The Surgical Treatment of Exophthalmic Goiter.

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The treatment of exophthalmic goiter by operation is a comparatively recent procedure and its usefulness as a means of relieving this serious disease is not yet conceded by all. In many cases operation is contraindicated, while in others operative measures result often in complete cure, or almost always in improvement.

The cause of this disease is not yet sufficiently established, but that many cases are caused by an excess of thyroid tissues is self-evident. Yet in some cases (10 per cent.) it is said there is no enlargement of the thyroid and in many the enlargement is not marked. In some cases, again, enlargement of the thyroid is a late symptom in the disease, while in others the enlargement precedes the other symptoms by months and sometimes years. Goiter has been known to exist for years without producing any marked symptoms of this disease and then they appear. The parenchymatous goiter may be present for some time without giving rise to any symptoms, and the enlargement of the thyroid may only be accidentally noticed, by feeling the collar band too tight, or observing a fulness of the neck when looking in a mirror. Some attribute exophthalmic goiter to atrophy of the parathyroids or their infiltration by fat. In my cases where the parathyroids had been removed with the thyroid they have been found perfectly normal in appearance and not infiltrated or atrophied.

The idea that exophthalmic goiter is due to a disorder of the sympathetic and vagus is now abandoned by almost all, and the operation of excision of the sympa-

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thetic ganglia and trunk in the neck for the relief of this disease may now be looked on as an obsolete operation. That the nervous system is involved in the affection goes without saying, but the cause is not in the nervous system, but in the thyroid gland, and the profound effect produced on the nervous system is brought about "by the action of certain substances which find their way into the circulation as a result of deranged function of the thyroid gland"; overactivity of the thyroid, or the secretion of an enlarged thyroid produces too much oxidizing material.

Therefore, the probable cause of exophthalmic goiter is hyperactivity and hypersecretion of the thyroid, and the same condition may be produced by artificially feeding an individual with thyroid extract. It is certain that many patients are cured by the removal of the excess of thyroid tissue, and the natural inference is that the excess of thyroid tissue causes the symptoms in those cases in which this organ is enlarged. It is possible that there may be other causes (and in this connection the thymus can not be ignored) in the production of complex symptoms of this disease, for these symptoms may exist without special enlargement of the thyroid, but where there is enlargement the removal of a sufficient quantity of the gland tends to the cure or relief of the symptoms.

Dr. H. MacKenzie[1] says: "If we could assure ourselves that the disease is nothing more or less than a hypertrophy of the thyroid gland, it would seem that the most rational method of treatment is to reduce the enlarged gland to something like normal proportions by surgical means. But we can not ignore the part obviously played by the thymus in this disease. . . . Unfortunately, the operation is, even in the hands of most skilled surgeons, a dangerous one, and the risks are greatest in the class of cases which respond least to medical treatment."

Partial thyroidectomy does not always cure, perhaps because not enough of the gland is taken away. Kocher advocates removing three-quarters or more of the gland and the ligation of three arteries. Ligation of the thyroid arteries is as difficult as thyroidectomy, but less likely to cure and less dangerous. Curtis recommends it as a preliminary operation to partial thyroidectomy

1. British Med. Jour., Oct., 28, 1905.

and as a palliative operation. Schwyzer, of St. Paul, reports four cases of well-marked exophthalmic goiter cured by ligation of the thyroid arteries.

B. Farquhar Curtis[2] is still a mild advocate of sympathectomy, but latterly he has been practicing thyroidectomy, and in one case did both operations with good results. Jaboulay's operation of exothyropexy is now never practiced, and in fact Jaboulay himself gave it up for section of the cervical sympathetic. As many deaths occur, strange to say, after sympathectomy as after thyroidectomy. It has been thought that deaths following operation in this disease are due to too much absorption of thyroid secretion, owing to the rough handling of the gland. But in the operation of sympathectomy there is no rough handling. It is well known that individuals with exophthalmic goiter stand operations badly and cases are reported of deaths occurring from so-called thyroidism in persons suffering from this disease after operation on distant parts, such as the pelvis or breast. The cause of death in these cases is almost as obscure as the cause of the disease itself, which may sometimes come on after severe fright or anxiety, and these causes in a well-developed case of exophthalmic goiter are well known to lead to an exacerbation of the symptoms.

THE CLASS OF CASES SUITABLE FOR OPERATION.

I am of the opinion that early operations are the safest and that the class of cases most likely to benefit are not the most severe ones, but those in which the gland is more enlarged on one side than another, in which, in fact, there is a more definite tumor formation, in which the gland is not excessively vascular, and in which the enlargement has preceded the symptoms of Graves' disease by months and perhaps years. These might be called cases of secondary or acquired goiter. Also in those early cases of enlarged thyroid with a mild form of Graves' disease, in which the gland is soft, vascular, and evenly enlarged throughout, here operations are usually most satisfactory, the after-results being decidedly good. The cases in which operation should be avoided are those of large vascular thyroids in which there are definite febrile exacerbations, excessive tachycardia, "with acute dilatation of the heart, precordial distress, gastric and abdominal pain, vomiting and

2. Annals of Surgery, March, 1906.

diarrhea, sleeplessness, perspirations, sense of suffocation, great restlessness, edema of the feet—in fact, all the symptoms of toxemia due to thyroidism." (Thompson.)

It is singular that most physicians are against operative measures, or only consent in a half-hearted way to their occasional employment. It is perhaps because they hand over only the desperate cases to the surgeon, after all medical measures have proved futile. Hector MacKenzie[1] says: "On the whole, I consider the risk attending thyroidectomy too great to justify the operation save in exceptional circumstances." Eulenberg is opposed to operation, and Dr. George R. Murray[2] does not mention it at all. Nearly all the recent medical writers on exophthalmic goiter condemn surgical procedures as being too dangerous and not always successful (Collins, Robins, S. Smith).

MORTALITY FOLLOWING OPERATIONS.

A good deal depends on the kind of case operated on, and hence statistics are not of great value. Huntington[4] had one death in nine patients operated on. Ransohoff[5] reports six cases without any fatality. Curtis[6] reported fourteen cases of sympathectomy and thyroidectomy with four deaths, and mentions 136 patients operated on by surgeons, including Kocher, Schultz and Mayo, with 17 deaths. A large mortality, but no doubt in properly selected cases this would be much lower. Kocher's report of 59 patients operated on showed: 76 per cent., cured; 14 per cent., improved; 3.8 per cent., slightly improved; 6.7 per cent., died.

At the German Congress for Internal Medicine, held in April, Kocher reported having operated on 167 cases, with 9 deaths and 72 per cent. of cures. Friedheim, of Hamburg, out of 20 cases, had 15 patients cured and 5 improved.

The diseases having the symptoms complex of exophthalmic goiter, then, may be considered to be of two kinds: One in which the patient is extremely nervous and sleepless, has tachycardia, exophthalmos, pyrexia, tremor and edema of extremities, diarrhea and frequent sweatings, emaciation, and with a large, diffuse vascular

3. Medico-Chirurgical Society Transactions, 1903, London, Eng
4. Transactions of the American Surgical Association, 1905.
5. Lancet-Clinic, June, 1905.
6. Annals of Surgery, March, 1905.

thyroid usually not more enlarged on one side than the other, and which has not preceded the nervous symptoms, but has come on with the other symptoms indicative of this disease. This patient may have a dilated heart and perhaps endocarditis if the disease is of some standing; in such cases I should not now operate.

Patients in the second class, although ultimately not distinguishable from the former in symptoms, have had goiter for some years, which is more pronounced on one side than the other, and there is nervousness, excitability, difficult respiration, tachycardia, exophthalmos, tremors, sweatings and moderate loss of flesh. These patients are suitable for operation, and when the overgrowth of thyroid is removed the patient ultimately gets quite well. At first the pulse becomes quieter, nervousness is less, the patient increases in weight and generally improves, the exophthalmos, however, diminishes very slowly. Some of these patients operated on nine or ten years ago still remain quite well, and in this class of cases I have had no death following operation, though in some I have had some very alarming symptoms.

Huntington says: "We can not escape the conviction that general anesthesia is in a very large proportion of cases seriously at fault. There is no difference of opinion among operators as to the impropriety of general anesthesia in this relation and especially in advanced cases." Now, I have always used general anesthesia, latterly ether and chloroform mixed, and have had no bad results. In the two cases of death the patients perfectly recovered from the anesthesia and died after some time —eight hours in one case and two days in the other. The danger is always great in operation in a severe case of exophthalmic goiter, but not greater probably than the mortality would be if the patient were treated by medical means only. In selected cases this danger ought not to be very great, and with more extended experience in the cases proper for operation and if the operation is performed in the early stages, in the future I am sure the results will be much better.

REPORT OF CASES.

In the seventeen cases I report there were three deaths, all in desperate cases; nine patients were completely cured; three much improved; one relapsed and one was lost sight of, though improvement was noticed immediately after operation. Four cases were of the cystico-

colloid variety; eleven colloid adenoma, and two pure hyperplasia without as much colloid as in the normal gland.

In two cases there was no exophthalmos, though the other symptoms were marked. In two the exophthalmos was slight, and in thirteen it was well marked. The patients' ages ranged from 14 to 53 years, and the average was 28.80. There were sixteen females and one male. All the patients demanded operation for the relief of their distressing symptoms, and in none was the operation insisted on. In every case the dangers were distinctly placed before the patient and her friends.

The following is a synopsis of the seventeen cases:

CASE 1.—Mrs. H., aged 35, telegraph operator, always lived in Canada.

History.—Seven years ago she first noticed enlargement of the thyroid, which increased slowly until six months ago, when the gland began to grow rapidly and nervous symptoms were much increased.

Examination.—She entered the hospital for operation Dec. 16, 1894. At that time she had a pulse of 120, tremors, great excitability and loss of flesh with exophthalmos. She had been forced to give up her occupation on account of nervousness, and had also of late experienced some difficulty in breathing. There was enlargement of the thyroid, more on left side, and many hard nodules were felt in this lobe.

Treatment and Result.—The left half of the gland was removed with much benefit. Tumor after removal was found to consist of large vesicles filled with colloid and lined with flattened epithelium. The patient resumed her occupation, had little tachycardia and much diminished nervousness. Several years later I saw her again, when many of the old symptoms had returned, but she refused further surgical interference.

CASE 2.—Miss L., aged 20, was sent to me by Dr. Cornell, of Brockville, Ontario.

History.—She has had enlargement of the thyroid for some years; both sides are enlarged and have the appearance of localized tumors. A short time after she noticed the increased size of the gland, nervous symptoms developed, tachycardia, tremors, etc. These symptoms increased on exertion and her pulse was almost uncountable. Then came exophthalmos with persistent pyrexia and on exertion great difficulty in breathing.

Examination.—When I saw her in 1896 she was a pale, anemic girl, very thin, with slight exophthalmos and a rapid pulse, 140 to 200. She was excessively nervous, had tremors, some fever and edema of the extremities, and was much emaciated. Both lobes of the gland were considerably enlarged. The enlargement was not of the soft, diffluent character usu-

ally seen in Graves' disease, but was hard and seemed to be a growth well defined on each side and the size of a small orange.

Operation.—Nov. 18, 1896, I enucleated from each lobe by separate incision a solid tumor, the size of a tangarine orange, full of colloid matter.

Result.—The patient rapidly recovered and was sent home in ten days. Two years after she was perfectly well and had no signs of exophthalmos or tachycardia; in fact, all the symptoms for which she consulted me had disappeared. I heard from her in March, 1906, and she still remains perfectly well and has no signs of goiter or Graves' disease. This case was one of my most successful.

CASE 3.—Miss McC., aged 24, always lived in Montreal.

History and Examination.—She had a well-marked enlargement of the thyroid, more on the right side. It seemed to be a large solid tumor and commenced three years previously as a small nodule in the middle line of the neck and was supposed to be due to pressure of a brooch. Nervous symptoms appeared with the tumor. She was extremely nervous, had tachycardia (pulse 120), tremors, went upstairs with difficulty, sweated easily, had a slight cough; legs were edematous; she had lost much flesh and had exophthalmos.

Operation and Result.—Oct. 8, 1901, half the gland was removed and the patient made a good recovery. When last seen, three years after the operation, she was attending to her business as a milliner and was quite well, and though at times very nervous she had gained much flesh and the palpitation and other symptoms had disappeared. I have heard lately (April, 1906) that she still remains quite well. The gland was cystico-colloid with hyperplasia.

CASE 4.—Bridget McC., aged 16, had enlarged thyroid for four years.

History and Examination.—The enlargement was general, but not very soft or vascular. She was extremely nervous, had tachycardia, pulse 120, tremors, loss of flesh and slight exophthalmos. Two sisters and a brother have enlarged thyroids.

Operation.—At operation the whole thyroid was removed, except a small portion over the trachea.

Result.—The patient rapidly recovered and lost in the course of a few months all nervous symptoms, and when last seen, four years later, was stout, healthy, with no nervous symptoms, and following the occupation of a domestic servant.

CASE 5.—Jennie K., aged 24, since she was 15 years of age had enlargement of the thyroid.

History.—It commenced as a small round growth in the right lobe and had continued to grow ever since. For some years, owing to tachycardia and breathlessness, she had not been able to walk upstairs or to walk any distance on the level. For some years also she had had tremors and exophthalmos. The

tumor was of large size, smooth, soft and not very vascular. The patient had become much thinner of late.

Operation.—Jan. 27, 1899, the tumor was enucleated. It was cystico-colloid. After operation there was a temperature of 104 F. and an uncountable pulse, with excessive nervousness. The discharges from the wound were sterile; on removing the packing and the evacuation of a large quantity of clear serum the symptoms subsided.

Result.—She was discharged from the hospital much improved, the tachycardia was less, she had no tremors and was altogether better. Six months later she wrote me that her heart had ceased to palpitate and that she was gaining flesh rapidly. In June, 1903, three and a half years after operation, I saw her again and she was looking very well; there was no trace of enlarged thyroid, but she still had slight exophthalmos and was occasionally nervous. I have heard since that she is married.

CASE 6.—Miss S., aged 40, first noticed a small swelling on the left side of the neck ten years ago, which has been growing ever since.

Examination.—She had marked tachycardia, tremors, breathlessness on exertion, exophthalmos, and was emaciated and excessively nervous; pulse ranged from 108 to 110. The tumor was of considerable size and confined to the left lobe and isthmus.

Operation.—She was operated on Feb. 23, 1899.

Result.—For a time there was no improvement, but after six months there was less tremor and nervousness. Six years after I heard she was very well, but still has slight exophthalmos.

CASE 7.—Miss M., aged 29.

History.—Two years ago her neck began to enlarge on the right side and the swelling gradually increased in size to that of a tangarine orange. She had tachycardia (pulse 120 to 130), tremors, palpitations, breathlessness and hacking cough.

Operation.—August, 1901, operation was uneventful; the right lobe was removed. The patient was much improved by operation and the pulse soon after came down to 90. I have been unable to trace this patient.

CASE 8.—Alice H., aged 22, has had an enlarged thyroid all her life; up to three years ago she lived in Ireland.

History.—Latterly the gland has enlarged rapidly and nervous symptoms have been present for the past two years; the enlargement is more on the right side, smooth and vascular, pulsating. The pulse ranged from 100 to 120, the eyes were prominent; there were tremors, edema of legs, palpitation, insomnia, and latterly she has lost much weight.

Operation.—In May, 1904, the right half of the thyroid and isthmus were removed. Symptoms of thyroidism developed after operation; there were high temperature, great restless-

ness and uncountable pulse. These symptoms subsided at the end of a week and she was discharged at the end of two weeks.

Result.—Three months later I saw her and she had gained over 20 pounds in weight; the pulse was between 70 and 80, and she had resumed her occupation of nurse. Since then she has married and is now very well.

CASE 9.—W. M. L., aged 44, had had an enlargement of the right lobe of the thyroid for some seven years.

History.—Seven months before consulting me nervous symptoms commenced to appear with attacks of dyspnea, dry cough, loss of weight, and "protrusion of the eyes." He also had attacks of palpitation and had tremors. Pulse ranged from 110 to 120.

Examination.—A marked enlargement of the right side of the thyroid was found which was soft, diffluent and pulsating. The trachea was displaced to the left. There was a good deal of exophthalmos, more on the right side, with tremors and a pulse of 112.

Operation.—Aug. 9, 1904, the right half of the thyroid and the isthmus were removed. After operation there was great restlessness, rapid pulse, and high temperature, with insomnia; eight days after there was much less nervousness and less tremor.

Result.—Six weeks after he left the hospital he reported himself much better.

CASE 10.—Mrs. P., aged 34, was sent to me by Dr. Alguire, Cornwall, Ont.

History.—For the last twelve years she had noticed the thyroid enlarging; it came on soon after her marriage and especially grew during her last two pregnancies; her mother had enlarged thyroid and two of her sisters have it now, one of whom I have since seen has well-marked Graves' disease. The patient had great difficulty in breathing, but none in swallowing. She had tachycardia, pulse 134, exophthalmos, attacks of palpitation, and was very irritable. She had also lost flesh. She had a short, dry cough and of late her voice had altered.

Examination.—Paralysis of the left cord was found. The growth, which was a very large one, commenced on the right side and this is yet the largest part.

Operation.—Nov. 22, 1905, the whole gland was removed with the exception of a small part of the right lobe over the trachea. The trachea was found to be scabbard shaped. After operation, which was a difficult one, hoarseness and dysphagia followed, and then an attack of jaundice ensued, which had not completely disappeared when she left the hospital fourteen days later. With the jaundice her pulse fell to 76.

Result.—I heard from this patient a year after operation and she reported very slow recovery and still had some discom-

fort with dyspnea, but was gradually improving and had gained flesh. There were no signs of myxedema.

CASE 11.—Mrs. H., aged 53, had had enlargement of the thyroid for some years.

History.—She had become so very nervous and excitable that she insisted on operation. She was a thin, excitable woman, with a pulse ranging from 125 to 135, tremors, insomnia, and slight exophthalmos. On each side there was a much enlarged, soft, diffluent and vascular gland; the arteries were very atheromatous.

Operation.—Oct. 19, 1901. Ether anesthesia was used. The patient, on coming to the operating table, had a pulse of 200. The whole gland was removed. The patient stood the operation well and recovered perfectly from the anesthesia, but that evening the pulse became uncountable, the temperature rose rapidly, she was very restless, and died the next morning, evidently from thyroidism.

CASE 12.—Mrs. C., aged 30, had had a "full neck" ever since she can remember.

History.—Four months before consulting me, after the birth of her last child, the right lobe began to enlarge and severe nervous symptoms began to develop.

Examination.—When I first saw her I found a small, very excitable, emaciated woman with excessively prominent eyes, and with a pulse of from 140 to 150, and well marked tremors, she was also sleepless and had diarrhea and sweatings. Her husband said that at times she was quite maniacal. She had an enlarged neck, measuring 35 cm., the enlargement greater on the right side. The gland was soft, very vascular, diffluent and pulsating.

Treatment.—I first gave her potassium iodid in ten grain doses. This seemed to have the effect of hardening the gland and she was less nervous, but soon tired of it and refused to take any more. I then tried *x*-rays; six exposures caused diminution of the tumor from a circumference of 35 cm. to 32.5 cm., but there was no perceptible effect on the nervous symptoms. Operation was demanded, and, although I was not very eager to comply, I took her into hospital and kept her in bed for a week with an ice bag on the heart. I had much difficulty in keeping her in bed as she was at times violent and almost maniacal, and seemed in great fear. The left cord was partially paralyzed.

Operation.—Jan. 25, 1906, she was operated on. There was much difficulty in giving the anesthetic, but when she became unconscious she was quiet and her pulse fell from 200 to 140. An ether and chloroform mixture was the anesthetic. The operation was without incident, the right lobe and isthmus were removed and the patient recovered completely from the anesthetic and recognized her friends.

Result.—Towards evening she became excited, the pulse uncountable, respiration difficult, and the temperature rose to 104 F. She became quite maniacal and then subsided into a stupor and died during the night. Examination of the removed lobe showed some hyperplasia of the gland and it was found that the parathyroid had also been removed, and on examination was found to be quite normal.

CASE 13.—Miss D., aged 23, for some years had had an enlargement of the thyroid which was soft and vascular.

History.—She has had frequent attacks of palpitation, tachycardia and excessive nervousness, which made her life miserable. She could do nothing and was getting worse. She had lost flesh. There was no exophthalmos and no tremors, although Graefe's sign was present.

Operation.—Dec. 2, 1898, the right half of the thyroid and the isthmus were removed. She had some symptoms of thyroidism after operation and perspired most profusely for some days.

Result.—At first there was no improvement but a year afterwards the patient said she was better than she had been for years and that the left half of the gland had diminished considerably. It was a colloid goiter with hyperplasia.

CASE 14.—M. McL., aged 19,

History.—For two years she had noticed enlargement of the neck and latterly had been very nervous, breathless, and had suffered from palpitation; the eyes also had become prominent.

Examination.—A moderate enlargement of the thyroid was seen more on the left side; it was soft and vascular. The patient was excessively nervous, had a moderate degree of exophthalmos, and some breathlessness; pulse ranged 110 to 120.

Operation.—June 17, 1895, the left lobe and isthmus were removed. The left lobe contained an adenomatous growth.

Result.—The patient recovered well from the operation and left the hospital on the tenth day. She was much improved, pulse had come down below 100, and the nervousness was less. I heard of her some months after and she reported that she was quite well, had no tachycardia, and was much less nervous, but the exophthalmos still persisted.

[These notes were taken from my private operation book and from a short account on the back of a photograph. The complete hospital case record had been borrowed and never returned, and could not be found.]

These fourteen patients are all on whom I have operated with sufficient severity of symptoms to call the condition Graves' disease. Many patients have been operated on who had difficulty of breathing, rapid pulse, and some with a considerable degree of nervousness, but, although there were some of the symptoms of Graves' disease, yet they were not severe enough to be classed as

exophthalmic goiter. Of the 14 patients operated on twelve patients have been benefited by operation, one has relapsed and one has been lost sight of; the deaths have been two, both in very advanced cases. The next three cases I mention shortly are patients who have been operated on by colleagues in the hospital, who have kindly consented to allow me to make use of them.

CASE 15.—C. G., aged 19, had had gradual enlargement of the thyroid for five years.

History.—She had lost weight, was excessively nervous, had frequent attacks of palpitation, pulse 140, tremors, and marked exophthalmos.

Examination.—She had enlargement of the heart, a systolic murmur at the apex, and an accentuated second pulmonic sound. The left side of the thyroid was larger than the right, and the whole gland was much enlarged, soft and pulsating, except on the right side where the enlargement was apparently cystic.

Operation.—January, 1897, the patient was operated on; she lost considerable blood and never recovered consciousness after the operation. The autopsy showed a greatly enlarged thymus and excessive enlargement of both suprarenals.

CASE 16.—E. B., aged 14, had been excessively nervous for two years and had had profuse sweats.

History.—For six months the voice had been affected and she had had difficulty in swallowing and excessive restlessness and periods of mental depression. Although there has been slight enlargement of the thyroid for two years, it had increased greatly in size during the past three months. Pulse ranged from 120 to 130. Tremors were well marked and there was great dyspnea on exertion; she had marked exophthalmos.

Operation.—The right half of the thyroid was removed in November, 1904, under local anesthesia, and the patient did well.

Result.—When last heard of some months after operation she had improved greatly and was much less nervous, and the pulse was 80 to 100.

CASE 17.—Mrs. G., aged 33, had noticed increasing enlargement of the thyroid for the past sixteen months, and especially during the last three months.

Examination.—She had well-marked exophthalmos, tachycardia (pulse 120), tremors, great nervousness and excitability. Both lobes of the thyroid were moderately enlarged, the right being more prominent; the gland was firm, elastic, not very vascular, and of uniform consistence.

Operation.—In February, 1905, excision of the right lobe was performed under cocain and ether and the patient rapidly recovered, going out in eight days, with much better pulse (under 100), and not nearly so nervous. In this case there was

very little colloid, there was hyperplasia of the gland with very small alveoli.

In most cases hyperplasia of the gland was found, in some the colloid matter was much more abundant than in others; in some the vesicles were smaller, and in others there was the folding in of the epithelium as described by MacCallum. I have not given the description of the microscopic sections, but have been content to make a diagnosis from the clinical symptoms which are complex. I do not yet believe that we can always tell by microscopic examination whether or not the condition is one of Graves' disease, for in many cases in which there were no symptoms, such as tachycardia, nervousness, etc., well-marked hyperplasia of the gland was found.

This being a surgical paper, I have not mentioned the medical treatment. The cases I have related had all been treated medically before being sent to me. Of the serum treatment I have no experience nor have I seen cases treated in this way, though I have heard that good results have been obtained in many instances.