Malignant tumors of the thyroid are sufficiently uncommon to make their clinical diagnosis a matter of considerable difficulty. Three cases recently coming under observation and treatment are here reported. One was a case of Riedel's struma, one a case of carcinoma appearing first in an aberrant thyroid and later recurring in the adjacent lobe, and the third a highly malignant and rapidly fatal carcinoma.

Case I: Riedel's Struma

A woman of fifty-one entered the Fifth Avenue Hospital Jan. 20, 1932. She was born in the United States and had lived in the vicinity of New York most of her life. Her mother had died of carcinoma of the uterus at the age of sixty. There was no other family history of malignancy or goiter.

Past History: The patient had had the usual childhood diseases. In 1907 she was operated upon for the drainage of an appendiceal abscess and made a good recovery. She was married and had had three children. One was living and well; two died in infancy. Following a confinement in 1916 pyelitis developed, which necessitated nephrectomy in 1929. Renal tuberculosis was the probable cause, although it was not possible to determine this. Menstruation began at the age of sixteen and ceased at the age of forty-eight.

Present Illness: For many years the patient had had palpitation of the heart on exertion and sufficient dyspnea on lying down to make it necessary for her to sleep with her head on two pillows. She perspired freely, was inclined to be nervous, and had a large appetite. In August 1931 she complained of a rushing of blood to the head and a tight feeling in the throat, which somewhat aggravated a dry cough of long standing. In October 1931 she first noticed a swelling in her neck, which had gradually increased in size until her admission to the hospital. She had lost no weight.

Physical Examination: The patient was of small stature but of good musculature and well nourished. Her eyes reacted to light and accommodation and showed none of the abnormalities associated with hyperthyroidism. There was a slight tremor of the extended tongue. The lungs were clear throughout to auscultation and percussion. The heart was slightly enlarged to the left, with a soft blowing systolic murmur; the rate was 92 and regular. Compensation was good. Abdominal examination showed an oblique scar in the right lower quadrant, the site of the appendix operation, and another oblique scar in the left lumbar region, the site of the nephrectomy.

Symmetrical enlargement of both lobes of the thyroid was observed. The swelling was smooth and without nodules, rather more firm than the ordinary goiter but not hard. No bruit could be heard. The basal metabolism was minus 10; blood and urine normal.

Operation: The patient was anesthetized with avertin and nitrous oxide. The thyroid was approached through the usual collar incision, and the ribbon muscles divided between clamps. The thyroid was large, firm, and pale. The pyramidal lobe was distinctly enlarged and extended well up onto the trachea. This was first resected between clamps and the right lobe was then approached. On cutting the capsule the gland was found to be composed of a pale, friable, homogeneous substance unlike either adenoma or hypertrophy. The lobe was resected with very little bleeding, and a piece sent for frozen section diagnosis. An attempt was made to suture the capsule, but the tissue was so
friable that this was impossible. In the left lobe a similar condition was encountered and similarly treated. Thus a small amount of denuded thyroid tissue was left in each cervical gutter attached to the posterior capsule. Drains were placed to these raw areas and the wound closed. The frozen section diagnosis was lymphosarcoma.

Pathological Examination: There was a thin, transparent capsule over the rounded or lobulated surface on one side of each specimen. On section the tissue was pale, of a homogeneous and friable consistency, unlike normal thyroid.

The tissue was composed chiefly of small round cells of the lymphoid type invading the gland in all directions, without restraint (Figs. 1 and 2). Scattered mitotic figures could be seen. In some places were collections of larger round cells with more abundant cytoplasm and chromatic nuclei. Scattered throughout the tissue were islands of normal thyroid acini which seemed to have been cut off and isolated by the invading lymphoid cells. In some areas there was fibrosis. No giant cells or tubercles were to be seen. The tissue contained a moderate number of adult blood vessels.

Figs. 1 and 2. Case 1: Riedel's Struma (x 125 and x 270)

After careful study of the sections, the diagnosis was changed from lymphosarcoma to benign granuloma of the thyroid or Riedel's struma.

Postoperative Course: The subsequent course has been uneventful. The wound healed promptly and the patient left the hospital the eighth day after operation. She is now well, two years after operation, except for hypothyroidism, with a basal metabolic rate of minus 11, for which she takes 2 grains of thyroid twice a day.

Case 2: Carcinoma of Aberrant Thyroid with Subsequent Extension to Left Lobe of the Thyroid

A woman of forty-one was admitted to the Fifth Avenue Hospital in December 1925, complaining of a swelling in the left side of her neck. The family history and past history were irrelevant. The patient was married and had had six pregnancies, two of which resulted in miscarriages. She had four children living and well. In July 1925, five months before admission, she had noticed a swelling in the left side of her neck. She consulted a doctor and received iodine medication. A slight decrease in the size of the swelling followed, but because of iodine poisoning the medication was discontinued. The swelling then began to increase in size and had been growing steadily since. The patient complained of restlessness, occasional sweats, increased appetite and loss of weight, but not of tremor.

Physical Examination: The patient was mentally alert and apparently not ill. Ex-
CASE 2: CARCINOMA OF ACCESSORY THYROID (× 100)

CASE 2: CARCINOMA OF ACCESSORY THYROID (× 325)
except for poor teeth the general physical examination revealed no abnormalities. In the left side of her neck, at about the level of the upper pole of the left lobe of the thyroid and somewhat lateral to it, was a soft uniform tumor about the size of a hen's egg. It was apparently encapsulated, freely movable, discrete, and non-inflammatory. It did not move with deglutition. The preoperative diagnosis was aberrant thyroid. The basal metabolic rate was minus 11.

Operation: Operation was done December 15, 1925, by the late Dr. George W. Roberts. Approach was made through a collar incision and the growth was isolated. It lay under the sternomastoid muscle, received its blood supply from the superior thyroid artery, and was not attached to the thyroid gland. It was easily separated and removed after ligating the pedicle. The patient made an uncomplicated recovery and left the hospital on the twelfth postoperative day.

Pathological Examination: The specimen was an ovoid tumor covered by a thin, delicate capsule. The cut surface showed a pink, firm, rather homogeneous tissue with a few spots of congestion and a few yellow areas of degeneration.

Microscopically the tissue was seen to be composed of large ovoid epithelial cells with scant cytoplasm and large hyperchromatic nuclei containing occasional mitotic figures (Figs. 3 and 4). In many areas these cells were arranged around thin-walled blood vessels. Elsewhere they grew in masses without form or architecture. There was no invasion of the capsule. The tissue was quite vascular.

Diagnosis: Carcinoma of aberrant thyroid.

Interval History: The patient remained well until December 1929, when she again entered the hospital and hysterectomy was done for fibromyoma of the uterus. At this time there was no evidence of recurrence in the thyroid gland. A few months after leaving the hospital, however, she noticed two lumps in the left side of her neck. These grew slowly at first and then more rapidly. She became nervous and irritable, lost weight in spite of a large appetite, and complained of palpitation of the heart. She re-entered the hospital in June 1931.

Physical Examination: There were two discrete nodules in the left lobe of the thyroid, 2 cm. and 1.5 cm. in diameter. The scar of the previous operation was well healed and smooth. Except for these observations, the physical examination added nothing new.
**Operation:** On July 1, 1931, the scar of the former operation was excised. Because of the underlying scar tissue, the growth in the left lobe of the thyroid was exposed lateral to the ribbon muscles. The left lobe of the thyroid was dissected free from the surrounding tissues and the capsule opened. The tumors were shelled out without great difficulty, although the tumor capsules were broken open and the tumors removed in pieces. It was then found that very little thyroid tissue was left within the capsule of the gland. The gland capsule was closed with interrupted sutures and the external wound closed with drainage.

The postoperative course was smooth, and the patient left the hospital on the sixth day after operation.

**Pathological Examination:** The specimen consisted of several small masses of pink tissue, all irregular in appearance and showing no definite structure. Microscopic examination showed cells similar to those in the tissue from the first thyroid operation. There was, however, no tendency for the cells to group themselves around the blood vessels, as in the earlier specimen. They grew, instead, in a solid mass and in some places seemed to have invaded the capsule. Mitotic figures were more numerous. The tissue was highly vascular and was permeated by many thin-walled blood vessels. Figure 5 shows the tumor growing into a vein. In comparing the tissues from the first and second operations it was apparent that they were essentially the same, but in the later tissue the growth seemed to be more active and the malignancy greater.

**Diagnosis:** Recurrent carcinoma of the thyroid.

**Subsequent History:** After leaving the hospital, the patient had three x-ray treatments, the last in February 1932. In August 1932 she returned to the Thyroid Clinic, complaining of dizziness and a rushing of blood to the head; the basal metabolic rate at this time was minus 7. She was given two grains of desiccated thyroid twice daily, and under this medication her symptoms disappeared. There is no evidence of recurrence at this time, two and a half years after the last operation.

**CASE 3: RAPIDLY FATAL CARCINOMA OF THE THYROID**

A white male of twenty-one entered the Fifth Avenue Hospital January 27, 1932, complaining of a swelling in his neck of five days' duration. At the time of his admission he was employed as a truck driver. He had always lived in New York City. His family history and past history were irrelevant. Five days before admission he was seized by a fit of coughing, after which he noticed for the first time a swelling in the left side of his neck. This increased in size rather rapidly, so that his voice became husky and he suffered from dyspnea on lying down and after exercise. He complained of no other thyroid symptoms, such as tremor, excessive sweating, or palpitation.

**Physical Examination:** The patient was a thin but fairly well developed young man who appeared rather dull and unresponsive. The blood pressure was 142/90; pulse, 80; basal metabolism plus 11. Except for the condition in the neck, no abnormalities were found, and the usual signs of thyroid disease were absent. In the neck there was a fairly large, symmetrical swelling involving the left lobe of the thyroid. It measured about 6 cm. in diameter. It was firm and elastic, but neither hard nor fluctuant. There was no bruit. The tumor moved with deglutition.

On the supposition that we were dealing with a hemorrhage into a cyst, aspiration was done. A little soft tissue and blood were obtained, about enough to make a smear. The smear showed, in addition to the blood, some large oval cells with hyperchromatic nuclei suggesting malignancy. Operation was thought advisable to relieve the mechanical pressure and in the hope that the tumor could be shelled out.

**Operation:** On Feb. 1, 1932, under avertin and ethylene anesthesia, the thyroid was exposed through a collar incision, with division of the ribbon muscles. The left lobe of the thyroid was greatly enlarged by a tumor which pushed the trachea over to the right. On incision of the gland capsule the tumor seemed to have a capsule of its own. This was so adherent that enucleation was impossible and an attempt was made to free it by sharp dissection. In this maneuver the capsule was ruptured and a quantity of soft friable tissue gushed forth. The remainder of the tumor tissue was then removed by finger dissection as far as possible. Brisk hemorrhage followed this procedure but was
CASE 3: VASCULAR CARCINOMA OF THE THYROID (× 150)

CASE 3: VASCULAR CARCINOMA OF THE THYROID (× 400)
finally controlled by pressure and the application of two clamps. The clamps were left in place and the cavity was packed with gauze. No attempt was made to suture the wound, and the patient was returned to bed in considerable shock from loss of blood. He recovered under routine shock treatment. The clamps were loosened on the second day and removed on the third. The packing was removed more gradually. The wound eventually healed, and the patient left the hospital on the 21st day after operation.

Pathological Examination: The specimen consisted of a large amount of soft, pink, meaty tissue, in small fragments. On section the tissue was relatively firm except for various yellow areas of a buttery consistency, evidently spots of degeneration. There was nothing to suggest a capsule or retaining membrane.

Microscopic examination showed closely packed cells without arrangement or architecture (Figs. 6 and 7). Many blood vessels and blood sinuses permeated the tumor, being present in such numbers that special endothelial stains were used to determine that the entire tumor was not of endothelial origin. Delicate connective tissue strands supported the cells. There were spots of degeneration where the cells had lost their staining properties. The individual cells were large undifferentiated epithelial cells. The nuclei were large, almost filling the cell body. All had nucleoli and hyperchromatic granules, and mitotic figures were so numerous that many could be found in every high-power field. No normal thyroid cells were found.

Diagnosis: Carcinoma of the thyroid.

Subsequent Course: Before the patient left the hospital, x-ray treatment was instituted and he subsequently returned for the full course of therapy. On his last admission, March 19, 1932, there were a queer stridor and vibration in his trachea on respiration. Laryngoscopic examination revealed a paralyzed vocal cord. The patient would not permit bronchoscopic examination and left the hospital March 21. Five days later, March 26, he was brought back to the hospital, dyspneic and cyanotic. He died before he could be examined. Autopsy was refused.

Comment: This case was poorly treated, but the mistake did not lie in the decision to operate but rather in the operative procedure. The entire lobe should have been removed, with transplantation of the parathyroids if possible, or sacrifice of them if necessary. X-ray treatment could then have been instituted with relative safety. However, the end-result would doubtless have been the same, as the tumor was of such rapid growth and of so malignant a character that a fatal outcome could probably only have been postponed and not avoided.