another from beneath the tip of the chin to meet this at right angles, the anterior triangle is first cleared of the fascia, fat, and lymphatic glands belonging to the submental, submaxillary, inferior parotid, and carotid groups, taking care to prevent tearing of these glands, as otherwise cancer implantation followed by recurrent nodules, or, more frequently, widespread and rapid malignant induration of the whole side of the neck, might result. Drainage tubes are inserted before closing this wound, to remove blood-stained exudation or secretion from any of the salivary glands, or in case a communication be accidentally made with the oral cavity. Thereafter the mucous membrane of the floor of the mouth and the fraenum is divided, allowing of the tongue being pulled forward and the lingual arteries ligatured. The tongue is divided transversely as far back as possible and the mucous membrane of the floor of the mouth sutured over the stump. Preliminary laryngotomy is quite unnecessary, and is not adopted by us. The modified Trendelenburg position in which the patient is put at operation prevents blood entering the trachea. The patient is propped up in bed as soon as is possible; mucus is removed by swabbing; and nourishment is given by means of a rubber tube placed on the spout of a feeding cup and passed well into the pharynx, where swallowing is entirely a reflex action. As the healing of the wound progresses the patient is able to drink out of a cup. He is supplied with a writing block, and is forbidden to make attempts at speech. Gradually the scar tissue disappears and mobility of the floor of the mouth and the stump becomes restored, so that after the lapse of a fortnight articulation is possible and improves with time, finally approaching so near the normal that the uninitiated might not detect the loss of the tongue. You will hear from one of the patients here to-day, whose tongue I removed for cancer fifteen years ago, how perfect is this articulation. For the first week after excision of the tongue, partly as a result of the operation and partly from the enforced silence, the patient is apt to become very depressed, and I always advise getting him out of bed as soon as possible to sit in an armchair, as this cheers him up.

(c) *Palliative*.—In those cases which are beyond the stage of operation, where their life becomes a burden to them and their sufferings grow more acute, can nothing be done? I strongly advise removal of the tongue where it is possible, even when there is no hope of cure owing to the widespread glandular involvement. In many cases it may be removed even when the disease is far advanced, and with the aid of the cautery any suspicious foci of recrudescence can be attacked and the condition rendered vastly more satisfactory than if the disease had been allowed to pursue its course unchecked. Unless something is done to alleviate the patient's condition terrible suffering has to be endured. For a considerable time I have been endeavouring to carry out some sort of starvation treatment of the growth by avascularizing the part. The fact that the tongue is a fairly well isolated organ with a definite blood supply coming from the two lingual arteries seemed to hold out the hope that by ligation of these vessels avascularization would result, but I found that, owing to the free anastomosis between the various branches of the external carotid arteries, such a proceeding was attended with but little success. Further attempts by tying the external carotids did not give any better results, and it is, in fact, impossible by mere ligation to cut off the blood supply anywhere in the carotid area. Dawban suggested the injection of the vessels with a paraffin preparation of a melting point somewhat higher than body temperature. This I have adopted on several occasions. The method indubitably accomplishes more complete avascularization than ordinary ligation. It causes shrinking of the part, the ulceration becomes less foul, contrary to what one would expect, but the great benefit derived from it is the marked alleviation of pain. In one case, where there was extensive recurrence in the stump of the tongue and the floor of the mouth and where the disease had spread to the anterior pillar of the fauces and the right side of the pharynx, the whole affected area cicatrized over and the disease seemed to have disappeared. It, however, recurred on the side of the pharynx a year afterwards. I cannot recommend paraffin injections as a routine method, as they appear to be not wholly free from risk.

CONCLUSIONS.

The lessons to be learnt are: Wide removal in definite epithelioma; microscopic examination of suspicious lesions; the avoidance of tobacco by those who have syphilitic lesions of the tongue; and radical treatment of all syphilitics till serologically they are pronounced free.

The thorough treatment of syphilis would wellnigh abolish cancer of the tongue.

ENUCLEATION OF TONSILS AND REMOVAL OF ADENOIDS UNDER GAS ANAESTHESIA.*

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By enucleation of the tonsil I mean the complete removal of the circumscribed mass of lymphatic tissue lying between the anterior and posterior faucial pillars, together with its capsule.

The earlier operations on the tonsils were directed chiefly towards the removal of the redundant mass of tissue which projected beyond the pillars of the fauces, leaving the tonsillar base and capsule *in situ*. Such tonsils gave rise to some mechanical obstruction, associated with occasional inflammatory attacks, and these constituted the indications for their amputation.

With the evolution of the view, as to the part played by the tonsils as a path of entry for local and systemic infections, came more vigorous attempts at their removal as a whole, greater importance being attached to septicity than to size. These attempts were more or less successful, but no surgeon could state with any degree of tolerable certainty, when about to operate, that he would be able to remove the gland with its capsule completely, except in a limited number of medium-sized, compact, and firm tonsils, until the method of enucleation by dissection was introduced.

This method is a certain and efficient one, and in the hands of its advocates has been used frequently to enucleate the portion of the glands which the older method failed to remove, and with decided benefit to the patients.

Any operator with a fair degree of dexterity can soon master either or all of the various types of technique used in this method, but there are certain essentials of the operation which stand in the way of its popularity. This applies particularly to the depth of chloroform anaesthesia required, which is always a source of anxiety to surgeon and anaesthetist; and, indeed, many of the latter dislike pushing the anaesthetic to such a degree. Partly on account of this difficulty with the anaesthetic, and at the same time recognizing the value of complete removal, surgeons have latterly turned their attention to perfecting some method of enucleation by tonsillotomes.

To Greenfield Sluder of St. Louis belongs, I believe, the credit of having first originated the idea of applying the tonsillotome by its outer aspect to the tonsil, whilst laying special emphasis on the sliding of the tonsil on to the alveolar projection of the lower jaw, to facilitate pushing the gland through the ring of the instrument. Sluder's idea has been considerably modified by some surgeons in this country, notably Pybus and Whillis of Newcastle and Peters of London. The points which, in my opinion, are of most importance, and my reasons for specially emphasizing some of them, will probably be best conveyed by giving a description of the whole of the method and the technique which I adopt at the Evelina Hospital for Children, where an average of about thirty cases in a morning have to be operated on.

1. Preparation of the Patient.

If the patient has any decayed teeth the help of the dentist is sought to get the mouth into good condition. It is obviously bad surgery to operate in the presence of manifest sepsis, in the absence of urgency. The bowels are cleared out the day previous to operation, and on the

* Read before the Dartford Division of the British Medical Association.

morning of the operation no solid food is given—in fact, the usual preparation for a general anaesthetic. The following mixture is given one day before the operation and continued for six days after:

R.	Sodae salicyl.				
	Potass. bicarb.	...	...	āā	gr. x
	Potass. chlor.				
	Elixir aromat. (B.P.C.)	...	...	ṡ	xx
	Aq. chlorof.	...	...	5	jss

This is the strength of a stock mixture. The dose is as follows: Under 6 years of age, 1 drachm; from 6 to 12 years, 2 drachms. It is given for its local and general antiseptic action, and to counteract any septic absorption from the raw tonsillar bed and naso-pharynx. This treatment has arisen out of the view that acute rheumatism is a type of systemic infection of tonsillar origin. Potassium chlorate enjoys a wide reputation as an excellent drug in the treatment of unhealthy conditions of mucous membranes. When taken internally it is said to be excreted by the saliva, and in this way can exert its local action on the throat after operation. For the idea of this useful combination I am indebted to my friend Mr. Somerville Hastings.

2. Position of the Operating Table.

This is of considerable importance to ensure good light. I have tried the various forms of head lights, and discarded them one after the other as unsatisfactory, and only to be used in the absence of daylight. The table is placed lengthwise, parallel to the window, and the operator stands between the two. A good light and full view of both tonsils are absolutely essential to enable the surgeon to enucleate completely, and avoid injuring the uvula and faucial pillars. The table shown in Fig. 1 has two hinged

Fig. 1.

basins, fitted one on either side near the top, and when not in use they swing under the table. The basin next to the operator is for the purpose of receiving the blood. It also receives the water used in cleaning the patient's face. The basin on the opposite side contains ice-cold water and sponges to apply to the patient's face when the operation is completed.

This simple device limits the range of blood-splashing so common during these operations, and is far more effective and cleanly than a pail or tray of sawdust placed on the floor. The table should not be higher than the tip of the great trochanter of the surgeon, or he will find his movements restrained during the operation.

3. Position of the Patient.

The patient is placed on his back on the table with his right side to the window, and resting on the specially constructed sand pillow seen in Fig. 1. This pillow, though not an essential, as any pillow measuring about 12 to 14 in. square by 1½ in. thick will do quite well, enables the operation to be done with greater comfort and speed, as it guides the nurse who assists to the exact position in which to keep the patient. It is, therefore, especially useful when doing a large series of cases.

The shoulders rest on s, the occiput at o, and the right cheek against the process a, with the face partially turned to the window and the operator. When the tonsils are removed the patient is turned on to the right side for the removal of the adenoids. The right cheek now rests flat on the process A, and the right shoulder fits into the notch N. This gives fixity and stability to the position of the patient, and enables the operator to manipulate with

a greater degree of precision when removing the adenoids. The nurse must hold the patient's arms well down along the sides to depress the shoulders below the level of the chin.

4. Gag.

I use a modified Doyen's gag, made for me by the Holborn Surgical Company; it answers the purpose well. Its flanges are applied to the lateral teeth and not to the incisors. This enables the operator to bring the adenoid curette out in an abrupt curve, and sweep the growths cleanly away. There is less risk of slipping down the naso-pharynx with the cutting edge, and consequently less danger of leaving tags or removing mucous membrane than if the blade of a gag is resting against the upper incisor teeth.

5. Anaesthesia.

At the Evelina Hospital I use nitrous oxide gas anaesthesia with air in all cases of enucleation of tonsils and removal of adenoids. When skilfully administered it gives ample time to complete the operation efficiently. The enucleation of each tonsil takes four to five seconds, and the removal of adenoids fifteen to twenty seconds—in all less than half a minute.

I do not propose to discuss the merits of the various anaesthetics in use for this operation, and therefore desire at this point to remove any impression which the title of this article may convey as to my being an advocate of gas anaesthesia exclusively. My purpose is merely to state that, in my opinion, with a properly modified tonsillotome and careful technique, tonsils can be enucleated as completely as it is possible by any other method, even under such short anaesthesia as gas affords.

I do, however, wish to add that, personally, I like a longer anaesthetic than gas, and particularly when doing isolated cases and working with strange assistants. A hypodermic injection of morphine and atropine given three-quarters of an hour to an hour before the operation adds considerably to the after comfort of the patient. In children ¼ grain of morphine and 1/10 grain of atropine is sufficient to ensure a good night's rest following the removal of tonsils and adenoids. In private I find that it is an excellent addition to the general anaesthetic and can be used to advantage, but in a large out-patient department at a hospital it is difficult to carry out.

6. Tonsillectome.

As this instrument is used exclusively for enucleation, I propose in future to refer to it as the *tonsillectome*. The instrument which I find most satisfactory is a modification of one designed by Ballenger of Chicago for Sluder's method, made for me by the Holborn Surgical Company (Fig. 2). In the original instrument the handle was set at a very acute angle to the shaft and blade, and was chiefly intended for use on patients in the sitting position. Owing to this close proximity of the handle and shaft, it was almost impossible to enucleate tonsils with the patient lying down, hence the open angle in the present instrument. The shaft and blade are 1 in. longer than Ballenger's, and there are several other points of difference. The essential features are:

Fig. 2.

(a) A thin ring, not bevelled (like the usual type of tonsillotome), but square-edged around the margin of the opening.

(b) A small opening. The transverse diameter of the opening is eleven-sixteenths of an inch. The transverse diameter, including opening and ring, is fourteen-sixteenths of an inch. The antero-posterior diameter of the opening is ten-sixteenths of an inch. The two diameters of the opening can be increased up to thirteen-sixteenths of an inch with advantage, as this size will take any tonsil, and one instrument will suffice for all cases, but with the smaller opening the beginner can operate on the vast majority of cases with far less risk of including and damaging the faucial pillars, uvula, etc. It is therefore better to have the two sizes.

(c) Dull edged blade and long, stout shaft.

(d) No slot to receive the blade when the latter is driven home. The slot recess is filled with lead and the blade cuts on to this.

The thin ring, not bevelled, enables one to thread it on to any tonsil, no matter how flat, with very little risk of slipping when the gland is being raised forwards to the anterior pillar of the fauces. The small opening fits tightly around the base of the tonsil when the latter is squeezed through it and the capsule is inverted in this manœuvre. The thin ring and small opening have the further combined advantage of keeping the size of the instrument such that it will fit any fauces and remove any type of tonsil in one bite (if the larger opening is used). The stout shaft is necessary to prevent bending when pressure is exerted in raising the tonsil forwards. The shaft being long, the handle clears the patient's cheek and chin and facilitates movements. The dull-edged blade, entering between the anterior faucial pillar and the tonsil, strikes the anterior border of the capsule, and the leaded slot of the ring rests against the posterior border.

7. Removal of the Tonsils.

The patient's shoulders rest at s on the pillow shown in Fig. 1, the occiput at o, and the face looks towards the operator and the window. In this position the chin is thrown forwards from the chest and the head is partially extended. This position of the chin enables the operator to move the handle of his instrument freely from side to side, without any obstruction from the patient's chest or shoulders. When the facepiece of the gas apparatus is removed the fauces are full in the light of the window, as the mouth is already opened by the gag. Opening the mouth to its fullest extent is undesirable, as it tightens the faucial pillars and diminishes the mobility of the tonsils. Partial opening, just wide enough to give a good view and easy access to the tonsils when the tongue is depressed, is quite sufficient. Observance of this small point will obviate the dislocation of the lower jaw, which one hears of occasionally.

The right or lower tonsil is removed first. This enables the operator to seize the left or upper, and extract it before his view is obscured by blood from the lower. The right hand holds the instrument for both tonsils.

The tonsillectome is inserted with the outer aspect of the ring towards the tonsil to be removed, and the edge of the shaft is used as a tongue depressor, to bring the whole tonsil into view. The lower part of the ring is threaded under the lower pole of the tonsil, pressed firmly outwards, and the latter is then raised forwards as far as its mobility will allow. This movement is aided and slipping of the ring on the tonsil controlled by hooking the left thumb under the centre of the shaft.

The handle and outer end of the shaft are next carried to the opposite angle of the mouth, and a quarter turn given to the shaft, which is now lying obliquely across the oral cavity with its outer aspect upwards. This causes the tonsil to lie over the tonsillectome opening, bulging the anterior pillar, as it does when seized by a blunted conchotome in dissection enucleation. The handle is now slightly depressed, the ring still more firmly pressed up behind the tonsil, and the whole instrument withdrawn a little way. This movement has the effect of rolling the tonsil better into view, and its junction with the anterior pillar is more readily seen, for the insertion of the blade at the margin of the capsule. It also facilitates the inversion of the latter, when the left index finger is applied outside the border of the anterior pillar, on the prominence of the tonsil, to push it through the opening of the instrument. When the tonsil is slightly larger than the opening, and some pressure is required to squeeze it through, a peculiar sensation of "dislocation" is felt by the left index finger. This is due to the fact that the margins of the tonsillectome ring are firmly applied to the periphery of the tonsil, and offer resistance, so that when the latter is pushed through the opening the capsule is inverted, and gives a sensation of slipping, like that felt when a dislocated shoulder-joint slides into place on reduction.

The blade is now closed, and includes the whole periphery of the tonsil capsule between its dull edge and the leaded face of the ring. Both hands momentarily grasp the handle of the instrument and drive the blade more firmly home. Another half-turn is now given to the tonsillectome in the long axis of the shaft towards the uvula, and withdrawn, bearing the tonsil and capsule on the inner or under aspect of the instrument. In this way the capsule is stripped off its bed completely, and its

vessels are first crushed and then torn across. For this reason the haemorrhage is far less than when a sharp blade cutting into a slot is used, as the latter type of instrument cuts through the margins of the capsule. All the tonsils removed are carefully examined, and in several long series done recently enucleation was quite as complete in every case as that by the dissection method. I have used this method exclusively for over twelve months—in nearly 1,000 cases—with very satisfactory results.

8. Removal of Adenoids.

After removal of the tonsils the patient is promptly turned on to the right side, and the anaesthetist empties the throat of blood by momentarily holding the face partly downwards over the side of the table and basin, and shaking the head. This obviates swabbing and much of the after-sickness due to swallowed blood or the risk of any of the latter entering the bronchi.

The patient's right cheek is now placed firmly on the process a of the pillow, with right shoulder in the notch n (Fig. 1). The curette which I find most useful is one which Krohne and Sesemann have made for me (Fig. 3).

Fig. 3.

It is practically the same size as Lake's No. 2, but shaped like the German-made modification of Gottstein's (a smaller size is used for children under 4 or 5 years of age). The cage somewhat resembles that in common use, but it is controlled by a spring which is exerting constant pressure on any mass of adenoids which enter it, and prevents their slipping out when the instrument is withdrawn. By using it as described below the main mass of adenoids is always withdrawn in the instrument, and where the mass is a compact growth it is removed so completely in one sweep as rarely to need any further curettage. This helps to obviate the risk of leaving a separated mass to be swallowed or inspired, or that of a hanging mass falling over the laryngeal opening and causing respiratory distress.

The operator's left hand is placed on the parietal and occipital region of the patient's head, to control the resistance to the pressure exerted by the curette, and to flex the head, as the instrument is being swept over the nasopharynx. This flexion diminishes the prominence of the body of the axis, and makes the naso-pharyngeal curve more even. The curette is inserted in the middle line, using it as a tongue-depressor to enable the point to clear the uvula and avoid injuring it, and is pushed backwards until it strikes the pharynx. The point is then carried upwards, firmly pressed against the posterior wall, and still in the middle line, until it is stopped by the posterior border of the septum. It is now drawn forwards to pull on the soft palate to ensure its proper relationship to the latter before starting to cut. The point is again carried upwards along the septum and pushed backwards, downwards, and outwards, still in the middle line, with firm pressure and gradual, easy movement, whilst the patient's head is partially flexed and steadied by the operator's left hand. With a small uncaged Kirstein or Stubbs curette any remaining adenoid irregularities are removed by a series of short scrapes, and the forefinger is finally introduced to verify this.

9. After-Treatment.

The patients are placed in bed in an airy room for two days at least. It is always wise to keep them in bed for two days to recover from whatever degree of shock they may have suffered as a result of the operation. After this period they should be allowed to get up if they show a desire to do so. The diet should be cool liquids for the first two days, and then semisolids and solids.

The sodium salicylate mixture is continued for six days and then followed by syrup of the iodide of iron or syr. ferri phos. co. for a fortnight.

Breathing Exercises.

When healing is complete, a short, easy, daily course of breathing exercises, with the mouth shut, is insisted upon. This should be persisted in for at least six months.

Conclusion.

Let me enter a plea for raising the standard of this branch of surgery, by making it an operation of precision, and removing some of the reproach of doubtful value and inefficiency attached to it. In this connexion I should like to quote the following extracts from Dr. Still's excellent book on *Common Disorders of Childhood*:

"I would lay stress upon the importance of complete removal of adenoids and tonsils by whatever method is found to be most practicable." "I will venture to insist that the operation for removal of adenoids and tonsils is not so simple that anybody and everybody who happens to have a surgical qualification and a guillotine can do it as it ought to be done; it is one which, if done, ought to be done by the most expert skill attainable."

A CASE OF VAQUEZ'S DISEASE

(POLYCYTHAEMIA WITH PLETHORA, AND
SPLENO-MEGALY).

BY

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It is now just over twenty years since Vaquez first described the syndrome of polycythaemia with true plethora, cyanosis, and splenomegaly, with which his name is associated. A full description of the condition, with the literature, was given by Parkes Weber¹ in 1908, and by myself² in 1911, while Senator's³ monograph published in the latter year contains much of the most recent work on the subject. This observer then paid special attention to the condition of the gaseous exchange in the lungs. He found in several cases not only a greatly increased exchange of both oxygen and carbon dioxide, but also a great increase in the volume of air respired. Further observations are required with regard to these points. Since that date considerable additions have been made to the literature, and cases have been recorded by Hale White,⁴ Emanuel,⁵ Isaacs Coke,⁶ and Parkinson⁷ in this country, by Kuttner⁸ in Germany, while Hamilton and Morse⁹ have published a case in America with a full report of the *post-mortem* findings.

The fact that so many fresh cases have been published in so short a period shows that the condition is by no means so rare as was at one time believed. But while so much advance has been made in the recognition of the disease, it cannot be said that equal advance has been made in the elucidation of its etiology. The case which it is the purpose of the present paper to record merely confirms previous observations; it is, perhaps, of special interest because the bone-marrow was examined during life, a procedure which, so far as I am aware, has only been adopted before on one occasion, namely, in the case described by Gibson¹⁰ and later published by myself.

A man aged 52, a gamekeeper, was admitted to the Royal Infirmary in August, 1912, under the care of the late Dr. G. A. Gibson. He complained of pain in the upper part of the abdomen. The family history is of little importance, his mother having reached the age of 92, while his father was the victim of an accident at the age of 54. He is married and has three children living, three others dying in infancy. With the exception of a slight attack of influenza fifteen years ago he has never had a day's illness. He is a non-smoker and practically a teetotaler, and from the nature of his occupation he leads a healthy open-air life. The pain of which he now complains first troubled him a month before admission. It is sharp and lancinating in character, is almost constantly present, and is felt in the left hypochondriac region. For some months his wife has told him that his face was becoming very florid. The patient states that he has had several attacks of epistaxis. He has lost fully a stone in weight during the last two or three years.

General Appearance.—His height is 5 ft. 8½ in., and his weight is 9 st. 2½ lb. The face, lips, and ears show a striking degree of cyanosis. The tongue and mucous membranes are of a dark bluish-red tinge. The conjunctivae are markedly injected. He is thin, but not emaciated.

Alimentary System.—The tongue is clean and moist. The teeth in the upper jaw are artificial, the others having become loose and dropped out; those in the lower jaw are fairly good. He complains of some loss of appetite, and he also suffers to a slight extent from a sensation of distension and discomfort after meals. There is no sickness, thirst, or constipation. His breath is rather foul. The stomach is not dilated, and the vertical dullness of the liver is not greater than normal.

Abdomen.—The most striking feature of the examination of the abdomen is the presence of an enlarged spleen, which

extends downwards and forwards three fingerbreadths beyond the left costal margin. It is firm, and very slightly tender to the touch. On auscultation distinct friction is heard over it.

Circulatory System.—The heart is not enlarged; the apex beat is in the fifth interspace, 3½ in. from mid-sternum. The sounds are closed and pure. The vessels are healthy and the systolic pressure 108 mm. Hg.

The examination of the respiratory system was negative.

Urine.—Acid; specific gravity 1016; deposit of urates and uric acid; no albumen or sugar. The centrifugalized deposit shows no tube-casts.

Nervous System.—The patient has occasionally slight headache. He states that he is unable to read for long at a time. The pupils react briskly to light and on convergence. The examination of the fundus oculi shows that the vessels are engorged with very dark blood.

The Blood.

Red blood corpuscles	...	...	8,420,000
Haemoglobin	...	...	100% + (Tallqvist)
White blood corpuscles	...	...	39,000

Differential count of 400 leucocytes:

Polymorphs	...	...	87%
Lymphocytes	...	...	6%
Large mononuclears	...	...	3%
Eosinophiles	...	...	2.5%
Mast cells	...	...	1.5%

Further observations:

(1) Red blood corpuscles	...	...	9,248,000
Haemoglobin	...	...	100% + (Tallqvist)
White blood corpuscles	...	...	24,000
Polymorphs	...	...	81%
Lymphocytes	...	...	8%
Large mononuclears	...	...	2%
Eosinophiles	...	...	4%
Mast cells	...	...	5%
(2) Red blood corpuscles	...	...	9,240,000
Haemoglobin	...	...	110% (Haldane)
White blood corpuscles	...	...	28,200
Polymorphs	...	...	77%
Lymphocytes	...	...	12%
Large mononuclears	...	...	1%
Eosinophiles	...	...	6%
Mast cells	...	...	4%
(3) Red blood corpuscles	...	...	9,760,000
Haemoglobin	...	...	110% (Haldane)
White blood corpuscles	...	...	31,600
Polymorphs	...	...	81%
Lymphocytes	...	...	9%
Large mononuclears	...	...	3%
Eosinophiles	...	...	5%
Mast cells	...	...	2%

The specific gravity of the blood, estimated by Hammerschlag's method, was 1062. The viscosity, estimated by Denning and Watson's clinical viscosimeter, was 26.4, that is, 2½ times the normal.

The coagulation time, estimated by Wright's coagulometer, was slow, 6 min. 25 sec. This is in accordance with the observations of Bence¹¹ and Pethybridge.¹²

The red cells were unaltered in size and shape; abnormal cells were exceedingly scanty, for though a large number of films were examined only two megaloblasts, one neutrophilic myelocyte, and one eosinophilic myelocyte were seen.

On September 20th Mr. Alexis Thomson kindly trephined the right tibia, and from the bone marrow thus obtained films and sections were made. Two days after the operation there was considerable bleeding from the wound, necessitating frequent dressing, and a haematoma formed. In order to determine whether the haemorrhage had caused any marked change in the blood count, the following observations were made:

Red blood corpuscles	...	...	9,216,000
Haemoglobin	...	...	110% (Haldane)
White blood corpuscles	...	...	40,000
Polymorphs	...	...	86%
Lymphocytes	...	...	4%
Large mononuclears	...	...	6%
Eosinophiles	...	...	3%
Mast cells	...	...	1%

It was also noted that the spleen had become much smaller since the previous day, and now only just reached below the costal margin, a fact which tends to confirm the usual view that, while the spleen in this condition enlarges partly on account of increased functional activity, it also acts partly as a reservoir to compensate for the greatly increased total volume of the blood.

The bone marrow from the centre of the shaft of the tibia was deep red in colour. The microscopical appearances were not nearly so well marked as in the case published two years ago. There was marked congestion, a few small haemorrhages were present, and the blood vessels were crowded with non-nucleated erythrocytes. The films did not show any great departure from the normal, but the sections revealed distinct though slight evidence both of erythroblastic and leucoblastic reaction. The fatty tissue of the marrow was encroached upon only to a slight extent; but when one remembers that all the long bones share in the erythroblastic and leucoblastic reaction, although it is only slight in degree, there is no difficulty in explaining the high counts of the red and white corpuscles.

Judging from the appearances of the bone marrow, the case must be considered a fairly early one. The patient was also singularly free from many of the usual symptoms associated with the condition. Pain in the left hypo-