reading the details of the various operations for prolapse which we have seen performed so skillfully by one of the authors in Hong Kong.

The chapter on the important problem of sterility is full of interest.

The discouragement of meddlesome interference in acute salphingitis, and the stress laid on preserving some ovarian tissue whenever possible in operations on chronic inflammatory conditions are two pieces of advice not unneeded in the current surgical practice of the Far East.

The volume is easy to handle, and has a good index.

The text book should be in the hands of every medical student, general practitioner and gynæcologist.

"*Handbook of Obstetrics*": By Prof. R. E. Tottenham, M.D., F.R.C.P.I., F.C.O.G. 'Professor of Obstetrics and Gynæcology, University of Hong Kong; consulting Obstetrician and Gynæcologist to the Hong Kong Government; formerly Censor and Examiner in Midwifery and Gynæcology, Royal College of Physicians, Ireland;

Obstetric Physician and Gynæcologist to Dr. Steevens' Hospital Dublin; Assistant Master Rotunda Hospital, Dublin.'

1931 Edition with 102 illustrations. Price 10s. 6d.

Published by:

Messrs. J. & P. CHURCHILL,
4, Gloucester Place,
Portman Square.

The author's ease of expression and his sound teaching gained from a great clinical experience in the teaching of Midwifery is more than exemplified in this bandbook of midwifery.

Throughout the book problems are approached from the clinical point of view and special prominence is given to those conditions which in the experience of the writer, are of frequent occurrence clinically. In keeping with the recent advances in Obstetrics, the Author has not forgotten to mention Zondek Ascheim's test and other new advances. Tweedy's treatment for Eclampsia has been modified and the results certainly prove the efficiency of this new line of treatment.

Chapter IX devoted to occiput posterior is exceedingly well written and well illustrated by plates.

Text Books on midwifery divide uterine inertia into primary and secondary. Students usually mix up the two conditions and are none the wiser. The author has wisely departed from the usual treatise and explains in simple language what inertia means.

It is an essentially practical little volume and one that can be recommended to all students of medicine and nurses.

D. K. P.

"*An Introduction to Medical History and Case Taking,*" by Geoffrey Bourne, E. & S. Livingstone, 16-17 Teviot Place, Edinburgh.

On reading this book of 185 pages, one is rather surprised at the choice of the title. One is certainly "introduced" to medical history and case taking, but that is all. After page 48 the author goes on to write sketchy notes on physical examination, diagnosis, prognosis and treatment.

Although all this matter is written in an interesting form, one cannot help feeling that such subjects are treated much better in larger textbooks written specially on such subjects. When big subjects such as these are dealt with so briefly they cannot be treated adequately. As an instance of this, in the table of Urinary Examination on page 81, no mention is made of advisability of looking for either blood or

pus in the urine. Again on page 77, in the examination of the abdomen, no mention is made of reflexes of the muscles in each quadrant of the anterior abdominal wall. It is true this is mentioned later in the Central Nervous System examination, but one cannot help feeling that all this extra matter has suffered by compression and is incompatible with the title.

The small amount of the book which deals with history and case taking is good, although perhaps mention might have been made of the difficulties experienced when the patient has been found unconscious. The few paragraphs dealing with children are well worth remembering and will help many a student to learn how to win the confidence of a very young sufferer.

Summing up, the book is written in a very readable style and in an interesting manner, and could be read by both student and doctor, with much advantage especially on account of the advice the writer gives as to the best textbooks of reference for each part of the subject under consideration.

"*Clinical Chemistry in Practical Medicine,*" by C. P. Stewart and D. M. Dunlop. E. & S. Livingstone, 16-17 Teviot Place, Edinburgh. 246 pages.

Clinical Chemistry is one of the many recent branches of Medical science that is rapidly accumulating a literature for itself, and the Edinburgh School is to be congratulated on turning out such a good book.

This book is not so much a textbook for laboratory workers, as a guide book to the practitioner or specialist, telling him what help he can expect from the laboratory and how best to obtain that help. In cases where the chemical determinations are easy and require little time and apparatus, the methods are described in detail, so that the physician may be able to get his information without bothering a laboratory expert.

It is easy to see that the authors have had laboratory experience for they rightly stress the necessity of the sample being accompanied by a short note from the physician giving the main clinical condition of the patient. They also stress the importance of methods of preservation of samples of urine, faeces, blood, etc., what biochemist has not had, to ask for a further sample of blood because not enough has been sent, or because it has been allowed to clot or too much anticoagulant has been added? If clinicians could spend a few minutes reading a book such as this, much of their valuable time would be saved in the long run.

The chapter on acidosis and alkalosis is very well written, and glycosuria, renal function, basal metabolism, pancratic and hepatic function tests are all adequately considered. On the chapter dealing with the examination of stomach contents we should like to make one or two minor criticisms however. It is doubtful whether it is worth while using the Congo-red Test for free hydrochloric acid when Topfer's reagent is at hand, and especially when Gunzberg's reagent is more delicate and, in the case of stomach contents, specific Uffelmann's Test is not very satisfactory for lactic acid and the reagent does not keep well in this climate.

The authors use the unfiltered gastric contents for their titrations. Owing to the variations in the amount of mucus in samples we favour the method of always centrifuging before titrating, and it is a pity that the estimation of total chlorides is not insisted on in every sample as well as acids. For those of us in Hong Kong this chapter along with the one on Blood Calcium is very valuable on account of the prevalence of sprue.

The authors are to be congratulated on this good book which we can thoroughly recommend to all doctors and students.