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TOXIC GOITRE: A SURVEY OF 125 CASES TREATED SURGICALLY

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This paper is based on an analysis of 125 consecutive and unselected cases of toxic goitre treated by operation. All the cases came under the charge of one surgeon during a period of sixteen years. A few of the cases were treated as far back as 1918, but the majority have been operated on during the last six years. It is not our intention to present in any detail the symptomatology of toxic goitre or the operative technique, but rather to record the results of operative treatment in a representative series of consecutive cases. We are fortunate in that the great majority of the patients have been able to report periodically at hospital, so that it has been possible to make regular observations of their progress. All but a few were treated in the wards of the Royal Infirmary; cases treated privately have also been included to enlarge the series.

To simplify description cases have been divided into two groups—primary and secondary toxic goitre. Primary toxic goitre signifies toxic symptoms occurring as a result of pathological changes in a previously normal thyroid, giving rise in the majority of cases to typical exophthalmic goitre. The group classed as secondary toxic goitre includes those cases in which some simple form of goitre preceded the development of toxic symptoms, and the cases in this group correspond closely to those formerly described by Plummer as toxic adenoma. This classification, though it may be open to objection, is simple and comprehensive.

In our series of 125 cases 105 were classified as primary toxic goitre and twenty as secondary toxic goitre. On account of the difficulty of allocating some cases, these figures should be regarded as being only approximately accurate.

Sex and Age Incidence

Of the 125 cases 109 were females and sixteen were males: a sex ratio of 6.8 to 1. The largest number of cases occurred at the age period 20 to 40, the average age for the whole series being 33 years. Seven patients were under 20 and sixteen were over 50 years of age.

Duration

The duration of symptoms prior to operation varied from a few months to eighteen years, with an average of thirty-two months. In our experience it is not infrequently difficult to estimate the exact duration of symptoms, since patients with toxic goitre are apt to be

vague in their statements and tend to underestimate the duration of their illness.

Severity of Cases

Since the severity of toxic symptoms may have an important bearing on the results of treatment, we have graded our cases as severe, moderate, and mild. In the severe group are included patients who at the time of operation were extremely toxic, bed-ridden, and entirely incapable of even the lightest activity. The moderate group comprises patients who showed very definite toxic symptoms and were unfit for their employment, but who managed with difficulty to "remain on their feet" and perhaps carry out the easiest household duties. In the group classed as mild are patients who showed only comparatively slight toxic symptoms and who were able to perform their various duties, although with some considerable effort.

In the following table the number of cases allotted to each group is shown:

Severe	...	...	...	...	...	33, or 26.4 per cent.
Moderate	...	...	...	...	...	65, or 52.0 " "
Mild	...	...	...	...	...	20, or 16.0 " "
Not classified	...	...	...	...	...	7, or 5.6 " "

Previous Medical Treatment

A considerable proportion of the cases in this series had undergone a systematic trial of medical treatment before they were finally submitted to operation. Out of the total of 125, eighty-two had received prolonged courses of treatment in the medical wards apart from the usual pre-operative preparation. Such treatment consisted in long periods of rest in bed with iodine medication, and in some cases irradiation with radium had been tried. In the remaining forty-three cases, although we have no record of any intensive medical treatment prior to operation, we have reason to believe that the majority were treated with iodine and rest in their own homes.

Operation

Pre-operative Treatment.—Apart from the earlier cases in this series iodine has been given pre-operatively in the form either of Lugol's solution in doses of from 5 to 15 minims daily or of potassium iodide, 2 to 4 grains daily, over a period of from ten days to three weeks. When the symptoms have been severe larger doses of iodine have been found necessary. This regime has been

employed in both primary and secondary cases. Operation was performed when the maximum benefit seemed to have occurred, usually within ten to twenty-one days. The striking benefit which usually follows the administration of iodine is not as a rule maintained; it is therefore an advantage if the iodine is discontinued for some time before the patient is admitted for preparation for operation. The diet given in the average case has a caloric value of between 2,800 and 3,000. No effort is made to force diets of 5,000 calories as such forced feeding tends to disturb digestion. The patient is encouraged to take glucose drinks during the pre-operative period and, during the two days immediately preceding operation, receives 100 grams of glucose daily.

Anaesthesia.—In the earlier cases in this series either open or intratracheal ether anaesthesia was employed; later, gas and oxygen were preferred when a general anaesthetic was indicated. Local anaesthesia has, however, been employed in the majority of cases, and during the last six years has been regarded as the method of choice. Anaesthesia is induced by local infiltration of the operation area with 1 per cent. novocain solution and by regional block of the branches of the cervical plexus at the posterior border of the sternomastoid muscles. Care is taken to introduce the solution around the upper poles and above the isthmus of the gland. Local anaesthesia alone has been used successfully in ninety-seven of the cases in this series, and in only nine of these was it necessary to supplement it with light general anaesthesia. General anaesthesia alone has been used in twenty-eight cases. It is an advantage of local anaesthesia that the operation must be done with gentleness, and with the minimum of trauma, and that the patient can phonate at any stage of the operation if the integrity of the recurrent nerves requires to be decided. After operation under local anaesthesia the patient can take fluids at once, and there is a lessened tendency to respiratory complications. In order to perform the operation satisfactorily a pre-operative sedative is advisable. On the night before operation the patient receives 6 grains of veronal and 5 grains of aspirin. One and a half hours before operation one-third of a grain of omnopon is given, and one hour later, depending on the patient's reaction to the first dose, a second injection of omnopon is given if necessary. With omnopon as a pre-operative sedative the patient remains conscious and lies quietly during the operation. We have not observed any diminution of the respiratory rate in any of the cases in which omnopon has been used such as occurs with morphine and heroin. The use of omnopon has helped to strengthen our faith in the advantages of local anaesthesia in all types of toxic goitre, including those cases which at best can only be regarded as bad subjects for operation. Earlier experience with morphine and hyoscine was not uniformly satisfactory, as in some cases the hyoscine excited rather than quieted the patient. In a few cases avertin was used, but with it it was found impossible to perform the operation under local anaesthesia. The combination of avertin and light general anaesthesia, however, gave satisfactory results in the cases in which it was employed.

Operative Technique.—In the following tables are shown the types of operation performed in this series.

(A) Primary Toxic Goitre

	Cases
(1) Subtotal thyroidectomy	97
(a) One-stage operation	93
(b) Preliminary ligation of superior thyroid arteries with subsequent subtotal thyroidectomy	2
(c) Subtotal thyroidectomy in two stages	2
(2) Resection of one lobe	7
(3) Ligation of superior thyroid arteries	1
Total	105

(B) Secondary Toxic Goitre

	Cases
(1) Bilateral resection	10
(2) Enucleation of adenoma	7
(3) Resection of one lobe	3
Total	20

It will be noted from the above tables that one-stage bilateral subtotal thyroidectomy was performed in a very high proportion of the cases. The following is a brief outline of the technique employed in this operation:

After reflection of the skin and platysma, exposure is facilitated by wide separation of the skin flaps with a self-retaining retractor. The depressor muscles are freely separated in the mid-line. Transverse division of the muscles is seldom necessary. At the outset the upper pole of the right lobe is exposed and the superior thyroid vessels are ligated and divided. The lobe is drawn medially, and the middle thyroid vein and other accessory veins are secured at the lateral aspect of the lobe. The lower pole is finally drawn forwards, and after the thyroid sheath has been separated the inferior thyroid veins are ligated and divided, and the trachea is exposed. The left lobe is dealt with in a similar manner. After the whole gland has been freely exposed the isthmus is divided between clamps and each half is dissected laterally until the anterior part of the lateral surface of the trachea is exposed on either side. The greater part of each lobe is removed by sharp dissection with the knife from the medial to the lateral side, leaving a strip of the postero-medial part of each lobe with its capsule intact. The margins of the thyroid remnant are sutured together with catgut. In very toxic cases the amount of thyroid tissue left on each side is approximately equal in size to one-third of a normal lobe. When involution is well marked more tissue is conserved. In our experience there is a tendency to remove too little rather than too much gland tissue. A small glass drainage tube is inserted through a puncture in the pre-thyroid muscles on each side into the lowest part of the space around the trachea. The drains are brought out laterally between the lips of the wound, the edges of which, including the platysma, are approximated by fine catgut sutures and Michel clips.

Post-operative Treatment.—After operation the patient is encouraged to take fluids freely by the mouth. Six ounces of glucose-saline are given per rectum four-hourly during the first two days, a total of 50 to 100 grams of glucose being given during the first twenty-four hours. While the patient remains in the surgical ward the same dose of iodine is given as was taken before the operation, and thereafter the iodine is discontinued unless the pulse rate remains high. The drains are removed in twenty-four to forty-eight hours, and the clips on the third day, when the edges of the wound are painted with collodion to maintain apposition. After leaving the surgical ward the patient is usually transferred to a medical ward or convalescent home for a further period of rest. Patients who return direct to their homes are advised to continue to rest in bed for a few weeks, and to resume normal activities very gradually.

Post-operative Complications

Shock.—Although shock is exceptional, the blood pressure may be reduced as a result of the operation, particularly in chronic cases in which the gland has been unusually vascular and friable. In these circumstances we have given a transfusion of blood at the conclusion of the operation, which has had the immediate effect of restoring the patient to a safe condition.

Sepsis.—No serious infection occurred in the series. In six cases a mild infection developed; these were all cases in which there was a collection of serum which necessitated the reinsertion of a drain. In none of the cases was complete healing delayed for more than a few days. In these cases with mild infection the average

number of days in the ward was 19, as compared with twelve days for the whole series.

Conjunctivitis.—This complication is liable to occur in cases with severe exophthalmos in which the eyelids fail to close during sleep or when the patient is under the influence of a sedative. Slight conjunctivitis occurred in a few of the early cases of this series. Subsequent experience has shown that it can readily be prevented by using some suitable eyewash and by protecting the eyes at night with a vaseline dressing kept in position by means of a bandage.

Dyspnoea from Pressure of Blood Clot.—In two cases the patient, who was perfectly comfortable and in good condition after returning to bed, developed after a few hours rapidly increasing dyspnoea with stridor. The rapidity with which the dyspnoea developed was such that both patients were soon in a critical condition. The stridor, which could be heard outside the ward, suggested bilateral abductor paralysis of the vocal cords. Within a few minutes of the onset of the dyspnoea in both cases the wound was opened up, and some clots under tension were evacuated from the retrosternal space. No bleeding points were seen, and there was no evidence of compression or collapse of the trachea. Within a few minutes the breathing became quieter, and within an hour it was normal. On examination of the larynx on the following day the vocal cords in both cases were found to move perfectly. Both patients made a satisfactory recovery. Somewhat similar symptoms, which, however, did not cause anxiety, developed in a third case, in which laryngoscopic examination proved that the vocal cords moved equally and well, and that the stridor was due to oedema of the hypopharynx and the upper part of the glottis. In this case the front of the neck seemed swollen as a result of accumulation of blood clot. On opening up the wound completely a large amount of clotted blood was found under tension, and a minute persistent oozing vessel on the front of the trachea was secured. The moderate degree of dyspnoea present was relieved by removal of the clot, and the patient's breathing was perfectly normal within a few hours. The details of these cases have been related in order to draw attention to a complication which may be encountered occasionally in any long series of thyroidectomy cases, and to emphasize the necessity for prompt recognition and immediate treatment.

Recurrent Nerve Paralysis.—No instance of either temporary or permanent paralysis of a vocal cord occurred in any of the cases in this series. In three cases limitation of one cord was noted on laryngoscopic examination before operation. In two of these recovery of movement of the cord was noted at a subsequent date.

Mental Symptoms.—Mental depression occurred in one case. The patient, who had suffered from primary toxic goitre for several years, was perfectly normal mentally until the tenth day after operation, when she became acutely melancholic and suffered from delusions. She was transferred to a mental home, from which she was discharged after a period of six weeks, having completely recovered her mental stability.

Tetany.—There were two cases of post-operative tetany. In the first case the symptoms were transient, and were confined to slight stiffness of the fingers, observed only on the first and fourth days after operation. Parathyroid extract and calcium were given for a period of two weeks. Thereafter no further signs of tetany were observed, and the patient has remained in excellent health. The second case was remarkable in that the symptoms of tetany did not appear until four months after operation, and no trace of parathyroid tissue could be detected in the resected lobes. Large doses of calcium were needed to

control the symptoms, and although it is now three years since her operation, the patient still requires to take calcium regularly. The general health is excellent, and the patient is in regular employment.

Myxoedema.—Signs of myxoedema developed in one case. There was no indication of thyroid insufficiency until three and a half years after the operation, when the weight became excessive and mental apathy was noted. This patient is now in excellent health, and requires to take only $1\frac{1}{2}$ grains of thyroid daily.

Results of Treatment

Since the main object of this paper is to present the results obtained by operative treatment in toxic goitre, we shall consider these in some detail. Out of a total of 125 cases 104 were examined personally by us when they presented themselves at hospital to report progress; a further ten patients were unable to report owing to distance or to family ties, and questionnaires were sent to these regarding their present state of health. In nine cases the operation has been performed too recently to allow of their inclusion in this section dealing with after-results. Two cases are untraced. Thus if we omit the nine cases which have been operated on during the last few months, we are left with a total of 116 cases, and we have information regarding the present state of health in 114 of these. For the purpose of discussing the after-effects of treatment, therefore, 114 will be taken as the total.

When an attempt is made to assess the results of treatment in a condition such as toxic goitre it is important to have some standard by which each individual case may be judged; and while, no doubt, we can to some extent gauge the degree of improvement by the disappearance of certain symptoms and signs, we are strongly of the opinion that the most valuable criterion of success or failure is the patient's general health and well-being. In this section dealing with the results of operative treatment, then, we shall first of all assess the patients according to their general health and fitness for work at the present time, and then the effect of operation on various symptoms and signs of toxic goitre will be considered. For the purpose of a general assessment certain symbols have been employed as follows:

S++. The patients included in this group were completely symptom-free, and stated that they were able to carry out their usual employment without any effort.

S+. These patients stated that they were feeling very well and fit for their work, but still showed slight evidence of hyperthyroidism.

S. The patients thus classified showed definite improvement as a result of the operation but did not feel capable of a full day's work, there being definite persistence of toxic symptoms.

S-. This group comprises the failures, and includes patients who obtained little or no relief from their symptoms following operation or who showed definite signs of a recurrence of thyroid enlargement.

The above classification, founded as it is on personal impression, must necessarily be merely approximate. We would state, however, that great care was exercised both in the examination and in the questioning of each patient before the final assessment.

The following table shows the number of cases included under each heading and, in addition, the number of deaths is shown. These latter cases, in which the patient died as a result of the operation or on some subsequent occasion, are discussed further in another section.

S++	...	...	...	72 or 63.2	} 86.9 per cent.
S+	...	...	...	27 or 23.7	
S	...	...	...	7 or 6.1	} 6.1 per cent.
S-	...	...	...	1 or 0.9	
Dead	...	...	...	7 or 6.1	„

This table reveals that 63.2 per cent. of those operated on are now completely restored to health and a further 23.7 per cent. are able to do a full day's work and remain practically symptom-free. Thus it may be said that highly satisfactory results have been obtained in 86.9 per cent. of cases.

Brief consideration of the patients in these groups may be of interest. Those classified S++ and S+ have been pronounced fit for their employment and, since the majority are women, the largest number are naturally engaged in housework. It is important to note that all the patients thus employed expressed themselves capable of the heaviest duties concerned with the management of their homes and not merely light household work. Regarding the time which elapsed following operation before the patients were able to resume their work our information is, unfortunately, incomplete. It is known, however, that 50 per cent. of the patients who are now fit for work were fully engaged in their various duties within one year of operation, and 30 per cent. were working within six months of operation. It is highly probable that these figures are considerably on the low side, and that resumption of work may usually be expected within six months of operation in successfully treated cases.

In the S group there are seven patients, and four of these are fit for light employment. The remaining three are able to go about, but any attempt at arduous work causes early fatigue. Study of these seven cases reveals that three have suffered from severe influenza or bronchitis since operation; two have had gynaecological operations, and two have had all their teeth extracted. The patients in this group have all gained weight since operation and show definite improvement in their general health, although persistence of a considerable degree of hyperthyroidism does not allow of their inclusion among the operation successes.

One patient has been classified S—, since, although there was some improvement following operation, there is now recurrence of thyroid enlargement and persistence of toxic symptoms.

Correlation of severity of symptoms with results of treatment may be conveniently shown thus:

	S++	S+	S	S—	Dead	Totals
Severe	15	9	2	0	5	31
Moderate	37	14	4	1	2	58
Mild	15	4	0	0	0	19
Unclassified ...	5	0	1	0	0	6
Totals	72	27	7	1	7	114

As would be expected, it is obvious from the above table that the best results are obtained in the moderate and mild cases.

Operation Mortality

In this series of 125 cases, four died as a result of the operation, representing a mortality rate of 3.2 per cent. In three of the cases death occurred on the day of operation, and the fourth died two days after operation. A brief description of these four cases may be of interest:

Case 1.—Mrs. C. W., aged 58 years. Duration, five years. Confined to bed for two years. Very feeble and exhausted, and weighed only 5 st. 3 lb. Operation: ligation of superior thyroid arteries under local anaesthesia. The decision to operate on this case was almost certainly an error of judgment.

Case 2.—Sarah D., aged 28 years. Duration, one year. B.M.R. + 90 per cent. Severe toxic symptoms. Operation: preliminary ligation of superior thyroid arteries followed by subtotal thyroidectomy with general anaesthesia. Post-mortem: fatty degeneration of liver with commencing necrosis of liver cells.

Case 3.—Andrew McL., aged 27 years. Duration, two years. B.M.R. + 59 per cent. Severe toxic symptoms. Operation: subtotal thyroidectomy with local and general anaesthesia. In this case death was possibly due to the pre-operative sedative, the patient appearing to have an idiosyncrasy to morphine and hyoscine.

Case 4.—Mrs. V., aged 50 years. Duration, two years, during which time she was confined to bed. Marked cardiac enlargement with auricular fibrillation. Operation: subtotal thyroidectomy under local anaesthesia. Died three hours after operation from sudden heart failure.

It will be noted that the operation fatalities occurred in the severest type of case. The four patients mentioned above had all received long courses of medical treatment without success before being referred to the surgical ward, and operation was only undertaken as a last resource.

In addition to the four patients who died as a direct result of the operation three have since died from other causes: two from diabetes mellitus, one and four years after operation respectively, and one from cardiac failure two years after operation. These three cases are not included under operation mortality, since, so far as can be determined, death was not in any way connected with the operation on the thyroid.

Effect of Operation on Certain Symptoms and Signs

When the patients reported at hospital following operation, notes were made regarding the presence or absence of certain of the commoner signs of toxic goitre. We would again emphasize, however, that we do not lay great stress on individual symptoms or signs, but rather on the patient's general well-being and fitness for work.

Exophthalmos.—In seventy-four cases where exophthalmos was present before operation we have information regarding the present state of affairs. This may be conveniently shown as follows:

Absent	Less	Unchanged	Total
25	41	8	74

It will be noted that exophthalmos was found to have disappeared in twenty-five out of seventy-four cases, or in 33.8 per cent., and in a further forty-one cases the degree of exophthalmos was considerably less than before operation.

Pulse Rate.—The pulse rate was recorded in each case before operation and on reporting at hospital after operation. The average rate for the total series before operation was 103 and after operation ninety-one—a difference of twelve per minute. It should be stated that these pulse rate figures are not strictly comparable, since the rate before operation represents the resting pulse rate after preparation for operation, whereas the post-operative rates were estimated when the patients reported at hospital, in some cases after a considerable journey. It was noted in a number of cases that tachycardia persisted for some months following operation, despite the fact that all other signs of hyperthyroidism had disappeared. A curious feature in connexion with the persistence of this symptom was that, in the great majority of cases, it did not appear to give rise to any discomfort and, in fact, the patients were usually quite unaware of its presence.

Auricular Fibrillation.—Auricular fibrillation was noted in ten cases at the time of operation, and we have information regarding all of these at the present time. In seven the pulse is now perfectly regular, and in one case the irregularity still persists eighteen months after operation, although the general health is excellent. The remaining two patients died, one on the day of operation and the other from cardiac failure two years after operation. Of the seven patients in whom the fibrillation ceased, five are now doing a full day's work without any discomfort and the remaining two are as yet only convalescing after their operation.

Weight.—A striking feature which was noted in almost every case was the gain in weight following operation. The average weight for the total cases before treatment was 120.5 lb., and the present average weight is 143.6 lb. Thus it will be seen that the average gain in weight amounted to nearly two stones. A point of interest in connexion with the weight is that many of the patients intimated that their weight rose rapidly during the first few months after operation and then tended to fall and become stabilized. The figures quoted here represent the stabilized weight and not the early rapid rise referred to.

Intercurrent Infections, etc.

When the patients reported they were questioned as to whether they had suffered from any illness since the operation on the thyroid. It transpired that thirty had suffered from some infection or prolonged worry subsequent to operation. Included in this number are two patients who have been confined and two who are at present in the late stages of pregnancy. A number of patients were found to have suffered from trivial ailments, but these have not been included, and it is only cases where confinement to bed for a considerable period was necessitated which are considered here. Out of the thirty patients mentioned above, twenty-three now enjoy excellent health and are fit for their employment despite intercurrent illness since operation. The remaining seven patients, to whom reference has previously been made, are all classified "S," and are not in a satisfactory state of health, although they assert that they feel better now than they did prior to operation. A point of interest arises in connexion with this question of intercurrent infection, since many of the patients remarked on their freedom from infections such as influenza and tonsillitis after the removal of the thyroid. Whereas previously they had been subject to frequent influenzal attacks, and the like, thyroidectomy appears to have increased their resistance to such infection.

Commentary

The treatment of toxic goitre is a subject which has given rise to much controversy in the past, and it is only in comparatively recent years, in this country at any rate, that surgery has been regarded with favour. Those who are averse to surgical intervention maintain that many cases may be cured by non-surgical measures, or that the operative risk is too great in proportion to the results obtained. There can be little doubt that many cases of toxic goitre may be greatly improved and even completely cured by medical treatment alone, but the admission of this fact should neither justify the adoption of medical treatment as a routine nor condemn operative treatment, since in most cases we are concerned not only with restoring the patient to health but with doing so as quickly as possible. Herein lies one of the great advantages of surgical treatment, since a high proportion of the patients thus treated are rapidly restored to good health and are enabled to return to their employment within a few months of operation. With non-surgical treatment, on the other hand, the patient may remain an invalid for many months, and at the end of this long period of inactivity there is no guarantee that she will be in a fit state to resume her normal activities. It is the uncertainty of medical treatment which is, in our opinion, its greatest disadvantage, since not only may there be little or no improvement as a result of such treatment, but there is a risk in some cases of actual deterioration in health with the lapse of time.

The question is frequently asked—What are the indications for operation in toxic goitre? It is now generally agreed that operation is indicated as a routine measure in all cases of secondary toxic goitre. It is in the

primary case that opinion is so divergent regarding the advisability of operative intervention. The decision for or against operation in any particular case must be a matter largely of personal opinion. We believe that, in our present state of knowledge, toxic goitre must be regarded as essentially a surgical condition, and as such should be treated by operation with the minimum of delay. This view is no doubt open to criticism, but it is felt that many patients are lost as a result of prolonged attempts to save them from the ordeal of operation by continuing measures which too often are of little or no avail. It is surely preferable to advise a patient with toxic goitre to submit herself to the slight risk of operation when her general health is comparatively good, rather than to temporize until perhaps there is permanent cardiac damage, and resistance is at its lowest ebb, and then as a last resource be compelled to advise surgical intervention.

The problem of operative risk is one which must always be considered when advising treatment in toxic goitre. If surgery is to be successful, scrupulous attention must be devoted both to the operative technique and to the details of the pre-operative and post-operative periods. The operation mortality of 3.2 per cent. in this series cannot be regarded as a very serious risk, and yet it is probable that this figure would have been lower if the patients could have been treated at an earlier stage of their illness. A considerable number came to operation in a very poor state of health, in spite of careful and prolonged medical treatment, and all the fatalities occurred in this type of case.

We would suggest that if the best results are to be obtained in the treatment of toxic goitre to-day, operation should be recommended at an early stage in all cases. Timely resort to surgery would ensure the complete restoration of health in the vast majority, and the number of fatalities would be reduced to a minimum. Furthermore, permanent cardiac damage as a complication would, in these circumstances, be almost entirely eliminated.

Summary

The results of surgical treatment are presented in a series of 125 consecutive cases of toxic goitre. Approximately 90 per cent. of the patients operated on are now fit for regular employment.

The operation of choice was subtotal thyroidectomy, performed under local anaesthesia with omnopon as a pre-operative sedative.

The operation mortality rate was 3.2 per cent. All the fatalities occurred in severe, long-standing cases which had been resistant to medical treatment.

It is suggested that, in our present state of knowledge, toxic goitre should be regarded as essentially a surgical condition, and that if this were done the operation mortality would be reduced to an extremely low figure, and rapid and complete restoration of health would be achieved in the vast majority of cases.

Changes have been made in the method of subscription by non-members to the afternoon lectures at the Royal Institution, 21, Albemarle Street, W. In future single lecture tickets will be sold at a charge of 3s. each. The new arrangements apply to all the afternoon lectures, except the Christmas lectures. Subscribers to a course will receive a book containing the appropriate number of single lecture tickets, the rates being 7s. 6d. for a course of three lectures and 10s. for a course of four. The tickets will be transferable, and a single lecture ticket not used for the course for which it has been issued will admit to a lecture of any other course. Season tickets will also be obtainable. The privileges of members of the Institution are not affected by these changes. Members are admitted without ticket to the afternoon lectures, and they can purchase books of single lecture tickets, to admit their friends, at privileged rates.