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JUAN A. DEL REGATO, M. D., *Editor*

CONTENTS

EDITORIAL CONSULTANTS

EDITORIAL OFFICE
PENROSE CANCER HOSPITAL
MARY ELIZABETH KELLY, SECRETARY
2200 CASCADE AVENUE, COLORADO SPRINGS, COLORADO

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Thoracic Tumors

THE relatively recent development of roentgenographic chest surveys has resulted in renewed interest in the histopathologic study and in the surgical treatment of mediastinal and pulmonary tumors. The discovery of these lesions in their asymptomatic stage is, in itself, an important new contribution of the science of roentgenology. That the exact nature of these tumors cannot be always recognized on radiologic examination is no discredit to this most important of investigative procedures. The roentgenologic examination provides us, nevertheless, with valuable information as to the location, the size, the density, the compression, displacement or apparent infiltration of adjacent structures, the presence or absence of calcifications, the mobility, the rate of growth, etc. This information, coupled with that provided by the patient's history, may permit a presumptive diagnosis of the probable histopathologic nature of the tumor. But, even when the cautious radiologist avoids a guess as to the nature of the lesion, the information which he can provide is indispensable to the thoracic surgeon and sometimes to the histopathologist.

The development of thoracic surgery has shifted the interest in these tumors from the autopsy table to that of the surgical pathologist. Tumors which were previously considered as rarities bring today the pathologist to the operating room and often require his considered opinion. And the pathologist's responsibility has consequently risen. The re-opening of this chapter of histopathology of tumors has brought forth an old case: pure morphology has definite limits in the diagnosis of tumors, and the pathologist who remains unaware of his own limitations may perpetuate his errors and lead his colleagues, the clinician, the radiologist, and the thoracic surgeon, into confusion. Old concepts and old entities have received new scrutiny; the pathologist owes it to himself and his colleagues to remain well informed. And, as histopathology reaffirms itself, the proper possibilities and limitations of roentgenology may be re-evaluated.

This Seminar was devoted to the study of sixteen cases of thoracic lesions graciously contributed from numerous sources. Sets of photographic reproductions of roentgenograms with the clinical summary of each case were distributed to radiologists. Sets of histopatho-

Pauline Chapel

logic slides of the same cases with the clinical summaries were sent to pathologists. Radiologists and pathologists submitted their opinions by mail and these were tabulated in each case. Some educational centers or study groups submitted the different opinions of their members.

We owe a special expression of thanks to the numerous authorities, national and foreign, in the fields of diagnostic roentgenology and of tumor pathology, who have consented to "play the game" and have taken time to give us their impressions and valuable comments. Their generous participation has added considerably to the educational value of these Seminars. The Seminars have permitted the recording of details and opinions which may not appear in the writings of their authors and which are only known to their immediate collaborators.

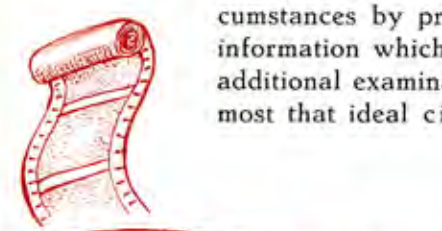
These CANCER SEMINARS have proved their definite value but they have their natural limitations. Admittedly, these exercises are not a **scientific test** since the participants are not all of equal experience and authority. The participating radiologists, in particular, have made concessions that put them to a disadvantage. Proper utilization of roentgenology would imply radioscopic examination, roentgenograms in several projections, planigraphy, kymography, etc. There is a great difference between the conscientious evaluation of the information thus obtained, and the mere expression of an opinion on the basis of a clinical summary and of the photographic copy of a conventional roentgenogram. Whereas an effort was made to counter-balance the circumstances by providing the radiologist with information which is usually obtained through additional examinations, it was understood by most that ideal circumstances could not be reproduced and definite limitations had to be acquiesced. Many radiologists rightfully objected to designate their opinions as "diagnoses" when they should be considered rather as "diagnostic impressions." The fact that radiologists consented to participate, in spite of limiting circumstances, permitted our exercise to take place. In return they were rewarded by learning that the finality of their individual pathologists must be taken, sometimes, with a grain of salt! The great differences of opinion that may be held by pathologists in respect to the same histopathologic specimen relieve the radiologist from any temptation to be dogmatic. Thus, these Seminars are, rather, an **educational exercise.**

The 270 surgeons, radiologists and pathologists who attended this CANCER SEMINAR at the Broadmoor Hotel, on September 8, 1951, were rewarded by the genial evaluations of Philip J. Hodes, M.D., Professor of Radiology at the University of Pennsylvania, and the mature considerations of Arthur P. Stout, M.D., Professor of Surgical Pathology at Columbia University. Their dissertations were followed by discussion from the attending participants. The quick wit and sharp comments of a third guest, L. Henry Garland, M.D., Clinical Professor of Radiology, Stanford University, contributed greatly to enliven and enlighten the discussion.

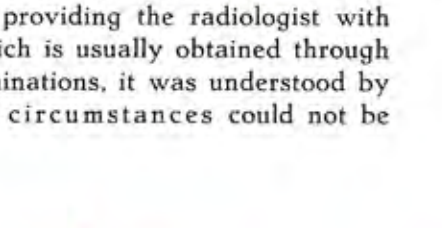
The College of American Pathologists graciously co-sponsored this CANCER SEMINAR. As in previous years, this Seminar brought to all of us a great deal of valuable information and considerable satisfaction.

J. A. del Regato, M. D.

Colorado Springs, August, 1952.



The Broadmoor



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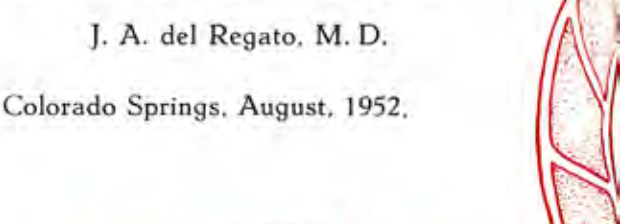
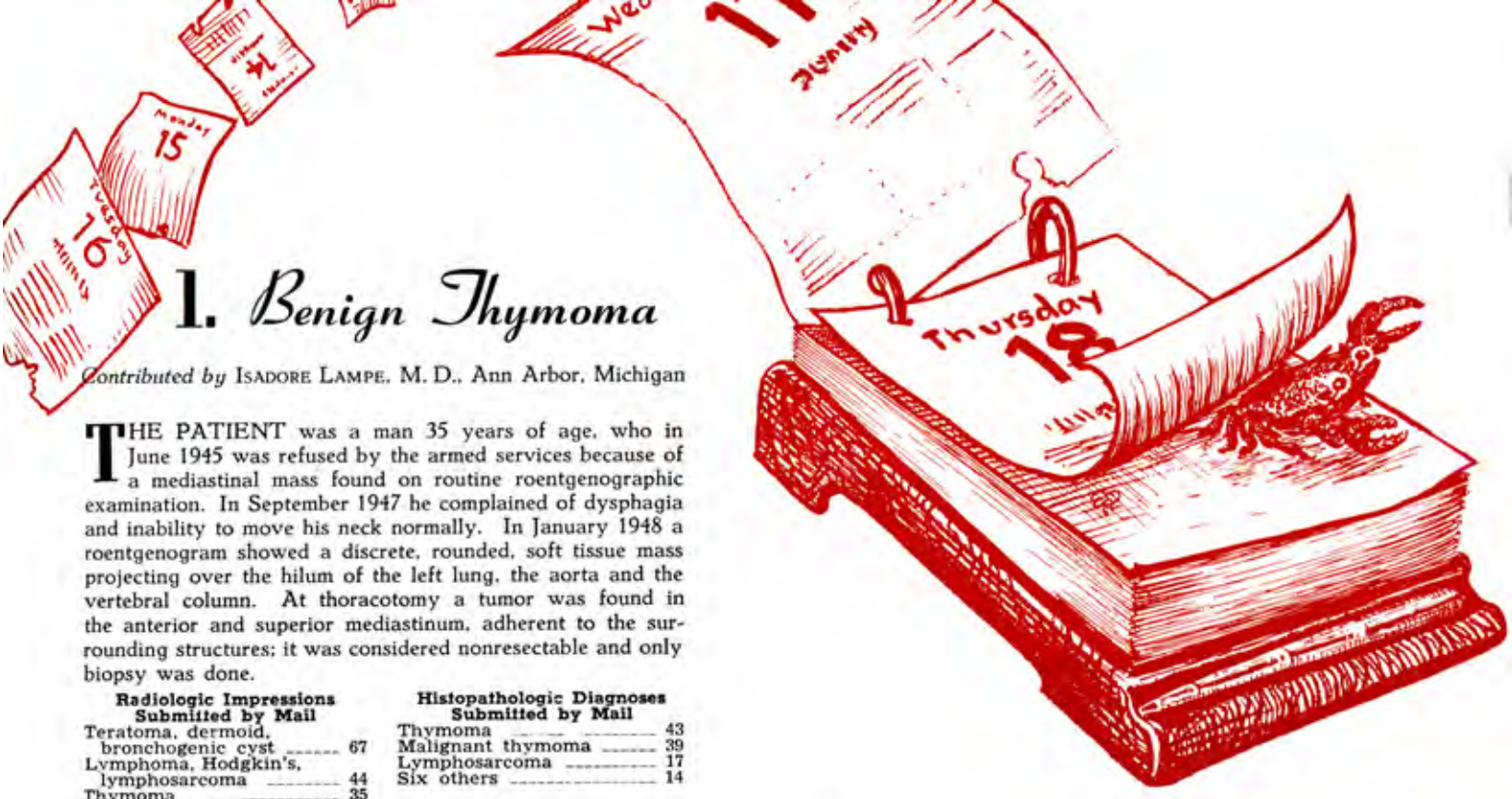


Mount Saint Joseph on-the-Ohio



1. *Benign Thymoma*

Contributed by ISADORE LAMPE, M. D., Ann Arbor, Michigan

THE PATIENT was a man 35 years of age, who in June 1945 was refused by the armed services because of a mediastinal mass found on routine roentgenographic examination. In September 1947 he complained of dysphagia and inability to move his neck normally. In January 1948 a roentgenogram showed a discrete, rounded, soft tissue mass projecting over the hilum of the left lung, the aorta and the vertebral column. At thoracotomy a tumor was found in the anterior and superior mediastinum, adherent to the surrounding structures; it was considered nonresectable and only biopsy was done.

Radiologic Impressions Submitted by Mail	
Teratoma, dermoid, bronchogenic cyst	67
Lymphoma, Hodgkin's, lymphosarcoma	44
Thymoma	35
Mediastinal tumor	10
Nine others	24

Histopathologic Diagnoses Submitted by Mail	
Thymoma	43
Malignant thymoma	39
Lymphosarcoma	17
Six others	14

Dr. Hodes: The clinical history, of observation for two and one-half years, suggests slow growth and consequently excludes the rapidly growing malignant tumors; the operative findings reveal the presence of a tumor which was not removed, either because it was inoperable or because it may have been more satisfactorily treated by conservative procedures.

One always considers seriously the possibility of a thymic tumor in the anterior mediastinum; yet there was no asthenia which is reported in forty per cent of the cases. The tracheal encroachment shown by this lesion would favor the possibility of a thyroid tumor rather than a thymic tumor; the latter less often affect the trachea, and when they do, they envelope it like a cast instead of displacing it. The point of compression of the trachea lies well above the lower limits of the tumor mass, which suggests that the tumor may have arisen near the thoracic inlet and gradually grown in a caudad direction. But a thyroid tumor would have been removed.

The possibility of a teratomatous tumor (including dermoid) undergoing malignant degeneration cannot be excluded; the size of the lesion would seem to militate against this diagnostic possibility, for teratoid tumors of this size can usually be removed surgically. The fact that the lesion is not an unusually radiopaque one suggests that it may be of fatty origin; other rather radioluscent lesions, when small, are the thymic tumors and the lymphangiomas. Lymphangiomas arise low in the neck and often grow into the superior and anterior mediastinum; they respond well to radiotherapy and are often difficult to handle surgically.

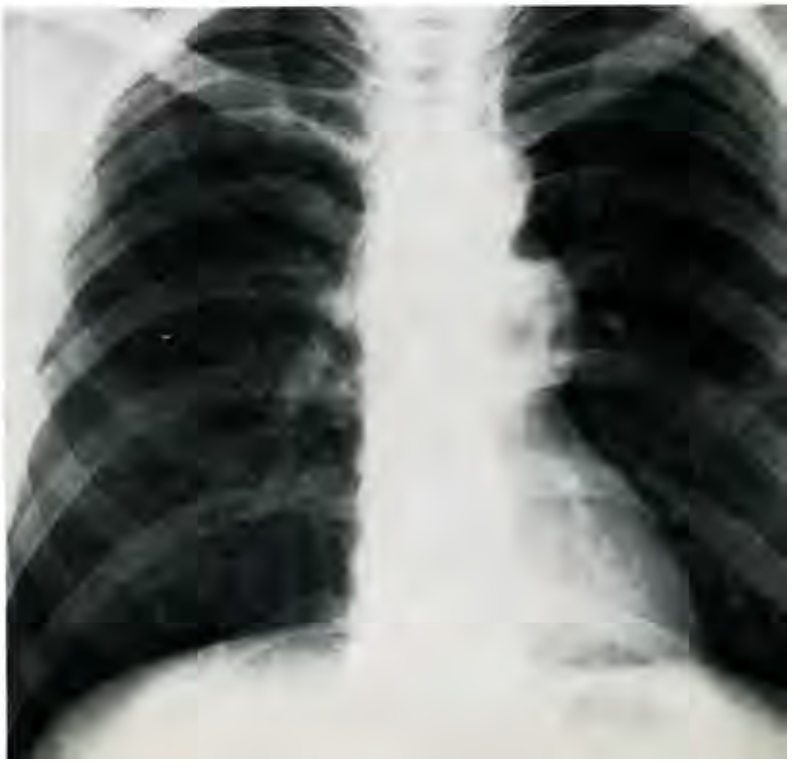
Dr. Hodes' conclusion: A BENIGN LESION. I favor the diagnosis of LYMPHANGIOMA of the neck and mediastinum, though I consider THYMOMA as a distinct possibility.

Paul C. Swenson, M. D., Philadelphia, Pa., (by mail): Within the last year we have had three cases with a similar mediastinal shadow that disappeared spontaneously. The assumption was that they represented non-specific inflammatory nodes. Why would anybody interfere with such a mass if it showed no change for three years? Somebody's intellectual curiosity got the best of him!

Dr. Regato: Dr. H. L. Friedell of Cleveland suggested a radiographic diagnosis of malignant thymoma; J. T. Case of Santa Barbara suggested the possibility of teratoma, and F. J. Hodges of Ann Arbor that of a lymphoblastoma.

Dr. Stout: This tumor shows certain characteristic features. It has a lobulated appearance because strands of fibrous tissue separate the groups of tumor cells. The tumor cells are of two types, a smaller one resembling a lymphocyte and a larger one resembling a reticulum cell. Both appear well differentiated, show no mitoses and are inextricably intermingled. The only variation occurs when the reticulum-like cells become elongated and spindle shaped. No Hassall's corpuscles are seen nor any tubes or cysts lined with epithelial-like cells. I can only interpret a growth with this morphology in the anterior mediastinum as a thymoma.

Fig. 1—Roentgenogram showing a discrete mass over the hilum of the left lung.



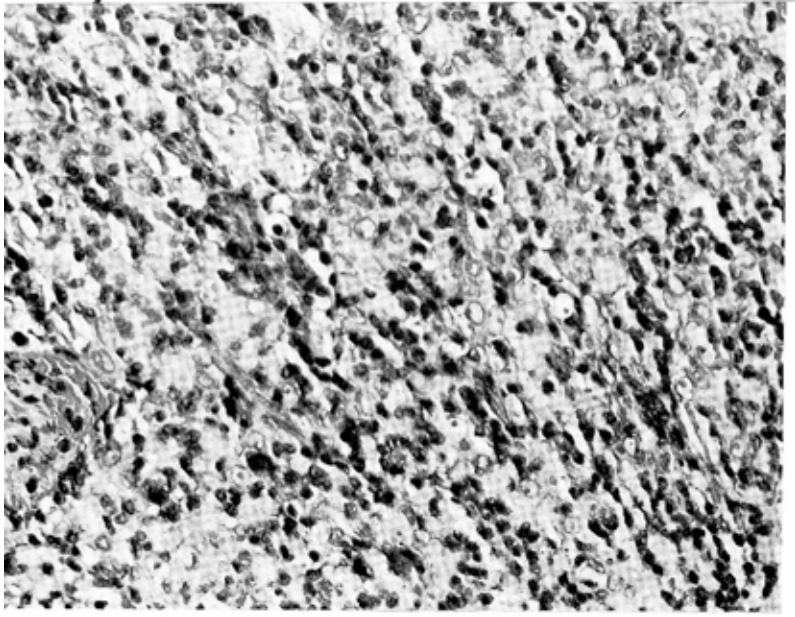


Fig. 2—Photomicrograph. Thymoma, showing mixture of two cell types.

At the laboratory of surgical pathology of Columbia University we have thirty-six cases of thymoma recorded; twelve of these were operated at the Presbyterian Hospital and twenty-four came from other sources. The sex is known in thirty-four of these cases: sixteen males and eighteen females. The age is known in thirty-two: twenty-five were over forty years of age and the other seven were 22 to 35 years old; we know, however, that they can occur in children, for there are cases recorded in our Babies Hospital and at least one of them was malignant. Of the thirty-six cases, eleven were associated with myasthenia gravis and one with aplastic anemia; the latter patient was temporarily relieved after removal of the thymus but the condition recurred and she died. The largest of these tumors measured 18x21x24 cm and weighed 1000 grams. Seven of these thirty-six cases showed some evidence of malignancy and four of them had metastases (one in the axillary nodes, one in the cervical nodes, one in the lungs and one in the cervical and mediastinal nodes, the lungs and pleura); one case showed direct invasion of the thyroid, neck muscles, esophagus, trachea, bronchi and pleura. Another case showed direct invasion of the heart; one recurred after operation and invaded the lung, and one was so large and adherent as to be considered inoperable. Not one of these malignant cases was associated with myasthenia gravis; Derow and associates have pointed out that metastases are not reported in case of thymoma associated with myasthenia gravis.

It is sometimes difficult to decide whether one is dealing with a true tumor or only thymic hyperplasia. If the enlargement is diffuse and the components relatively normal with Hassall's corpuscles we have called it hyperplasia. If the enlargement is a nodule and not diffuse we have called it thymoma, even if well differentiated. Hassall's corpuscles are seldom detected in thymomas. We have been puzzled in a few thymomas to find inclusions of small tubules lined with cells which may be epithelial although we cannot feel sure of this. These structures we have not yet been able to identify. It may be almost impossible to distinguish histologically between benign and malignant tumors and the decision may have to rest upon clinical evidence of infiltrative growth and or metastasis. The thymus may become involved by lymphosarcoma and Hodgkin's disease. It should be possible to distinguish these from true thymomas if one adheres to the criteria for thymomas and the other two diseases all of which differ one from the other.

In regard to nomenclature I think it is wise to continue the use of the term thymoma prefaced by the adjectives benign or malignant as the case may be. This is because of the uncertainty regarding their cellular origin and composition.

Dr. Stout's diagnosis: BENIGN THYMOMA.

Pierre Masson, M.D., Montreal, Canada (by mail): The bad condition of the preparation does not permit one to say whether these are thymic or lymphatic elements. A long time ago we stopped fixing our tissue in formalin, spreading the sections in warm water, which distorts the tissues, and staining with hematoxylin-eosin, which reveals nothing precise in respect to the cytoplasms. Very often, in spite of a careful study under the best of circumstances, we cannot arrive at a definite diagnosis. Our collection of "ignotomes" has become larger and larger.

Dr. Regato: A histologic diagnosis of thymic carcinoma was submitted by R. Willis of Leeds and also by A. J. French of Ann Arbor; C. A. Hellwig of Halstead thought this case to be one of malignant thymoma.

Subsequent history: In February 1948 the patient was submitted to roentgentherapy; a total of 2,850 roentgens (calculated on the skin) were administered to each of 4 fields, 15x10 cm in diameter, directed to the tumor area, in 38 days (200 kv, 50 cm distance, 0.9 copper h. v. l.) Reduction of the mass followed. The dysphagia and muscular difficulties were considered due to myasthenia gravis and the patient was given prostigmine; signs of prostigmine intoxication developed in May 1948. The syndrome of myasthenia was exacerbated in July 1949. A letter from the patient dated January 1950 stated that "he is feeling pretty good."

L. Henry Garland, M.D., San Francisco, Calif.: My impression was that the lesion could be either a thymoma or a dermoid; the developments in the recent history suggest malignant change. We have seen four cases of anterior mediastinal dermoid which suddenly took what appeared to be a malignant course. I note that Dr. Hodes' diagnosis was benign thymoma or lymphangioma. Would he please tell us how many cases of benign lymphangiomas of the mediastinum he has seen? Dr. Stout diagnosed this histologically as a benign thymoma; some of his colleagues as a malignant thymoma. I feel that the clinical course of the case is somewhat inconclusive to date, although there is a suggestion of malignancy in the recent developments.

Dr. Hodes: Mediastinal lymphangiomas are not rare. They may approach the size of this patient's tumor. The largest mediastinal lymphangioma I have seen was presented before the Philadelphia Roentgen Ray Society by Dr. G. E. Pfahler about ten years ago. It was approximately three times the size of this patient's lesion and disappeared entirely following radiation therapy.

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2. Lymphosarcoma (Benign Lymphoma?) of the Lung

Contributed by RICHARD H. OVERHOLT, M. D., Brookline, Massachusetts

THE PATIENT was a man 26 years old when discharged from the Armed Forces in 1946; he was informed then that the routine roentgenogram of his chest had shown a small shadow in the right lung. In November 1950 the roentgenogram showed a rounded discretely outlined soft tissue mass, measuring 3 cm in diameter, in the right middle lobe, near the hilus. There had been no change in size in a period of six months of observation. The tuberculin test was negative. In December 1950 a thoracotomy was done; a solitary intrapulmonary mass, 4 x 6 cm in diameter was found presenting in the major fissure between the superior and basal segments of the right lower lobe. A right lower and middle lobectomy was carried out.

Radiologic Impressions Submitted by Mail	
Benign lung tumor	49
A - V aneurysm	27
Hamartoma	24
Tuberculoma	23
Bronchogenic carcinoma	21
Bronchogenic cyst	17
Coccidioma	16
Nine others	32

Histopathologic Diagnoses Submitted by Mail	
Lymphoma, Hodgkin's, lymphosarcoma	30
Lymph node or adenitis	28
Thymoma	26
Thymic choristoma	18
Nine others	31

Dr. Hodes: The fact that this lesion was known to have been present for approximately four years, tends to exclude the malignant conditions. The negative tuberculin reaction would tend to exclude tuberculosis also.

Small nodular lesions like this, almost cherry-like in size and contour, call to mind many pulmonary abnormalities. To name the more common ones, one would include tuberculoma, hamartoma, arterio-venous aneurysms, metastases, adenomas, fibroadenomas, connective tissue tumors and bronchogenic carcinomas. The primary connective tissue tumors of the lung are rather rare. One would expect a pulmonary adenoma to have increased in size during the four year interval, though this is not always the case.

Close inspection of the lesion suggests that there are several large blood vessels intimately connected with it. Were stereoscopic films available, one could tell with ease whether these abnormal vascular shadows were but superimposed upon the tumor mass. If the latter were true, one would consider this to be an arteriovenous aneurysm. Fluoroscopy, angiocardiography and perhaps, even the patient's red blood count would easily confirm or exclude this suspicion. Had this lesion within it some calcific debris, the diagnosis of hamartoma would be most acceptable. It is only fair to say all hamartomas do not contain calcified cartilage.

Dr. Hodes' conclusion: A BENIGN LESION: because of the superimposed vascular shadows I am inclined to consider this an ARTERIOVENOUS ANEURYSM.

Dr. Regato: Dr. H. L. Friedell of Cleveland and P. C. Swenson of Philadelphia also suggested the possibility of an arteriovenous aneurysm; J. A. Campbell of Indianapolis submitted a diagnostic impression of benign lymphoma.

Dr. Stout: The section which I have studied shows no lung tissue only a solid mass made up of lymphocytic cells filling up all of the spaces except that occupied by a patchy fibrosis and the presence of a number of sinusoidal vessels, some of which contain masses of partly degenerate lymphocytic cells. The presence of a few focal collections of reticulum cells ape the appearance of follicles. Mitoses are not present.

Fig. 1—Roentgenogram showing a rounded mass over the right middle lobe.

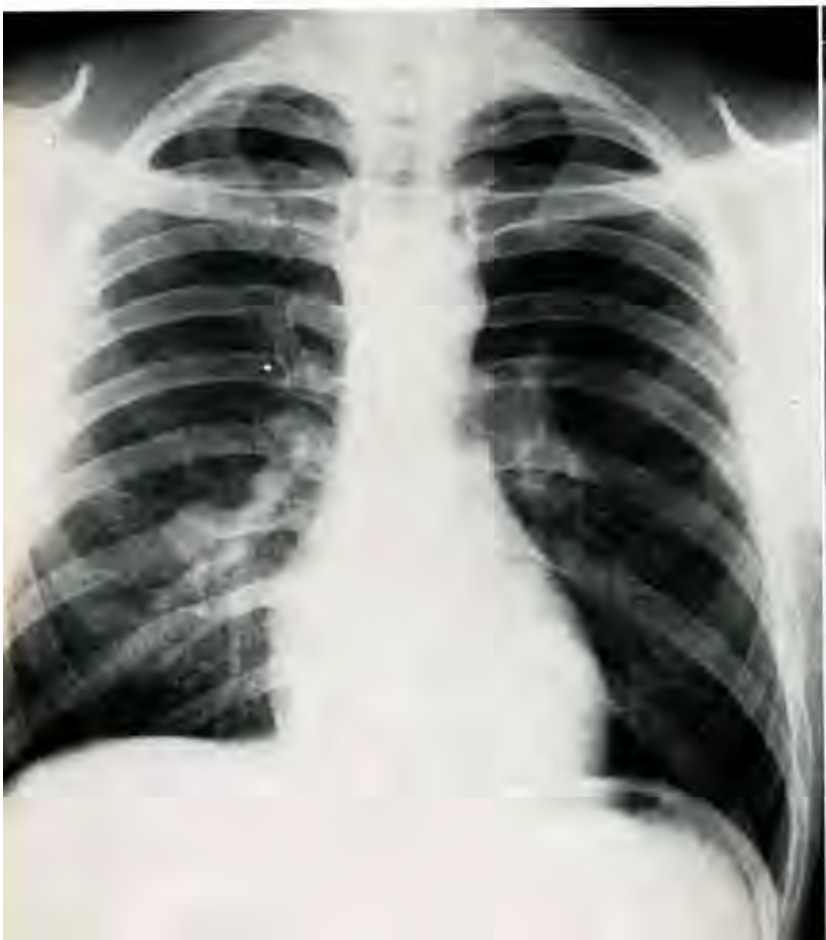
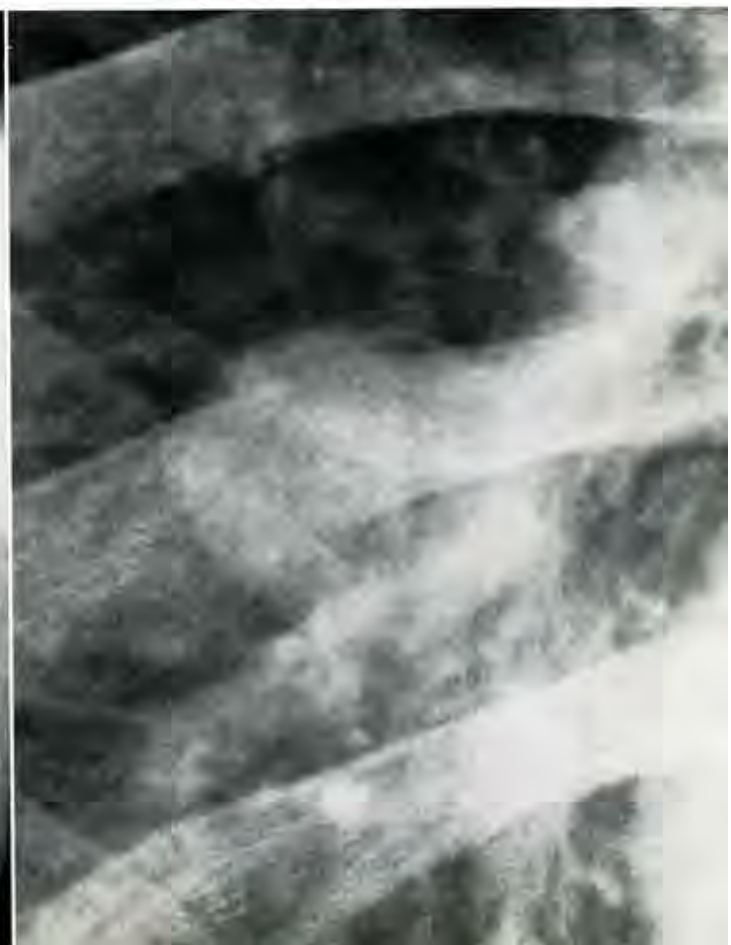


Fig. 2—Close-up of the same lesion showing large blood vessels in association with the lesion.



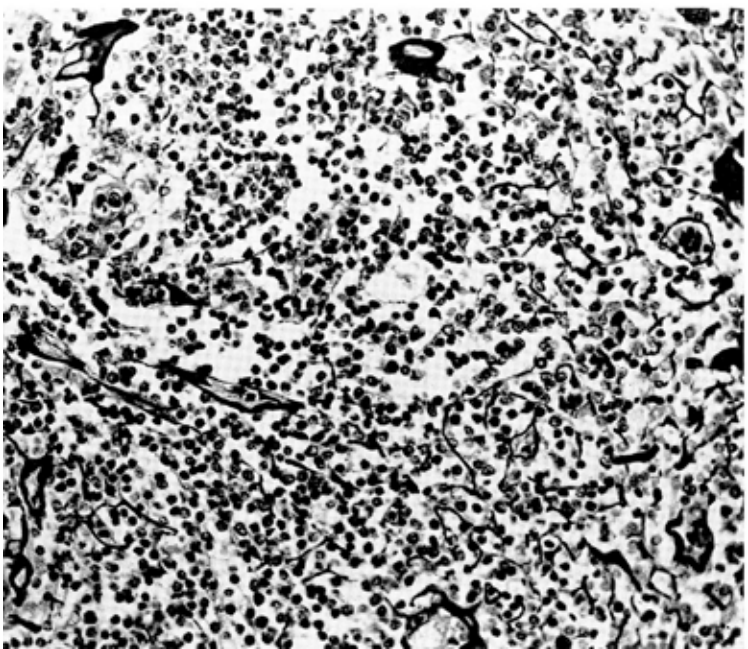
This is the seventh case of more or less localized collections of lymphoid cells in the lungs, forming tumor-like masses removed by surgeons, which I have studied. Three of them have been reported, one by Spott and Grayzel, one by Maier and one by Anlyan, Lovingood and Klassen. They have had certain remarkable features in common. All of them so far as my information extends have been limited to the lung and there have been no foci discovered in any other part of the body. It is evident, therefore, that they differ from cases of lymphosarcoma starting in other parts of the body and involving the lung secondarily. Six were males and only one was a female. Their ages were 25, 26, 38, 39, 50, 62 and 63. The right lower lobe was involved alone in four cases, the right middle lobe alone in two and in the other case the tumor occupied most of the left upper lobe and part of the lower lobe. Four cases had no symptoms. The other three had symptoms referable to invasion and/or obstruction of a bronchus. Six cases were composed largely of fairly well differentiated lymphocytes and only one was a reticulum cell tumor. One remarkable case studied by Colonel Farinacci at the Fitzsimons Army Hospital, which I have included among these but which will be reported in detail by him, showed, in addition to large solid masses of lymphoid cells replacing the parenchyma, a number of submucosal polypoid projections into large bronchi which were large enough to obstruct them.

I have wondered if it is proper to call all these tumors lymphosarcomas because of their benign course and localized features. It has seemed to me possible that they may be comparable to the localized lymphoid nodules in the mucosa and submucosa of the rectum and sigmoid which I like to call benign lymphomas. These lung lesions are generally very much larger than the rectal tumors—so large that it is difficult for me to feel justified in calling them simply lymphoid hyperplasias. For the present I continue to record them as lymphosarcomas pending more information concerning the subsequent course of these cases. We can all recall that Brill, Baer and Rosenthal at first thought that their cases of giant follicle lesions of lymph nodes and spleen were not neoplastic, but that later they had to acknowledge they represented a form of lymphosarcoma. When enough information about these lung tumors has accumulated, a proper descriptive term for them will be selected.

Dr. Stout's diagnosis: LYMPHOSARCOMA (benign lymphoma?) of the lung.

James H. Walker, M.D., Brookline, Mass. (by mail): This was definitely an intrapulmonary lesion. It was situated in the lower lobe, but a portion of it was present in the interlobar fissure. Once the tumor was removed one could definitely see the origin of the base of the tumor and it was within the lower lobe.

Fig. 3—Photomicrograph. Lymphocytoma (lymphosarcoma ?) of the lung. Laidlaw silver reticulin stain.



Pierre Masson, M.D., Montreal, Canada (by mail): The lymphoid tissue is composed of numerous follicles, most of them with reticular elements in their center, which are separated by fibro-hyalin tissue. This hyaline sclerosis invades the reticulum and extends to the adventitia of numerous vessels; around some of these there is a thick hyalin layer. The elements within the reticulum have the appearance of lymphocytes. This is probably a case of chronic lymphadenitis of unknown cause.

Dr. Regato: Dr. R. Willis of Leeds suggested that this is a case of simple lymph node hyperplasia. M. B. Dockerty of Rochester thought this to be a "giant hemolymph node" but admitted that it was "somewhat anemic." A. O. Severance of San Antonio submitted a diagnosis of agnogenic myeloid metaplasia.

L. Henry Garland, M.D., San Francisco, Calif.: My impression was benign lung tumor. Apparently Dr. Stout classifies this as a benign lymphatic structure. I suppose it might be an ectopic lymph node. Has Dr. Hodes seen any other such ectopic intrapulmonary nodes in humans?

Dr. Hodes: About fifteen years ago Dr. Herman Ostrum, radiologist to the Philadelphia General Hospital, presented a pulmonary lesion to our radiological conference which was thought to be an ectopic lymph node. If my memory serves me correctly this lesion was approximately 1.5 cm in diameter, and was situated in the peripheral portion of the middle third of the lung several cm away from the hilum itself. This patient had no pulmonary complaints. At post mortem examination, however, a well circumscribed lymphoid mass was found which was considered to be an ectopic lymph node. Never since then have I come across a similar case.

W. O. Brown, M.D., Scottsbluff, Nebr.: I would like to submit the suggestion that this lesion might be an ectopic spleen. I thought I could recognize Malpighian corpuscles in the section and the lesion had a definite sinusoidal arrangement.

A. O. Severance, M.D., San Antonio, Tex.: I thought this was a lymph node, and I also thought that there was some evidence of blood cell formation going on such as nucleated red blood cells, a rare megalokaryocyte, and immature granulocytes. In retrospect I believe that ectopic spleen is a better diagnosis.

Mark Wheelock, M.D., Chicago, Ill.: I saw what I considered thymic corpuscles and I understand that thymic tissue has been found in the lung. I remember a paper in which these various abnormalities were discussed (Gruenfeld). Thymus may occur if not in the lung, attached to it and maybe to the pericardium. The diagnosis of lymphosarcoma made by Dr. Stout may influence the surgeons to do a pneumonectomy. I wonder if the case deserves that much radical surgery. Dr. Arey reviewed my slide and though he would not state it was thymus, he could not eliminate it as a possibility. He believed that it could be found in the interlobar fissure.

Richard M. Mulligan, M.D., Denver, Colo.: I would like to know how to account for what looked to me like Hassall's corpuscles.

Dr. Stout: They were not present in my slide.

H. Mason Morfit, M.D., Denver, Colo.: Assuming that the diagnosis of lymphosarcoma is correct, it may be in order to remember that we ordinarily think of this disease as being multicentric in origin. There is increasing evidence, of considerable importance from a therapeutic point of view, that the disease may be unicentric in origin, and consequently

susceptible of local cure. We know that properly treated cases of lymphosarcoma of the tonsil have been followed for five to fifteen years and have remained well. Would Dr. Stout comment on the possible unicentric origin of lymphosarcoma?

Dr. Stout: I certainly agree to that. One example is that of lymphosarcoma of the stomach which remains well following surgical removal or radiotherapy. Generally these are treated surgically because the diagnosis is not made before treatment is instituted.

Leo Lowbeer, M. D., Tulsa, Okla.: In connection with the occurrence of "lymphomas" in the human lung, I would like to draw your attention to the well known fact that in the normal lung of the guinea pig, lymph follicle-like structures are found quite frequently and that these lymph follicles become more frequent and enlarged as a non-specific response to such infectious agents as experimental Brucella infection. The ubiquitous nature of lymphoid tissue is also apparent in giant follicular lymphoblastoma, where lymphoblastic tumors appear in places where there are no lymph nodes.

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3. Benign Solitary Fibrous Mesothelioma

Contributed by LAUREN V. ACKERMAN, M. D., St. Louis, Missouri

THE PATIENT was a 44 year old man in November, 1950, when an abnormal opacity was found in a survey roentgenogram of the chest; this consisted of a large, sharply defined dense shadow, measuring 10 cm in diameter, lying against the lateral wall of the right hemithorax, extending medially to within 3 cm of the right cardiac border and presenting no apparent calcifications. In December 1950 a thoracotomy was done; an ovoid mass, 13 cm in its greatest diameter, was found completely outside the lung and covered by pleura on only one side; the pleura was of normal thickness. On cut section, the tumor was somewhat slimy, but there was no great amount of mucous. It was easily removed.

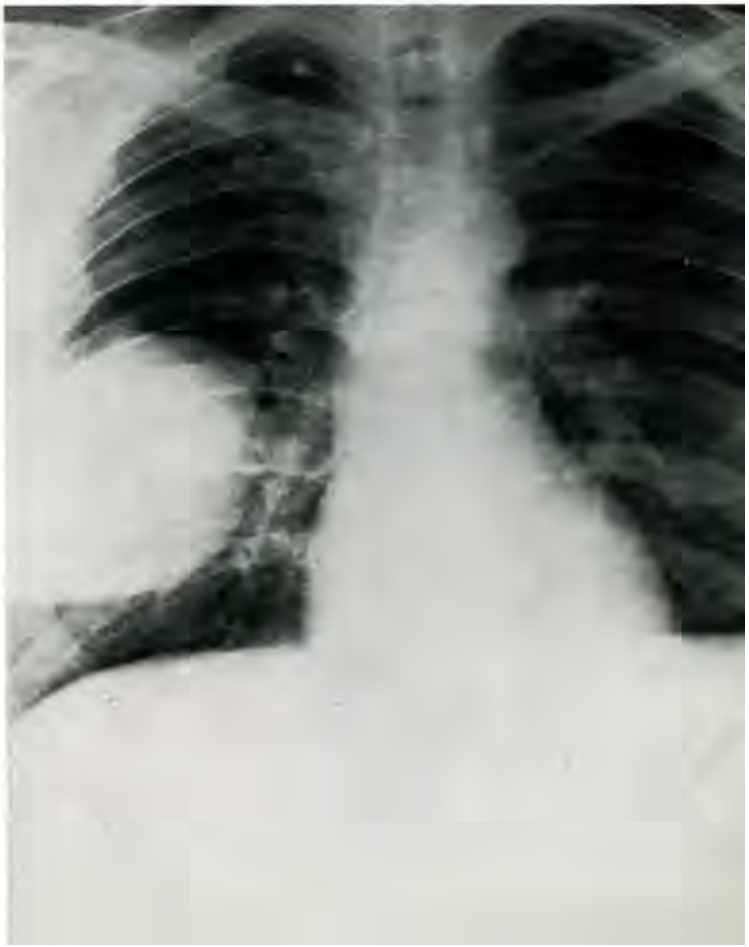
Radiologic Impressions Submitted by Mail	
Pleural mesothelioma, fibroma	42
Loculated fluid, cyst	34
Peripheral carcinoma	25
Neurofibroma	17
Chondroma	16
Eight others	45

Histopathologic Diagnoses Submitted by Mail	
Neurofibroma	32
Fibroma	27
Mesothelioma	21
Neurilemoma	18
Sarcoma	20
Six others	14

Dr. Hodes: Any mass this size must be suspected of being a bronchogenic carcinoma. The peripheral alveolar cell lesions sometimes assume this solid, well-circumscribed appearance. Metastatic carcinomas, particularly the "cannonball type" from the kidney, also must be considered. Recently some solitary muscle cell tumors that looked like this have been reported in lungs.

If I could be absolutely certain that the overlying ribs were perfectly normal, I would exclude a cartilaginous or bony neoplasm. Chondrosarcomas and chondromas in this portion of the hemithorax usually are well-demarcated, dense lesions that ordinarily spring from a rib or its components; almost invariably associated rib changes mark their site of origin. I am inclined to believe that this patient's ribs are normal even though they cannot be adequately visualized. Lipomas may become as large as this or even larger; they usually are less dense lesions. Occasionally, dermoids wander from the midline to produce somewhat similar dense lesions but the absence of fat or calcific debris militates against this

Fig. 1—Roentgenogram showing large, dense, sharply-defined mass.



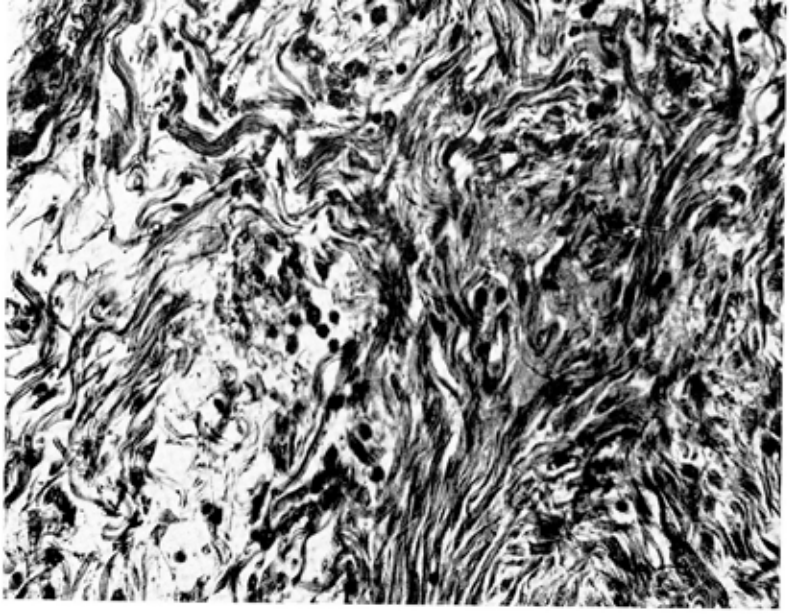


Fig. 2—Photomicrograph. Benign solitary fibrous mesothelioma of the pleura. Masson stain showing lack of pattern and abrupt change from dense to loose textured areas.

diagnosis. Ecchinococcus cysts assume a similar appearance although it is only fair to say that the ecchinococcus cysts usually are rounder and intra-pulmonary.

There is a tumor of the pleura which may grow slowly and remain well circumscribed. I refer to the rather rare neoplasm which has been variously called mesothelioma and pleural endothelioma. Seen early, they are usually asymptomatic, very dense, firm, tumor masses that apparently are confined to the pleural surface and not associated with pleural effusion. The tumor is most commonly found between the fourth and sixth decade which is the proper age distribution for our patient.

Dr. Hodes' conclusion: MESOTHELIOMA OF THE PLEURA.

Dr. Regato: A radiographic impression of benign, fibrous, pleural neoplasm was also submitted by F. J. Hodges of Ann Arbor, J. T. Case of Santa Barbara, H. F. Hare of Boston and E. E. Barth of Chicago.

Dr. Stout: This tumor is basically fibrous—it does not, however, show any of the standard patterns of fibromas or fibrosarcomas. Instead its characteristic is that it does not have any definite pattern at all. The spindle shaped cells and the collagen and reticulin fibers grow in a jumbled fashion—in some areas the fibrous elements predominate with few cells, other areas are more cellular with both spindle shaped and rounded cells present. Areas with very dense fibers are abruptly interrupted by very loose textured paler areas. No areas are very vascular but there are a few thick walled dilated sinusoidal vessels. So far as I can tell my section has not been taken through the periphery of the tumor.

It must have come close to the pleura on the right side from the description of the position of the mass. In any event, the histological morphology is so characteristic of the tumor which I like to call solitary fibrous mesothelioma of the pleura that I shall make that diagnosis. Because of the alternate dense and loose textured areas, one has to think of neurilemoma. I do not find any of the diagnostic features of that tumor in this slide: the cells are not Schwannian, there is no microcystic degeneration, no thick collagen sheaths about the vessels, no Verocay bodies. It is neither a simple fibroma, a fibrosarcoma nor any type of smooth muscle tumor. Is it benign or malignant? In my experience this is the characteristic benign form—the malignant fibrous mesothelioma is much more cellular, shows anaplastic spindle cells with mitoses and fewer and more delicate fibers. When these benign tumors are quite vascular, they can be confused with hemangiopericytomas and I myself confused one with a mixed mesodermal tumor or mesenchymoma.

The mesotheliomas of the pleura, theoretically can present themselves in at least 8 different guises. These depend upon whether the growths are fibrous or produce tubules, whether they are benign or malignant and whether they are solitary nodules or diffusely spread out over the pleural surface. Before the present case reached me I have had an opportunity to study 34 mesotheliomas of the pleura as follows:

Solitary benign fibrous mesothelioma	17
Solitary malignant fibrous mesothelioma	10
Diffuse benign fibrous mesothelioma	2
Diffuse malignant fibrous mesothelioma	1
Solitary benign tubular mesothelioma	1
Solitary malignant tubular mesothelioma	1
Diffuse benign tubular mesothelioma	0
Diffuse malignant tubular mesothelioma	2

Twenty of these tumors were benign and 14 malignant. The benign ones can grow to a very large size, become inoperable and kill but if removed a cure is generally effected. On the other hand, the malignant cases are almost invariably fatal. I cannot of course guarantee that it is correct to assume that all of these tumors are derived from mesothelial cells. I think they are because we know that mesothelium can produce connective tissue fibers and because when grown in vitro the outgrowth produced mesothelium in one case. I do feel, however, that it has been useful to use a single term for all these tumors so that they can be collected into a group and their biological characteristics learned. If everyone calls the tumors by different names according to the fancy of the moment, they can never be assembled into large enough groups to learn of their behavior and curability.

I believe the present tumor is benign and I expect a cure to result.

Dr. Stout's diagnosis: BENIGN, SOLITARY, FIBROUS MESOTHELIOMA OF THE PLEURA.

Pierre Masson, M.D., Montreal, Canada, (by mail): This tumor has the character of a fibroma, dense and poor in cells in places, and on the contrary, lax and rich in cells in others. Certain areas remind us of neurinomas but the fact that the nuclei are small and that the cells are always found between the dense collagen bands and not in the interior, makes me lean to a diagnosis of fibroblastoma of doubtful malignancy.

Dr. Regato: A diagnosis of leiomyoma, possibly of vascular origin, was submited by R. Willis of Leeds and one of neurilemoma by C. Oberling of Paris. The possibility of sarcoma was raised by C. A. Hellwig of Halstead, by A. J. French of Ann Arbor and by J. Engelbreth-Holm of Copenhagen.

L. Henry Garland, M.D., San Francisco, Calif.: I had the impression that this should be either a bronchogenic carcinoma or a bizarre cyst. I could not make up my mind whether malignant or benign lesion was the more likely. Dr. Stout called it *benign* mesothelioma. The subsequent course suggested benignancy. Perhaps the cytologic label is less important than the estimate of the biological character of the lesion.

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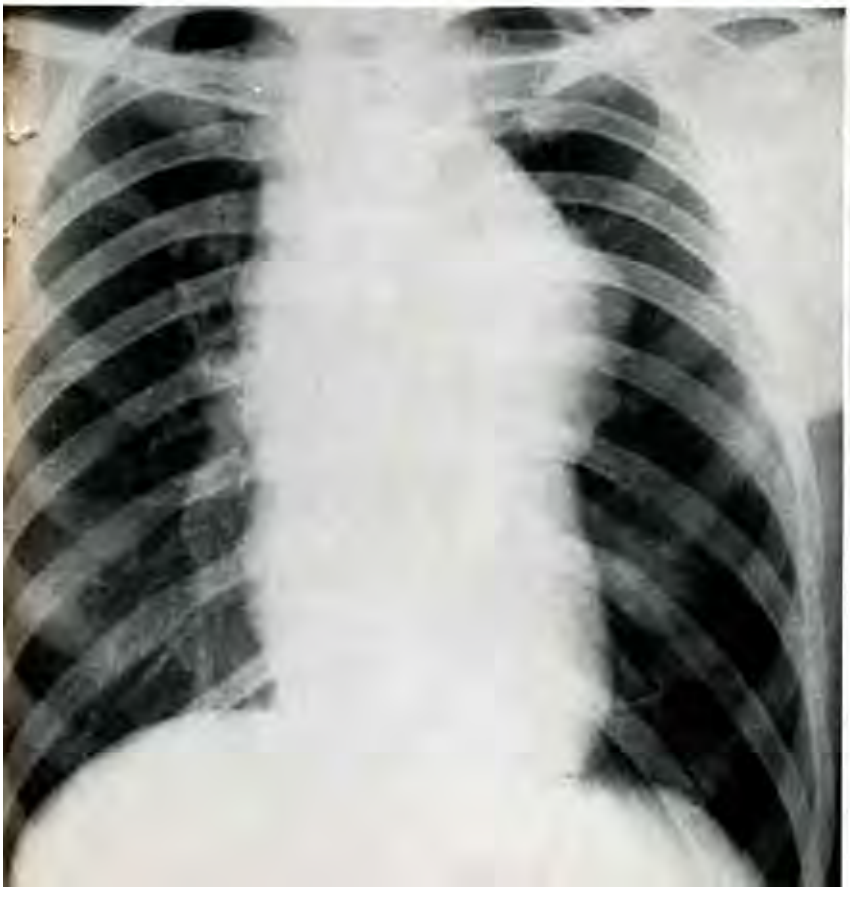
4. *Chorionepithelioma of the Mediastinum and Lung*

Contributed by FRANZ LEIDLER, M. D., Jefferson Barracks, Missouri

THE PATIENT was a 26-year-old man who had served four years in the Army and was in good health when in August 1950, he suffered an automobile accident with trauma over the sternum; he subsequently complained of asthenia, epigastric burning and occasional hemoptysis. In October 1950 he had lost 35 lbs. and gave a history of swelling and tenderness of both breasts; there was no peripheral adenopathy; the Kahn test was negative, the sputum was negative for bacilli. The chest roentgenogram showed

Fig. 1—Roentgenogram showing large mediastinal mass.

Fig. 2—Close-up view showing parenchymal densities within the lung.



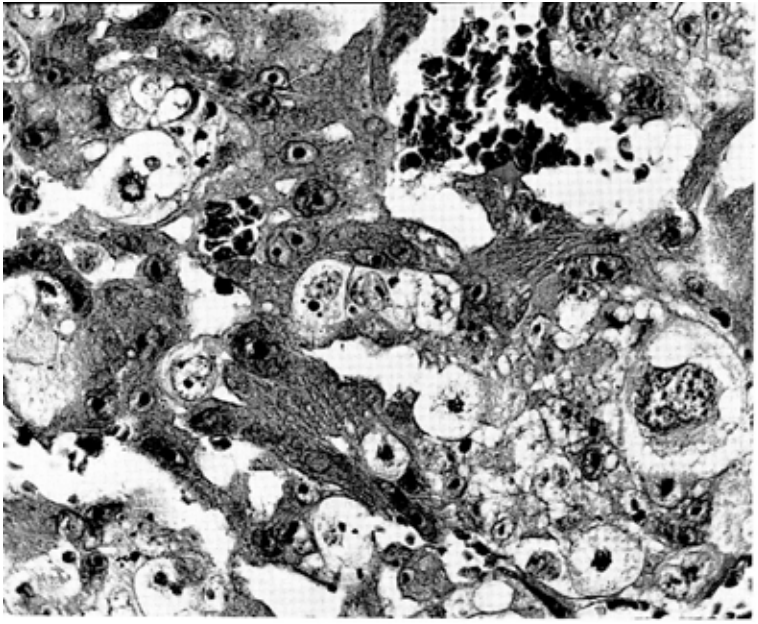


Fig. 3—Photomicrograph. Chorionepithelioma. Syncytial trophoblasts are prominent and surround inconspicuous paler cuboidal cells.

a large, well delimited upper mediastinal mass, 14 cm in diameter, overlying the arch of the aorta. A short series of roentgentherapy was given and the tumor was judged radioresistant. In November 1950 a thoracotomy was done; a large hemorrhagic mass was found in the anterior and superior mediastinum, adhering to the thoracic wall and surrounding organs; there were numerous hemorrhagic nodules in the lung parenchyma; only biopsy was done.

Radiologic Impressions Submitted by Mail	
Lymphoma, Hodgkin's, lymphosarcoma	49
Malignant teratoma, metastatic testicular tumor	38
Choriocarcinoma	15
Thymoma	27
Ruptured cyst or aneurysm	23
Ten others	45

Histopathologic Diagnoses Submitted by Mail	
Choriocarcinoma	99
Carcinoma	3
Liposarcoma	2
Malignant bronchial adenoma	1
Thymoma	1
Duck soup!	1

Dr. Hodes: This patient's downhill course following his accident suggests the injury might have been responsible for the onset of his symptoms. The history of breast tenderness is very provocative but we are told nothing concerning the presence or absence of testicular masses. The fact that this patient was given roentgentherapy suggests that we may be dealing with a relatively radioresistant malignant neoplasm. We are told nothing concerning the amount of treatment delivered to the tumor mass, but I will consider that it was adequate to exclude a radiosensitive tumor. For the same reason I am inclined to believe that the patient's breast symptoms will not prove to be due to a testicular tumor. One would have expected a mestastatic testicular tumor to have shown some degree of radiosensitivity, although this is not always the case. The reported hemorrhagic character of the mass in the superior mediastinum and in the lung seems significant. Were this a very vascular tumor to begin with, trauma would easily have caused hemorrhage and the precipitation of symptoms. Because of this, one must consider the tumors of blood vascular origin.

Close inspection of the left lateral and inferior margin of the tumor mass reveals a rather lobulated appearance. In addition to the mediastinal mass there is a parenchymal density, possibly two parenchymal densities, that seem actually within the lung; they should be studied stereoscopically for more accurate localization. I am impressed by the peculiar structure of the pulmonary lesions which suggest the possibility of a cluster of abnormal blood vessels rather than a parenchymal infiltrate.

Again, we are faced with a consideration of the malignant tumors that occupy the superior and anterior mediastinum. The thyroid and thymic neoplasms do this and would be radioresistant. A teratoma that had undergone malignant degeneration would be equally radioresistant.

No radiologist would stake his reputation upon one single diagnosis in a case like this. Unless he were sure that this man did not have a testicular or adrenal tumor, he would not ignore the patient's breast findings. Nor would he dogmatically state that the primary mediastinal glandular and teratoid tumors need not be considered. For today's exercises, however, I am going to do just that.

Dr. Hodes' conclusion: A MALIGNANT TUMOR: Probably a MALIGNANT HEMANGIOENDOTHELIOMA or MESTASTATIC TESTICULAR TUMOR.

Dr. Regato: A radiographic impression of choriocarcinoma was submitted by J. A. Campbell of Indianapolis, L. Guzmán of Santiago de Chile and L. Erlich of San Juan, P. R.; these gentlemen made use of the clinical information made available to them.

Dr. Stout: This tumor nodule is in the lung and is composed of strands and masses of syncytial cell aggregates of the Langhansian type which grow relatively unsupported. They are often bathed in red blood cells and there is a large area of blood clot containing degenerate tumor cells. Some of the alveoli of the lung tissue surrounding the tumor are filled with blood but the tumor does not seem to have invaded the surrounding alveoli or interstitial tissue.

The history and the morphology of the hemorrhage producing tumor make the diagnosis of chorionepithelioma relatively certain. The question of the origin of the tumor is perhaps the feature of greatest pathological interest. In the Surgical Pathology Laboratory at Columbia the only cases of metastasizing chorionepithelioma in the male could be traced to the testis which beyond doubt is the commonest site of origin. Even if no nodule could be palpated in the testes, one would not feel justified in excluding them unless both were serially sectioned and not only viable tumor but no cicatrix representing the site of a possible self cured primary tumor could be found.

Primary tumors have been found (after excluding the testes) in the mediastinum, in the region of the pineal body and possibly in the retroperitoneum. In each instance, the tumor has been presumed to come from a teratoma in which the hormone producing syncytial masses developed and formed the sole malignant tissue. The gynecomastia present in this case is interesting. Ordinarily chorionic cells when they become neoplastic do not contain amounts of estrogen comparable to those found in the normal placenta. It has been suggested by Twombly and Hocker that the adrenals may have been abnormally stimulated because in their case there was pregnandiol in the urine and that this provided the source of the increased estrogens.

Dr. Stout's diagnosis: CHORIONEPITHELIOMA OF MEDIASTINUM AND LUNG.

Subsequent history: The patient continued to complain of epigastric pain. A Friedman test gave a markedly positive reaction. No testicular tumors could be felt on palpation. In December, 1950, the patient expired; post-mortem examination was not done.

(No audience participation in the discussion of this case.)

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5. Eosinophilic Granuloma (?) of the Lung

Contributed by MAJ. ROBERT W. LACKEY, AMC, COL. FRANK Y. LEAVER, AMC, and COL. CHARLES J. FARINACCI, AMC, Denver, Colorado

THE PATIENT was a 24-year-old man in September, 1950, when upon discharge from the Army a routine roentgenogram of the chest revealed the presence of mottled, somewhat confluent densities throughout both lungs. The patient had undergone vigorous exercises without difficulty; before entering the Army he had been a truck driver and for four years hauled sand and cement. He served 14 months in the Philippines and in Korea. The sputum and gastric contents were negative for bacilli. The differential blood count revealed 10 per cent eosinophiles. In October, 1950, thoracotomy and biopsy were done.

Radiologic Impressions Submitted by Mail		Histopathologic Diagnoses Submitted by Mail	
Sarcoidosis	37	Eosinophilic granuloma	40
Parasitic infestations	29	Pneumonitis, chronic	36
Eosinophilic granuloma	27	Loeffler's	18
Loeffler's pneumopathy	26	Parasitic pneumonia	21
Fungus infections	21	Hodgkin's	9
Chronic inflammatory lesion	15	Six others	17
Nine others	38		

Dr. Hodes: Before considering the differential diagnosis, it is important to bear in mind that this patient had no clinical symptoms. This would seem to exclude the malignant diseases. Also noteworthy is the fact that his sputum revealed no evidence of tuberculosis.

Diffuse bronchopulmonary coalescent mottling of the type presented by this patient brings to mind the entire list of bronchopulmonary diseases recorded by Felson and Heublein several years ago. It included various forms of cystic disease, aspirated and inhaled substances, various infections and infestations, embolic and traumatic pulmonary diseases, bronchial diseases, Boeck's sarcoid, the allergic pulmonary conditions, and various neoplasms. The fact that this patient was clinically well and revealed no other disease stigmata would immediately exclude the vast majority of these conditions. To name but a few that are thus excluded, one can mention bronchiectasis, pulmonary manifestations of pancreatic disease, scleroderma, bronchiolitis obliterans, diffuse interstitial fibrosis, the fungus diseases, tuberous sclerosis, and the various forms of pneumoconiosis.

Bearing in mind that this patient was in the Philippines and in Korea, that he was apparently well, that he presented 10% eosinophilia, one can with justice, narrow the diagnostic possibilities to Boeck's sarcoid or one of the bronchopulmonary allergic conditions. That this patient had sarcoidosis could be supported by the roentgen findings. The eosinophilia is consistent and there is always the chance he picked up a parasite in the Orient.

While in India, we saw several patients with so-called "tropical eosinophilia." The condition was characterized by cough, leucocytosis and eosinophilia. The bronchopulmonary changes were exactly like those presented by this patient. The mere reference to tropical eosinophilia immediately brings up the possibility of Loeffler's syndrome, for in the minds of many, both conditions represent one and the same disease. Loeffler's syndrome is more commonly a bronchopneumonic process which wanders from lobe to lobe. Allergic conditions such as periarteritis nodosa, disseminated lupus and other collagen diseases could produce this pulmonary picture, but there are no other clinical data to suggest these diseases.

This patient might have pulmonary xanthomatosis or eosinophilic granuloma. But the patient's complete lack of symptoms cannot be ignored, unless later the patient went progressively downhill. Also significant is the purely pulmonary distribution.

Dr. Hodes' conclusion: PULMONARY GRANULOMA. I believe it will prove to be TROPICAL EOSINOPHILIA (Loeffler's).

Fig. 1 — Roentgenogram showing mottled, confluent densities throughout both lungs.

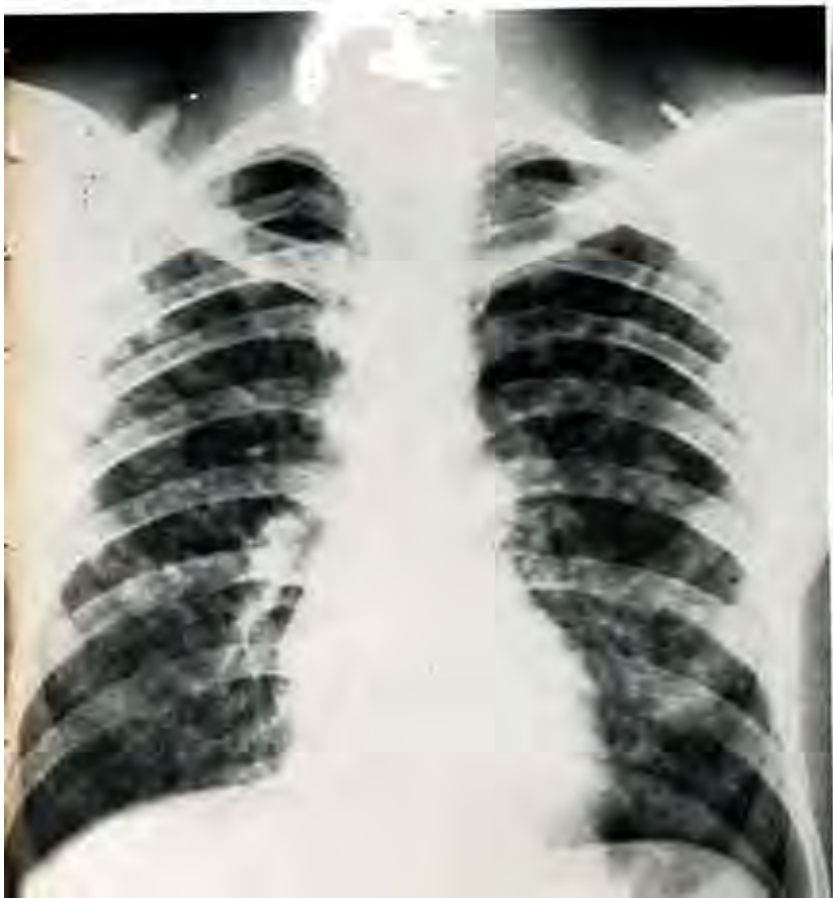

Fig. 2—Close-up view showing the same appearance.

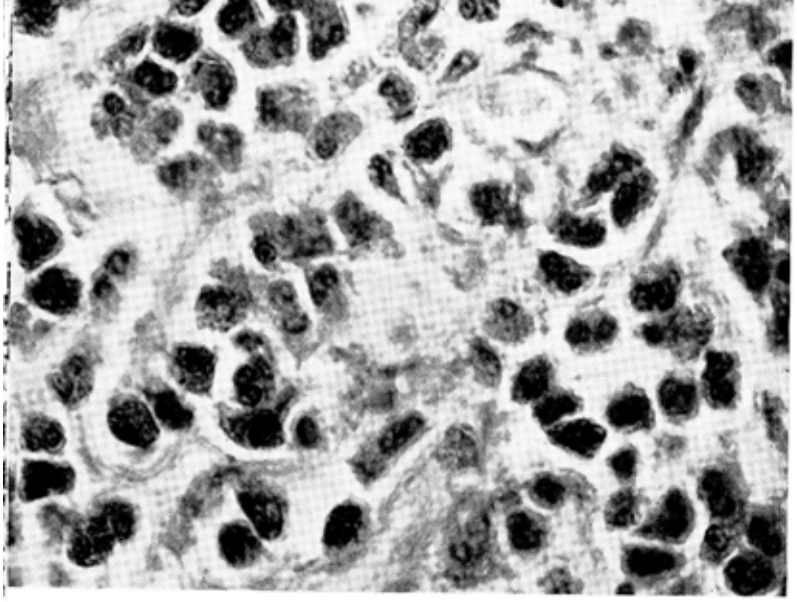

Fig. 3—Photomicrograph. Eosinophilic granuloma (?).

Dr. Regato: A diagnostic impression of Loeffler's was submitted by G. M. Tice of Kansas City and R. J. Reeves of Durham; J. M. Dell of Gainesville, Fla. and H. M. Valles of San Juan, P. R. concluded to the possibility of tropical eosinophilia, and H. L. Friedell of Cleveland and J. A. Campbell of Indianapolis suggested the possibility of schistosomiasis.

Dr. Stout: The lesions in the lung are granulomatous with fibrosis and an intense eosinophilic infiltration which dominates the picture. There are also areas where histiocytes are present in masses and in some alveoli adjacent to the lesion there are many phagocytic cells. A Scharlach R. stain shows that only a few of these contain lipoid. I can detect no evidence of parasites of any kind. Although there are a few multinucleated cells, none of them convince me that it is a Reed-Sternberg cell.

The two diagnoses which first come to mind are some form of parasitic infestation and Hodgkin's disease. I cannot exclude either of these possibilities but also I cannot make either of them lacking further information. I judge from a perusal of the literature that primary Hodgkin's disease of the lung must be a very rare lesion and certainly it is very difficult to prove that it is primary. At best it is occasionally possible to say at autopsy that the lung is the chief and dominant site of involvement.

If we can exclude Hodgkin's disease and parasites, I think we must consider the possibility that we may be dealing with the same peculiar type of granulomatous infiltration with eosinophiles described by Vanek first in the stomach and subsequently in the jejunum by Polayes and Kreiger. I have had an opportunity of studying the slides of all of the cases reported in these two papers as well as others like them. The condition is certainly an entity of an entirely unknown type. Possibly the present case may belong to the same category.

Dr. Stout's diagnosis: EOSINOPHILIC GRANULOMA (?) OF THE LUNG.

Malcolm B. Dockerty, M.D., Rochester, Minn. (by mail): The safest diagnosis is "granulomatous pneumonitis with eosinophiles." The presence of vacuolated histiocytes in abundance leads me further out on the limb of lipoid dystrophy.

Dr. Regato: Dr. R. Willis of Leeds concluded to chronic inflammatory granulomatous pneumonitis, possibly due to parasitic infestation. C. Oberling of Paris submitted a diagnosis of interstitial pneumonitis and J. Engelbreth-Holm of Copenhagen suggested a diagnosis of chronic inflammation of allergic type. G. Gricouroff of Paris made a diagnosis of reticulo-granulomatosis.

Subsequent history: This patient gave no history of mining, quarrying, welding or of contact with asbestos, beryllium or birds. The coccidiodin skin test was negative. A roentgenographic survey of bones did not reveal any abnormality. From November, 1950, to April, 1951, the patient was treated with ACTH and later cortisone but no improvement was noted. He was last seen in April, 1951.

L. Henry Garland, M.D., San Francisco, Calif.: This is indeed a rather strange form of eosinophilic granuloma. Perhaps we are entitled to doubt the pathologist's conclusion! We do not have an adequately long follow up to permit decision. My own inclination is to agree with Dr. Hodes, that is, that the lesion may be due to (a) sarcoidosis, (b) bizarre Loeffler's or (c) chronic, nonspecific granuloma.

Dr. Regato: We are asked to accept a diagnosis of eosinophilic granuloma of the lung; such diagnosis should be easily proven by a trial of roentgentherapy; we would suggest that the lungs of this patient be irradiated cautiously with small daily doses. One cannot help to wonder, were it possible to do a histopathologic study of many of these eosinophilic pneumopathies, if one would conclude that they are difficult or impossible to differentiate from the present case. This case failed to show the classical transient character of Loeffler's infiltrations and, while cases of persistent lesions have also been reported as cases of Loeffler's, it remains to be decided whether or not they should all be considered as one entity. Histopathologic studies of a few cases of so-called Loeffler's syndrome revealed abundant eosinophilic infiltration of the lungs, as well as of other organs (von Mayenburg). These changes have long been attributed to allergic reactions to different kinds of parasites from especially sensitive subjects. Harkavy has associated this eosinophilic infiltration to the finding of arteritis and periarteritis, and considers them as a manifestation of vascular allergy. A peculiar granulomatous character in addition to eosinophilic infiltration, giant cells and necrosing arteritis, has also been reported in a case of so-called Loeffler's that came to autopsy (Bayley). Dr. Stout considered the possibility that the histopathologic changes encountered may be due to a parasite, but found no evidence to prove it; the diagnosis of eosinophilic granuloma is thus made by exclusion.

Dr. Hodes: I should like to ask Colonel Farinacci how often patients with the bone lesions of eosinophilic granuloma develop pulmonary lesions of similar origin? I should also like to know whether any of the patients considered by Colonel Farinacci to have pulmonary eosinophilic granulomas were given roentgentherapy and if they were irradiated, what the effects of the treatment were. Finally it would seem important to establish how many patients with eosinophilic granuloma of the lung alone, without other viscera or osseous manifestations, have been brought to the attention of Colonel Farinacci.

During the war, in India, we saw a group of patients with bronchopulmonary lesions, not unlike those found in this patient, in whom an associated leucocytosis and marked eosinophilia were observed. In some individuals the total white count approximated 25,000 of which as many as 90% were eosinophiles. Clinically these patients complained of intractable cough, chest pain and loss of weight. Thought by some men to be the pulmonary lesions of the many parasites seen in India, the relationship was never proven. Of considerable interest, however, was the fact that these patients almost invariably responded rapidly when treated by arsenicals.

It would seem interesting to determine how many of the patients seen by Colonel Farinacci had been exposed to

parasites during the war. All other forms of treatment having failed, it would seem worth while to try a course of one of the arsenicals based upon our experience in India.

Col Charles J. Farinacci, AMC, Denver, Colo.: We are keeping this patient under observation. To my knowledge he has not received treatment with arsenicals nor has he received roentgentherapy. Inasmuch as he has failed to improve under treatment, that we have been unable to find parasites either in the intestines or in the pulmonary lesions themselves, and that the pulmonary lesions did not have the changing character described by Loeffler's, we concluded that this patient does not have either tropical eosinphilia or a Loeffler's syndrome. Recently we have had a similar case with a similar roentgenologic picture, but who had also granulomatous bone lesions; we have not, however, obtained a biopsy of the lung. In all we have seen two cases of eosinophilic granuloma of the lung (see references).

Marcus J. Smith, M.D., Santa Fe, N. M.: As I recall, in the two papers on eosinophilic granuloma mentioned by Dr. Stout, one described about half a dozen cases of eosinophilic granuloma of the stomach, and the other a solitary lesion in the jejunum, but no pulmonary involvement; presumably this is a different type of lesion from the frequently described one seen primarily in bone (occasionally with visceral involvement).

Dr. Stout: There was no involvement of the lung in any of those cases. I used the comparison only to show that it is possible to have concentrated eosinophilic infiltration in other parts of the body.

Leo Lowbeer, M.D., Tulsa, Okla.: I feel strongly that in any case of eosinophilia, one should look for the presence of intestinal parasites. Parasitic infestation is known to be associated on occasion with visceral granulomatous lesions involving lungs (Loeffler's syndrome) and sometimes the liver. We observed a child with a 30,000 white cell count, 70% of which were eosinophiles; chest roentgenograms showed some mottling; there was a history of his having passed round worms. No ova were found in the stool and a skin test done with an Ascaris antigen was negative, but there was some doubt about the validity of the antigen which was difficult to obtain and outdated. We were not permitted to perform a liver biopsy. There was recently reported an almost identical case by Mercer in which there was also leukocytosis, eosinophilia and hepatomegaly. A liver biopsy showed eosinophilic granulomas, in some of which Ascaris larvae were identified. Skin test with Ascaris antigen was strongly positive. No ova were ever recovered from the stool but at one time, a male Ascaris was passed. Ova were recovered from the dirt covering the floor of a basement in which the child had played. There were also pulmonary symptoms with radiographic findings suggestive of pulmonary granulomas.

The point I want to make is that in cases of eosinophilia with visceral manifestations, one should examine feces for parasites but in the presence of male parasites, no ova may be found. One should then attempt to administer appropriate drugs to recover a parasite from the stools and do skin tests with various antigens. This may make extensive exploratory thoractomies unnecessary.

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6. Hodgkin's Disease of the Mediastinum

Contributed by MARK WHEELOCK, M. D., Chicago, Illinois

THE PATIENT was a 22-year-old man in apparent good health, when upon induction in the Army in September 1950 a routine roentgenogram of his chest revealed a sharply defined mass of soft tissue density in the upper mediastinum and extending to the right, 5 cm from the midline. Blood serology and blood chemistry revealed no abnormalities; the blood count was within normal limits. Subsequent roentgenograms showed progressive enlargement. In January, 1951, a thoracotomy was done; a large lobulated mass was found in the upper mediastinum, bulging to the right, displacing the vena cava laterally and posteriorly and resting on the right surface of the aorta; it could not be adequately resected.

Radiologic Impressions Submitted by Mail	
Lymphosarcoma, Hodgkin's	55
Thymoma	45
Substernal thyroid, thyroid tumor	27
Sarcoid	10
Mediastinal tumor	9
Twelve others	21

Histopathologic Diagnoses Submitted by Mail	
Hodgkin's	98
Reticulum cell sarcoma	17
Lymphoblastoma	12
Neuroblastoma	5
Lymphoepithelioma	2

Dr. Hodes: This patient's tumor showed evidence of active growth during the four months that he was observed, which makes one suspicious that he had a malignant tumor.

We are again faced with multiple diagnostic possibilities including the teratoid tumors, tumors of thymic and thyroid origin, tumors of connective tissue origin, and the various cystic mediastinal new growths. Metastatic disease and the neurogenic tumors also occasionally seek the anterior mediastinum. And as always, there exists a chance that the mass may represent caseating lymph nodes or some other form of adenitis. Tuberculosis adenitis of this type usually is febrile and associated with loss of weight. Because this patient was apparently healthy when the mass was first found, I am inclined to exclude an inflammatory process. Since the benign mediastinal tumors and cystic masses usually do not grow as rapidly as did this tumor, I also exclude them.

Viewed radiologically, this tumor demonstrates no distinctive characteristics. I can find nothing within the tumor to suggest the presence of calcific debris or abnormal fat which would help narrow the field of diagnostic possibilities.

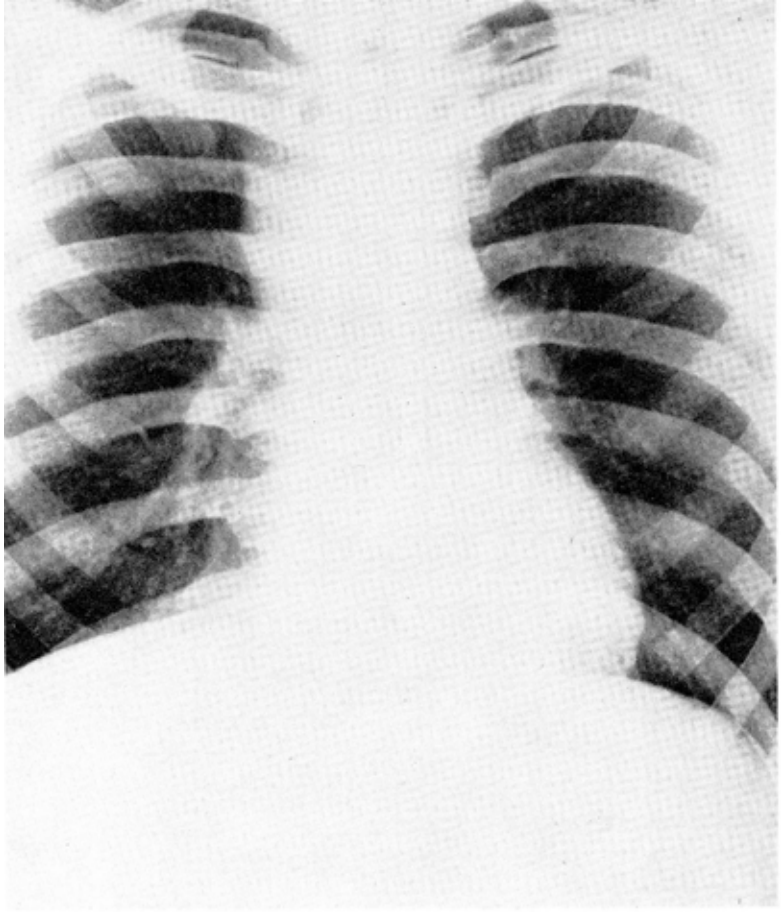

Fig. 1 — Roentgenogram showing sharply-defined mass in the upper mediastinum.

Instead, we are faced with a soft tissue density which could be almost anything. All we can say is that it was actively growing.

Our interest in thymic tumors has been stimulated recently by our surgical pathologists who, in reviewing our material, have found it necessary to reclassify many previously diagnosed teratomas. Almost all have now been added to the thymic tumor group. They tell me the confusion may stem from the fact that neoplasms spring from the same branchial cleft. Be that as it may, we are beginning to think of thymic tumors more often. A thyroid neoplasm could look like this radiographically. The latter displace the trachea more often than thymic tumors, however. No one would say this is not a connective tissue tumor. I have seen fibrosarcomas look just like this.

Dr. Hodes' conclusion: A MALIGNANT TUMOR, possibly thymic.

Dr. Regato: A radiographic impression of Hodgkin's disease was submitted by R. J. Reeves of Durham and by Col. F. Y. Leaver of Fitzsimons Army Hospital, Denver.

Dr. Stout: The section shows a diffuse proliferation of lymphocytes without any differentiation into follicles or sinuses. Scattered at rather wide intervals are solitary reticulum cells. Some of these have large solitary nuclei with prominent nucleoli and a few are found in mitoses. A small number have enlarged sufficiently to warrant calling them small giant cells. These have two to four nuclei and very rarely more. The largest groups of nuclei are in pyknosis and are clumped together. There does not appear to be much fibrosis and eosinophiles are not detected by me.

Although proof of it is not to be found until after rather careful study, I must conclude that this is a case of Hodgkin's disease and that the small multinucleate giant cells are true Reed-Sternberg cells. There is no doubt that Hodgkin's disease can involve the upper mediastinum, its nodes and the thymus forming a large lobulated mass which can be mistaken for a thymoma, mediastinal thyroid or teratoma. Evans and Haight in 1948 collected eight cases which had been surgically removed including two of their own. In most of these cases the operation was done because the lesion was thought to be a solitary lesion probably a benign tumor and its true nature was not recognized. In the only case operated upon at the Presbyterian Hospital, the failure to do a thorough physical examination before operation resulted in overlooking enlarged axillary nodes which presumably were involved. It would certainly have been simpler to biopsy one of these rather than remove a large anterior sternal mass which would probably fail to cure unless the mediastinal nodes happened to a primary focus of involvement. In that case, treatment by radiotherapy or surgery might have a chance of prolongation of life. One of the Evans and Haight's cases lived for over 7 years following surgical removal of a mediastinal Hodgkin's tumor before succumbing to the disease.

Dr. Stout's diagnosis: HODGKIN'S DISEASE OF MEDIASTINUM.

Dr. Regato: A histopathologic diagnosis of Hodgkin's was also submitted by R. Willis of Leeds, by C. A. Hellwig of Halstead, by A. J. French of Ann Arbor and P. Masson of Montreal.

Subsequent history: In January 1951 roentgentherapy was started; treatments were given through several fields, directed to the mediastinal mass; a total of several thousand roentgens was delivered to the tumor in 35 days. The patient was last examined in March 1951 when he appeared well.

Dr. Hodes: Because this patient revealed a unilateral mediastinal mass I never even thought of Hodgkin's disease. Hodgkin's disease when it involves the mediastinum is far more commonly a bilateral process. Of course this should not have militated against the diagnosis; I just never thought of it.

Mark Wheelock, M. D., Chicago, Ill.: This patient is at present in fair health; there have been no other manifestations, no enlargement of the spleen, no lymphadenopathy. Our thoracic surgeon thought that we should make a diagnosis of malignant thymoma; we did not think so, and countered that he was entitled to his own opinion. We thought it was Hodgkin's disease.

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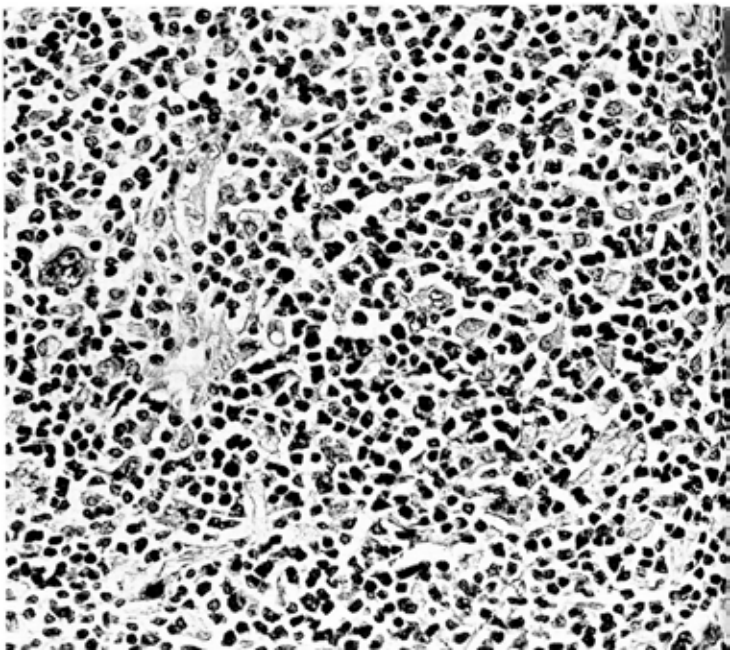
Fig. 2—Photomicrograph. Hodgkin's disease. Diffuse lymphocytic infiltration and one Reed-Sternberg cell.



7. Fibrosis of the Lung Due to Anthracosilicosis

Contributed by PHILIP J. HODES, M. D., Philadelphia, Pennsylvania

THE PATIENT was a 60-year-old man in April, 1951, when he complained of cough and 14 lbs. weight loss; he had been a coal miner for several years. The roentgenogram showed a poorly defined area of increased density in the upper part of the right lung, measuring 6 cm in diameter, and presenting strand-like prolongations; there was evidence of bilateral pulmonary fibrosis. Bronchoscopy revealed narrowing of the right main stem bronchus; bronchial washings were negative for bacilli and neoplastic cells. Vital capacity was 3 liters. A thoracotomy was done and the lesion removed.

Radiologic Impressions Submitted by Mail	
Carcinoma of the lung	75
Tuberculosis, tuberculoma	38
Pneumoconiosis, anthracosis, silicosis	27
Abscess, chronic inflammation	15
Six others	19

Histopathologic Diagnoses Submitted by Mail	
Anthracosilicosis	42
Silicosis	39
Anthracosis	21
Pneumonoconiosis	19
Fibrosis	15
Four others	12

Dr. Hodes: This case was submitted from our own department. The diagnosis was made by one of our assistants purely on the roentgen findings alone. The patient had been referred with the diagnosis of bronchogenic carcinoma for pneumonectomy. It was only after the roentgen opinion had been submitted that pertinent clinical data were obtained.

This roentgenogram presents the following cardinal features: a) pulmonary emphysema, b) diffuse coarse nodulation with a tendency toward coalescent mottling in various portions of the lung, c) a mass in the right upper lobe.

Close inspection of the lesion in the right upper lobe reveals a rather scalloped periphery. On analyzing this scalloped appearance, it seemed that it was the result of a contracting process within the mass with associated compensatory areas of hyperventilation. Thus, instead of an expanding lesion indicating growth, we are faced with a contracting lesion suggesting fibrosis. High among the fibrotic lesions of the chest are those found associated with silicosis.

The diagnosis of silicosis depending upon establishing exposure to an accepted hazard, an occupational history was obtained from the patient. Then, and only then, did we learn the patient was a hard coal miner.

Dr. Hodes' conclusion: PULMONARY FIBROSIS DUE TO ANTHRACOSILICOSIS.

Dr. Regato: Dr. P. C. Swenson, Philadelphia, suggested the possibility of changes produced by localized silicosis; H. L. Friedell of Cleveland thought the lesion possibly due to a combination of tuberculosis and silicosis; H. F. Hare of Boston thought the changes due to pneumoconiosis.

Dr. Stout: The lesion is an extremely dense, relatively acellular strand of fibrous scar tissue heavily pigmented with anthracotic pigment. Where it adjoins recognizable lung tissue the latter is also very heavily pigmented and there are many phagocytes, some with and some without pigment. There are a few small lymphoid foci. A careful search fails to reveal to me any evidence of carcinoma or other malignant tumor in this section.

Fig. 1 — Roentgenogram showing a poorly-defined increased density in the right lung.

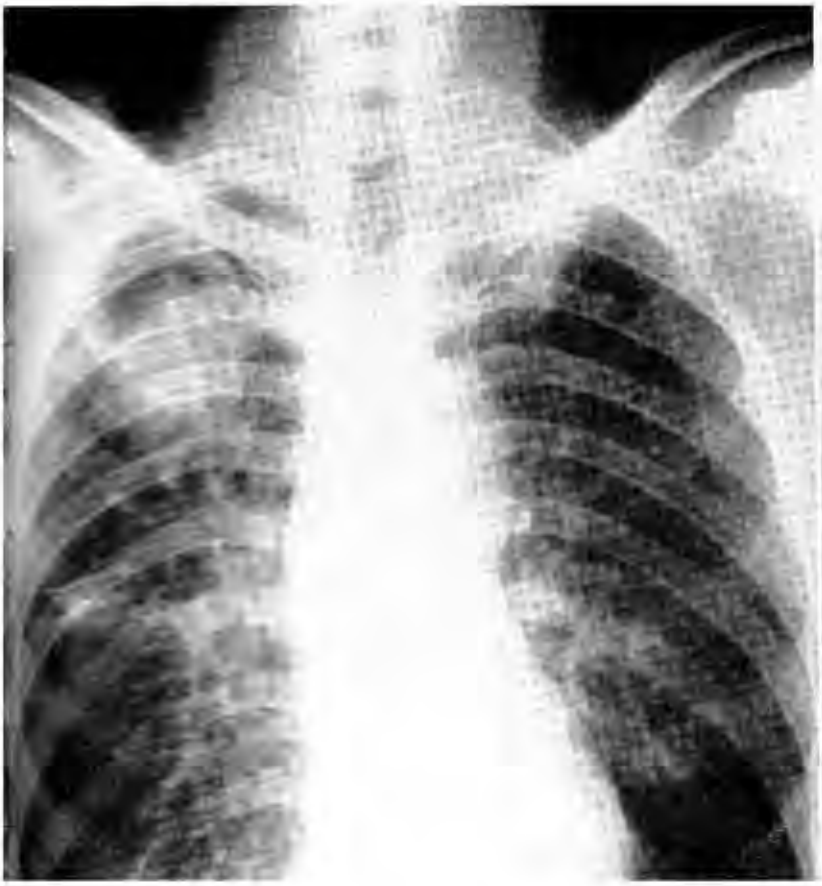
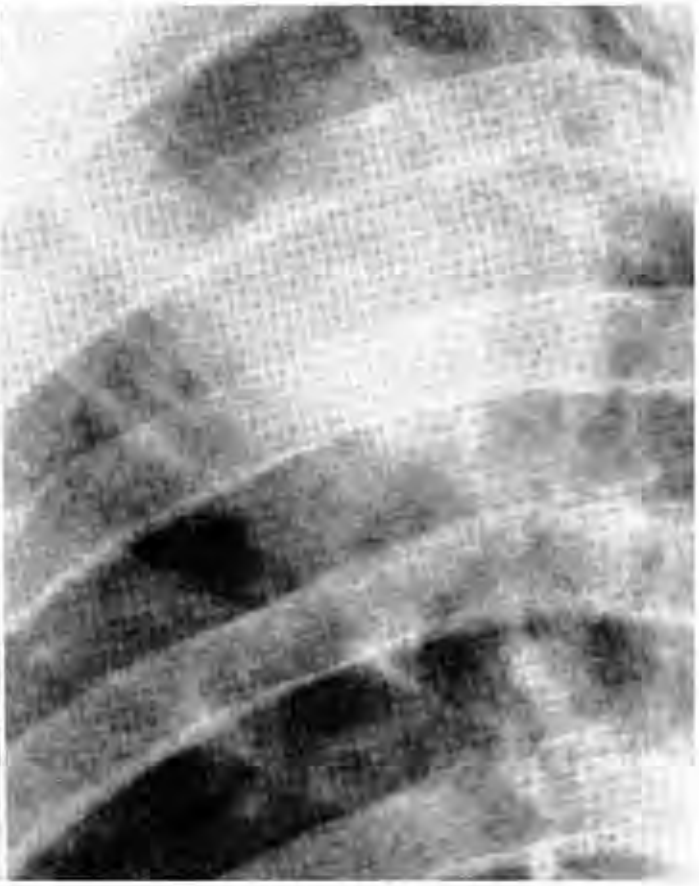


Fig. 2—Close-up view showing scalloped periphery.



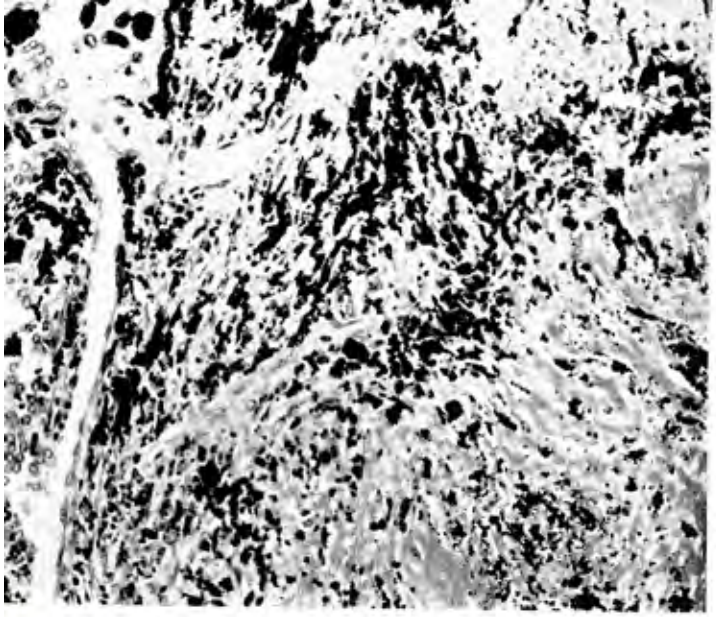


Fig. 3 — Photomicrograph. Fibrosis of the lung. The dense area of fibrosis joins still patent alveoli. Both show marked anthracosis.

So far as I can see, this appears to be a case of severe localized fibrosis of the lung with marked anthracosis in a coal miner. I could find no evidence of tuberculosis or neoplasm. I presume this case has been included as a problem in radiological diagnosis and in order to demonstrate the effect that a localized area of fibrosis can produce in the lung when it is so placed that it constricts a main stem bronchus.

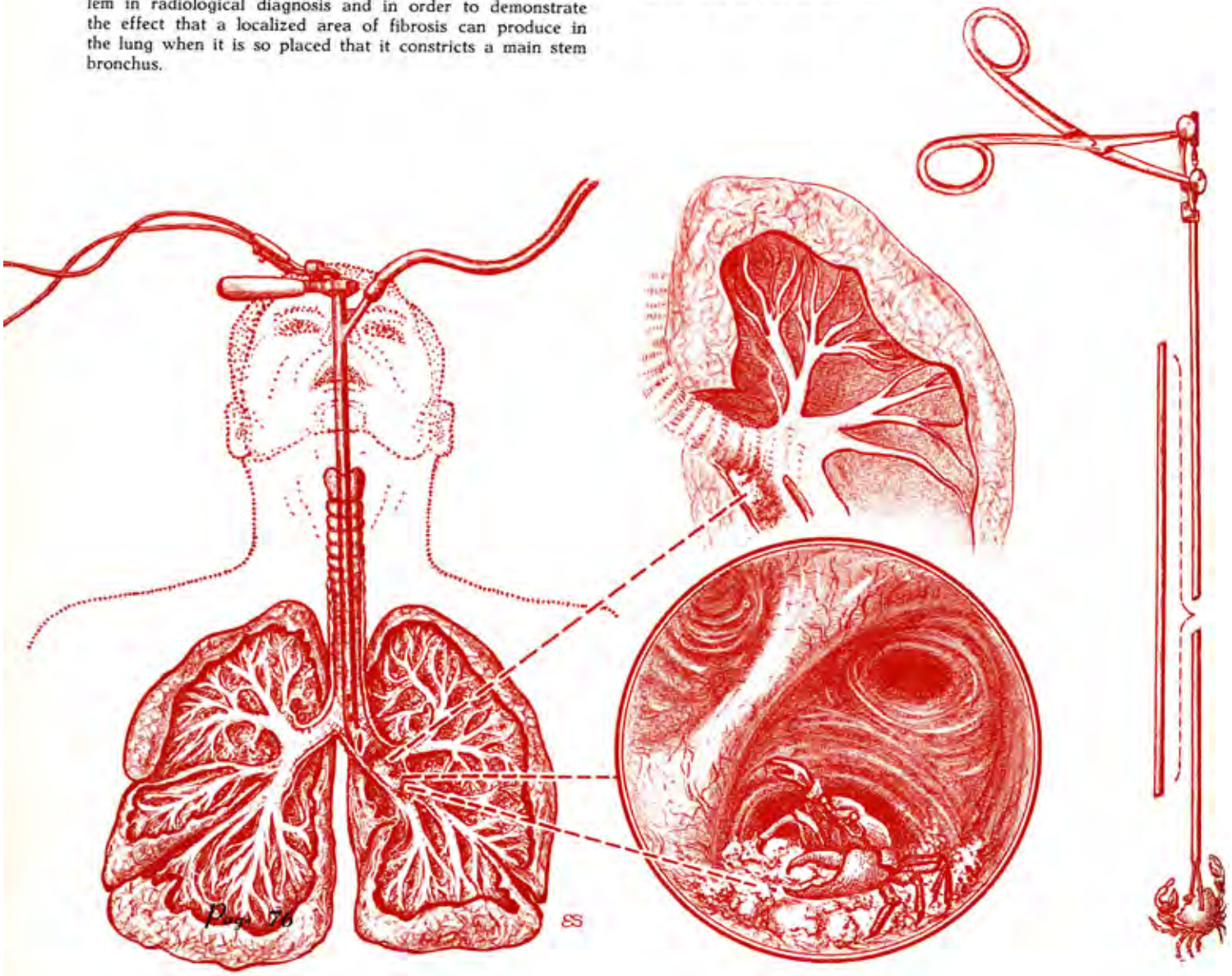
Dr. Stout's diagnosis: LOCALIZED FIBROSIS OF LUNG.

Dr. Regato: A histologic diagnosis of anthracosilicosis was submitted by R. Willis of Leeds and by A. J. French of Ann Arbor. C. Oberling of Paris and P. Masson of Montreal concluded to massive anthracosis; M. B. Dockerty of Rochester suggested that a diagnosis of silicosis could not be reached without aid of micro-incinerations.

Subsequent history: At thoracotomy the lesion was thought to be carcinoma, and for this reason the lung was removed.

H. K. Giffen, M. D., Omaha, Nebr.: I would like to ask Dr. Stout whether he feels that this degree of pulmonary fibrosis can be caused by mere anthracosis without the addition of silicon or other irritant.

Dr. Stout: It is my understanding that it is very unlikely this degree of fibrosis in the lung can be caused by mere anthracosis. Dr. Edith Sproul, my associate at the Delafield Hospital who has had considerable experience both autopsy and experimental with this subject, has informed me that when one is unable to demonstrate the presence of silicon particles with the polarizing microscope, it can be present in some other chemical form and produce the irritation leading to this degree of fibrosis.



8. *Hamartoma of the Lung*

Contributed by WILLIAM A. D. ANDERSON, M. D.,
Milwaukee, Wisconsin

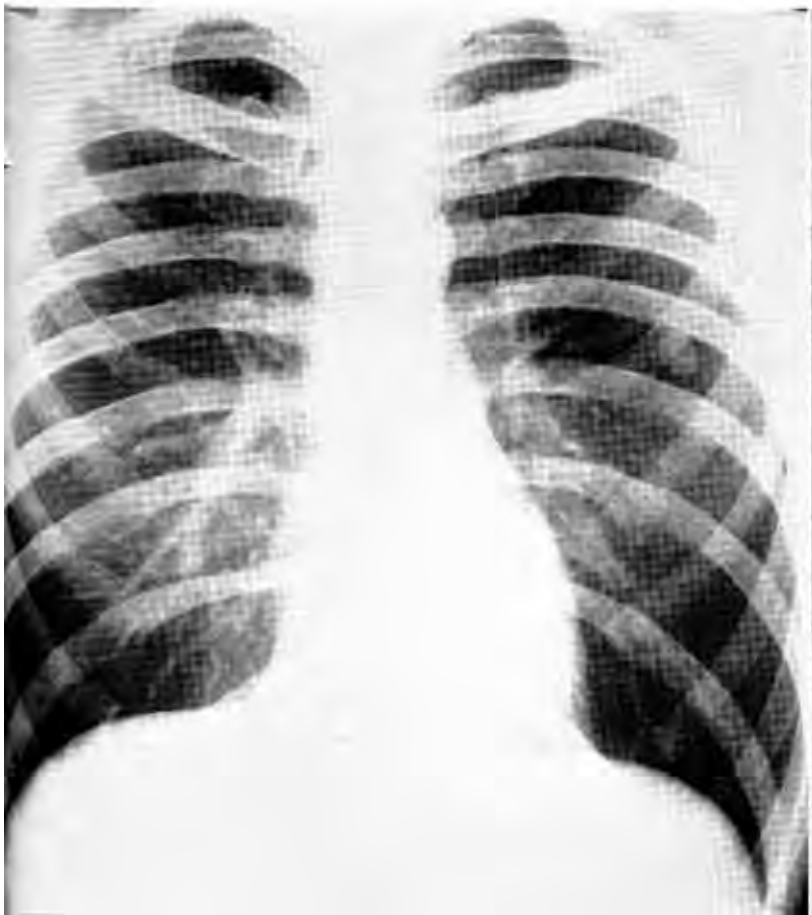
THE PATIENT was a man 33 years of age when a routine roentgenogram discovered the presence of a discrete dense shadow in the left lung. The lesion was observed for five years and showed very slow development, without symptoms. In September 1950 the roentgenograms showed a discretely outlined soft tissue density measuring 2 cm in diameter at the level of the third intercostal space anteriorly. A thoracotomy was done; a grayish mass was found near the periphery of the lung. A segmental resection of the lower lobe was done.

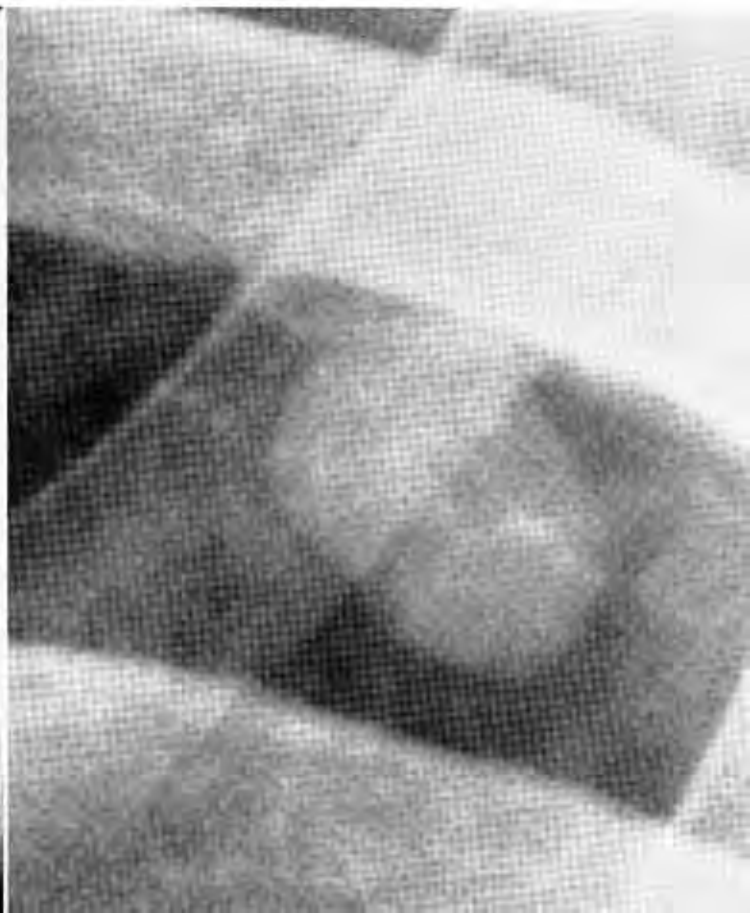
Radiologic Impressions Submitted by Mail	
Tuberculoma	76
Hamartoma (chondroma)	37
Benign tumor (lung, pleura)	32
Carcinoma of lung	22
Granuloma	15
Six others	27

Histopathologic Diagnoses Submitted by Mail	
Hamartoma	124
Mixed tumor	1
Why not more like this?	1

Fig. 1—Roentgenogram showing discretely outlined small mass in left lung.

Fig. 2—Close-up view showing some lobulation.





Dr. Hodes: In solitary lesions like this, the radiologist cannot make the diagnosis unless he can glean from the clinical record significant information. Two important observations help us in this individual. First, we are told that the lesion was observed for at least five years. We are also told that the lesion had a very slow development. This suggests that we are dealing with a benign process. Thus, we exclude such malignant lesions as early bronchogenic carcinoma, adenoma, fibrosarcoma, and metastatic disease.

At first blush, one might consider this as a tuberculoma. We are told nothing concerning this patient's tuberculin reaction. Radiographically we find no evidence of an old tuberculous process in the hila, or in other portions of the lung. Nor do we find any calcific debris within the nodular density itself to suggest a tuberculous process, although at least half of the tuberculomas do not show such calcification. The fact that the lesion was present for at least five years and the fact that it may have increased slightly in size are in keeping with this diagnosis. However, hamartomas often look like this. Some contain calcific debris. Generally they are slowly growing and asymptomatic. I am also reminded of a similar appearance in a patient with fibroadenoma. Radiographically, it is almost impossible to differentiate between tuberculomas, hamartomas and fibroadenomas.

Dr. Hodes' conclusion: A BENIGN LESION. I believe this will prove to be a HAMARTOMA.

Dr. Regato: The possibility of peripheral adenoma was suggested as a radiographic impression by J. T. Case of Santa Barbara. P. C. Swenson of Philadelphia suggested the possibility of either a tuberculoma or a hamartoma; he inquired why this lesion had been temporized with for five years: Doctor Swenson's intellectual curiosity got the best of him!

Dr. Stout: This circumscribed tumor is composed largely of hyaline cartilage. There are also smaller areas of fibrocartilage, smooth muscle, myxoid tissue and tubes lined by epithelium varying from cuboidal to low columnar but not ciliated.

This tumor composed of a mixture of adult or embryonal differentiated tissues of which cartilage is predominating fulfills the requirements for the diagnosis of hamartoma of the lung. These tumors are often called chondromas but it is probable that very few consist entirely of cartilage without any of the other elements, so that it seems to me preferable to label all of these tumors hamartomas and consider them neoplastic malformations. I am not fond of the term hamartoma because elsewhere in the body tumors labeled sometimes by this name have also been called other names with resulting confusion, but in the lung almost everyone understands that the term hamartoma is a benign growth of this type composed predominately of cartilage so that it is probably best to adhere to it. Lemon and Good report that 17 cases were removed at the Mayo Clinic during a period of six years. The Laboratory of Surgical Pathology of Columbia University has recorded six cases of this tumor all of them removed by surgery. The cases are generally symptomless unless the tumor presses upon or erodes into a bronchus. All of the cases I have seen have been benign. There have been cases reported with microscopic evidences of malignant change (Simon and Ballou) but it is probably exceedingly rare for one to exhibit true malignancy. Possibly, the case reported by Greenspan as a primary osteoid chondrosarcoma of the lung, may have been one.

Dr. Stout's diagnosis: HAMARTOMA OF THE LUNG.

Dr. Regato: The radiographic recognition of hamartomas is rather simple when they contain calcium; when they do not, their appearance is very much the same as that of peripheral lung tumors (Maier) and of tuberculomas, except for a peculiar lobulation observed in some hamartomas and which is mildly observable in this case. Histologically, the case brought an otherwise desirable international agreement.

Subsequent history: The patient was last seen, in good health, in January 1951.

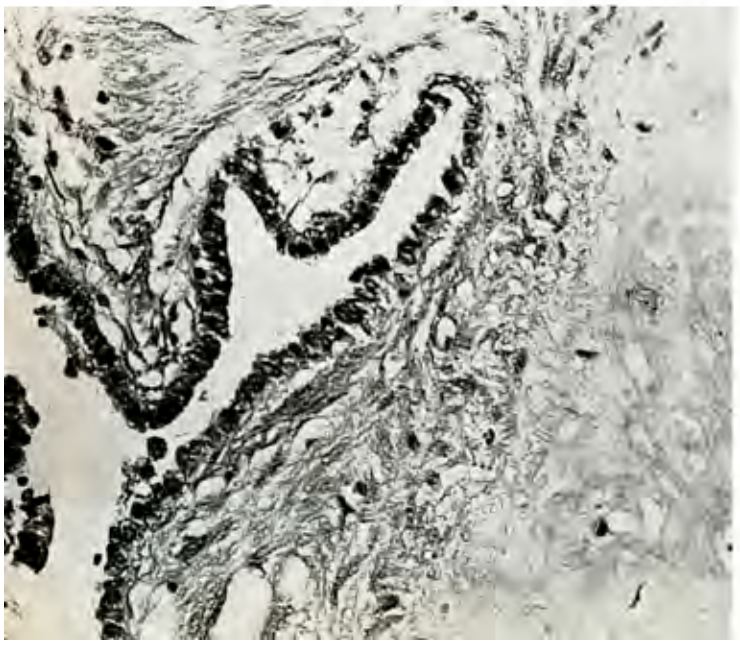
Dr. Hodes: The fact that so many radiologists considered this lesion a tuberculoma is really of no moment. Discoid tuberculous lesions commonly look like this although it is only fair to say they commonly contain calcific debris. This patient's lesion reveals no calcific debris.

Of additional significance is its shape. This is an elliptical lesion rather than a spherical one. The tuberculous discoid lesions usually are spherical. In our experience the ellipsoid lesions, particularly when they do not contain calcific debris, more commonly prove to be hamartomas. It is noteworthy that the hamartomas, too, may contain calcific debris in almost 40% of the cases.

No one can gainsay the possibility that this might prove to be a very early bronchogenic carcinoma or even a pulmonary adenoma. The fact that this lesion was known to have been present for so many years, would tend to exclude these diagnostic possibilities. For the record, attention should be called to the fact that bronchogenic carcinomas may cause pulmonary symptoms and produce minor roentgen abnormalities two and three years before the appearance of a classical fullblown picture. In this respect they are no different from the ordinary small carcinoma of the lip that can be watched for years as it converts from a small relatively "benign" lesion to its more devastating forms.

Mark Wheelock, M. D., Chicago, Ill.: The structure was more compatible with that of a chondroma. Such tumors are seen on occasions. Although hamartoma is acceptable, this lesion has more of the characteristics of a real neoplasm. The hamartomas seen in the Northwestern group of hospitals usually have had more tissue elements. Also they have developed in bronchi.

Fig. 3—Photomicrograph. Hamartoma of the lung. A cartilaginous mass adjoins a branched embryonal bronchial tube.



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9. Tertiary Syphilis of the Lung

Contributed by ALTON S. OCHSNER, M. D., New Orleans, Louisiana

THE PATIENT was a 43-year-old man who in June 1945 complained of cough, fever and dyspnea, and lost 20 lbs. in weight in the next two months. The roentgenogram of the chest showed an area of consolidation of the left lung with pleural thickening. The sputum was negative for bacilli; the Wasserman was positive. The patient was not seen again until October 1948; his cough persisted, and a poorly defined area of atelectasis and clouding of the left lung base was still present with slight shift of the mediastinum to the left. Bronchoscopy was negative, sputum was negative for bacilli; bronchograms revealed bronchiectasis. In November 1948 a pneumonectomy was done; an irregular nodular mass, 8 cm in diameter was found in the lingular area surrounded by sharply circumscribed nodules.

Radiologic Impressions Submitted by Mail		Histopathologic Diagnoses Submitted by Mail	
Carcinoma of lung	57	Tertiary lues (gumma)	69
Benign tumor (lung, pleura)	32	Chronic granuloma	18
Tertiary lues (gumma)	31	Lipoid pneumonia	17
Pneumonitis, abscess	27	Tuberculosis	15
Six others	22	Four others	20

Dr. Hodes: Significant is the fact that this patient was known to have had his disease for over three years. Whereas this tends to exclude a malignant process it is only fair to state that a bronchogenic carcinoma could develop in an area of chronic fibrosis. This patient obviously has a chronic illness. Among the chronic conditions one must consider tuberculosis, lipoid pneumonia, cholesterol pneumonia, bronchiectasis, and bronchial occlusion due to a foreign body. Apparently we can exclude tuberculosis for no tubercule bacilli were found in the sputum or in the bronchoscopic aspirations. For the same reason, one might exclude the fungus diseases. Bronchoscopy would also tend to exclude the possibility of a foreign body and I choose to believe that lipoid pneumonia and cholesterol pneumonitis of this duration would have shown evidence of their presence in bronchial washings.

The process looks like a chronic pneumonitis with elevation of the left hemidiaphragm, retraction of the mediastinal structures toward the affected side, narrowing of the rib interspaces and partial pulmonary collapse of the lower lobe. But superimposed upon this lesion are several soft tissue densities which seem like separate masses.

We are told that this patient had bronchiectasis. Bronchiectasis alone would not account for the soft tissue masses described in the roentgenograms and found at operation. One would have to postulate a superimposed bronchogenic malignant tumor to account for the latter.

It is noteworthy that this patient had a positive Wasserman. Syphilis predisposes to chronic pneumonitis and bronchiectasis. Gummas of the lung have been described. This possibility must carefully be considered because of the nodules that were present. Personally I know of two proven gummas of the lung that looked like this.

Dr. Hodes' conclusion: A GRANULOMA. Whereas according to the law of averages, one would expect this patient to have bronchiectasis with a superimposed carcinoma, I relegate this diagnosis to second place. I believe this patient had a GUMMA OF THE LUNG.

Dr. Regato: Dr. J. T. Case of Santa Barbara and R. J. Reeves of Durham also submitted a radiographic impression

Fig. 1—Roentgenogram showing consolidation of the left lung.

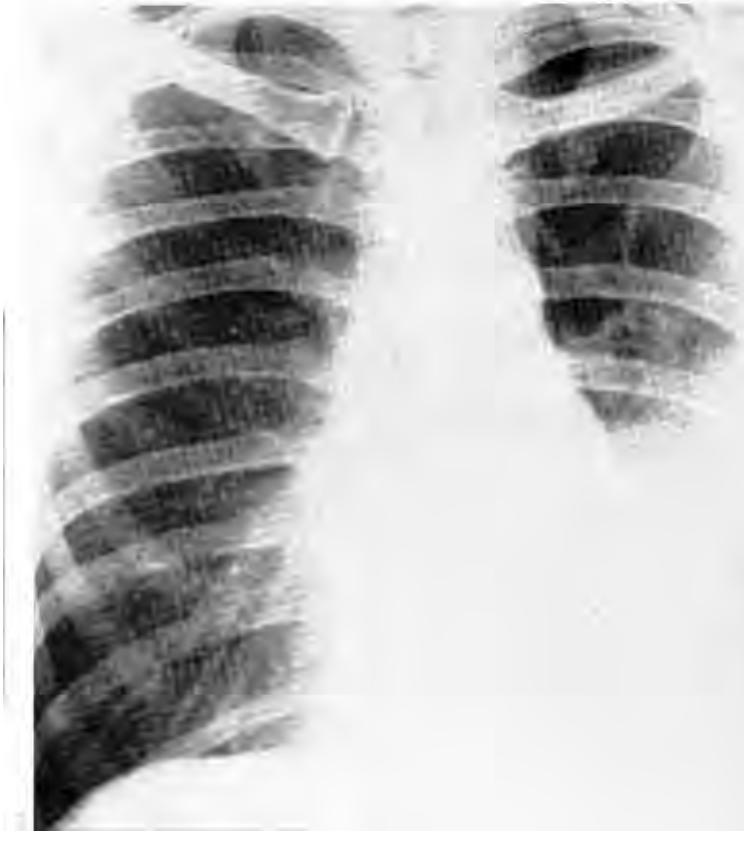
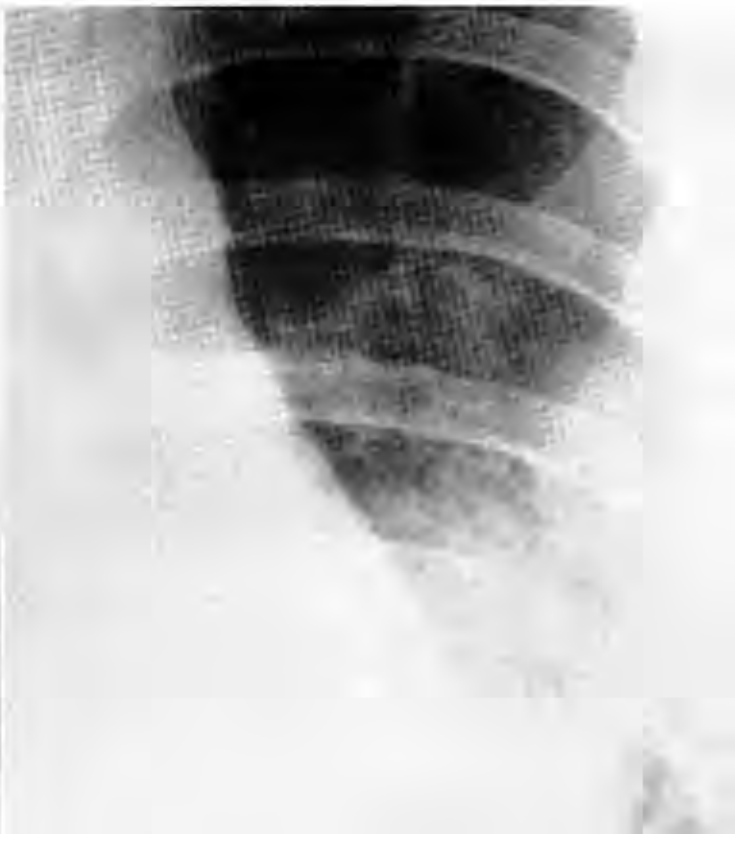


Fig. 2—Close-up view showing soft tissue densities within the lung.



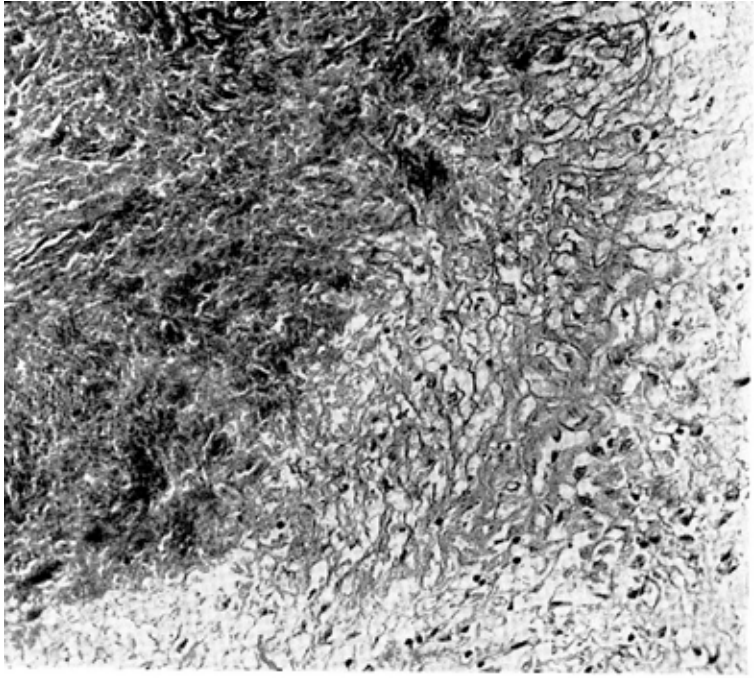


Fig. 3—Photomicrograph. Gumma of the lung. The area of syphilitic necrosis shows preservation of the architecture of the dead tissue. The surrounding membrane is very sparsely cellular and without giant cells.

of gumma of the lung. Foreign participants readily recognized the lesion: M. Madrazo of Mexico, L. Guzman of Santiago de Chile and Casares Rendón of Mérida, all submitted a radiologic impression of tertiary syphilis. P. Lamarque of Montpellier described the lesion as retractile pleuropulmonary condensation: P. C. Swenson of Philadelphia noted that unresolved pneumonias are more common in luetics than in other individuals.

Hymer L. Friedell, M. D., Cleveland, Ohio (by mail): I would not consider any diagnosis other than carcinoma until proven otherwise by surgical intervention.

Dr. Stout: An area of fibrosis surrounds a mass of necrotic tissue which is quite dense, and permits one to recognize the basic architecture of the tissue which has died, even many of the nuclei can be detected although neither they nor any of the other tissues are stained by hematoxylin. This differs from the coagulation necrosis of tuberculosis. In the fibrous tissue which surrounds this area of necrosis, no giant cells are seen and only a few histiocytes and lymphocytes. The surrounding lung tissue shows interstitial fibrosis and inflammation with many alveoli filled with phagocytic cells. Only one focus of lymphocytes is found and no perivascular infiltrates.

This is obviously not a neoplastic process and the diagnosis probably lies betwen tuberculoma and gumma. The clinical history indicates that the patient has syphilis and that attempts to find tubercle bacilli have failed. In the absence of evidence of treponema pallidum an absolute diagnosis of gumma is not possible but the evidence in this case is strongly in favor of that diagnosis. The type of necrosis which is non-coagulative like the caseous necrosis of tuberculosis, the absence of tubercles and the type of inflammation around the affected area are all much more like a gumma than a tuberculoma.

Only one case of gumma of the lung has been treated by lobectomy at the Presbyterian Hospital. It was reported by Findlay, Lehman and Rottenberg and resembled the present case very closely. It lay in the left lower lobe which was resected and the gumma measured 7 x 7 x 4 cm. Apparently syphilis of the lung is a rather rare disease; according to Wilson, writing in 1946, only about 200 cases had been reported.

Dr. Stout's diagnosis: GUMMA OF THE LUNG.

Malcolm B. Dockerty, M. D., Rochester, Minn. (by mail): The appearance of necrosis featuring 'ghost cells', vascular changes, histiocytic pneumonitis, giant cells and so forth, is highly suggestive that this granuloma is a gummatous one. I predicted that the Wasserman would be positive before I read the history.

Dr. Regato: Dr. C. A. Hellwig of Wichita suggested that there was lipoid pneumonia in addition to a gumma of the lung.

Subsequent history: The patient was last seen in February 1949 and appeared well.

L. Henry Garland, M. D., San Francisco, Calif.: This is indeed a rare bird. My own diagnosis will not be mentioned! It was incorrect! Permit me to congratulate Dr. Hodes on his. Perhaps the large pox is commoner in Philadelphia than it is in San Francisco, or perhaps our pathologists are more conservative. At any rate, in some 25 years of radiological experience in San Francisco, I have not seen one convincing case of pulmonary gumma. We have had, in former years, some cases of so-called white pneumonia in infants, alleged luetic in origin: of these we have roentgenograms and necropsy specimens. But none of the adult gumma. Could this be a granuloma of different etiology?

Leo Lowbeer, M. D., Tulsa, Okla.: In the presence of a positive Wasserman, one is certainly justified to interpret this granuloma as a gumma. With negative serology, one would have to consider the possibility of a brucellotic granuloma on morphologic grounds.. Coagulative necrosis of the type observed here is found in Brucella suis, as well as melitensis infections, and bacteriologically proven lung lesions have been observed. The brucellotic granulomas do not contain typical rod shaped epithelioid cells but rather spherical macrophages, lymphocytes and plasma cells. Preoperatively, such a disease could be tentatively made only in the presence of a significant agglutination titer and perhaps a positive blood and sputum culture. One wonders whether in such cases of pulmonary masses suggestive of granuloma, attempts should not be made to treat them etiologically. Anti-syphilitic therapy in this case presumably would have caused the disappearance of the gumma. This would have deprived us of an interesting specimen but spared the patient an extensive operation.

Mark Wheelock, M. D., Chicago, Ill.: The clinical findings, the radiographic changes, and the morphologic alterations indicate the diagnosis of gumma. Gummas in any organ are rare now. They are seen infrequently in Hines Veterans Hospital and at Cook County Hospital. At the request of our neurosurgeons, we have been looking for one in the brain, without success.

Karl T. Neubuerger, M. D., Denver, Colo.: I saw several cases of gummas of the lung in Germany many years ago. Nowadays, pulmonary gummas are still rather frequent in Venezueia, and chronic pulmonary inflammations leading to sclerosis are often seen in syphilitics in Portugal (Wohlwill).

Dr. Regato: Clinically a diagnosis of tertiary syphilis of the lung appeared more justified than one of carcinoma, in view of the chronicity of the course, the absence of pain, general mildness of symptoms in contrast with the findings, the presence of bronchiectasis and atelectasis, and, of course, the positive Wasserman.

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10. *Chorionepithelioma of the Mediastinum*

Contributed by JUAN A. DEL REGATO, M. D., and JAMES W. McMULLEN, M. D., Colorado Springs, Colorado

THE PATIENT was a man 37 years old who in November 1950 submitted to a radiographic survey and was informed that a mass had been discovered in his chest. In March 1951 the roentgenogram showed a discrete rounded mass, 7 cm in diameter in the superior mediastinum, overlying the right hilum and another dense shadow of the right apex. He admitted to have experienced pain in the right side of the chest for about a year and a burning sensation in the upper abdomen. Physical examination revealed only considerable emaciation, a varicocele and pigmentation of the nipples. On bronchoscopy no abnormality was found, bronchial washings were negative for bacilli and neoplastic cells. Coccidioidin skin test was positive. At thoracotomy a hemorrhagic mass was found in the superior mediastinum and a similar growth replacing most of the right apex; the tumor was adherent to the surrounding structures and obviously inoperable.

Radiologic Impressions Submitted by Mail	
Carcinoma of the bronchus	38
Metastatic tumor	29
Coccidiomycosis	28
Metastatic testicular tumor	27
Lymphoma	23
Chorioepithelioma	5
Nine others	30

Histopathologic Diagnoses Submitted by Mail	
Carcinoma of the bronchus	62
Chorioepithelioma	23
Metastatic carcinoma	19
Metastatic testicular tumor	15
Others	15

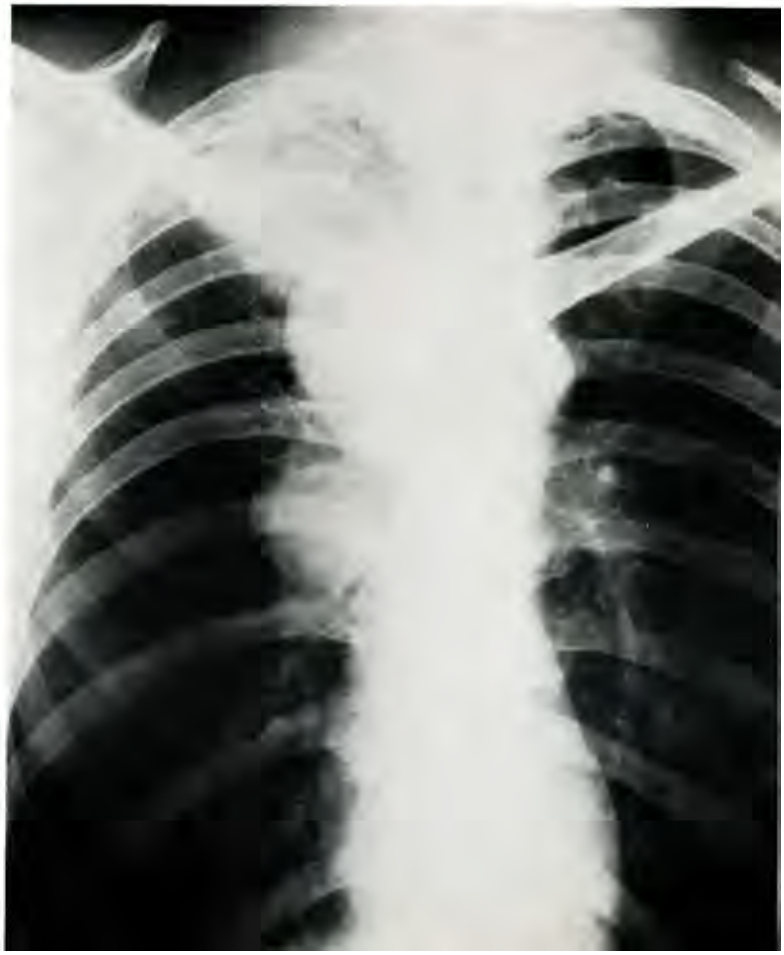
Dr. Hodes: I believe this patient is suffering from some sort of malignant tumor rather than from infection, in spite of the positive coccidiodin skin test. The fact that there are multiple large nodular lesions distributed throughout the right lung suggests that the process is metastatic. There is nothing distinctive in the appearance of this patient's pulmonary metastatic lesions. They tend to be large and of the "cannon-ball" variety, suggesting the kidneys or adrenals as primary sites.

In trying to determine the site of origin of this patient's neoplasm, one is impressed by two clinical findings. First, I am accepting the fact that this patient had a varicocele and not a testicular tumor. Second, the changes noted in the mammary glands, the unusual pigmentation of the patient's nipples may be a significant fact. One might suspect that his primary lesion was in the abdomen. Whether the burning sensation complained of by the patient was significant will remain to be determined. The fact that it was upper abdominal would also seem to point to the region of the adrenals.

Dr. Hodes' conclusion: METASTATIC MALIGNANT TUMOR. A primary lesion of the ADRENAL or a CHORIOEPITHELIOMA are likely.

Dr. Stout: We are not told whether this section comes from the lung or mediastinum. I shall assume because of the lymphoid tissue that it is part of a mediastinal lymph node. In this are cords of epithelial cells which are large hyperchromatic, have vacuoles containing material which stains red with mucicarmine and the nuclei show a considerable number of mitoses. These cords of polygonal cells have

Fig. 1 — Roentgenogram showing discrete mass in the upper mediastinum and dense shadow of the right apex.



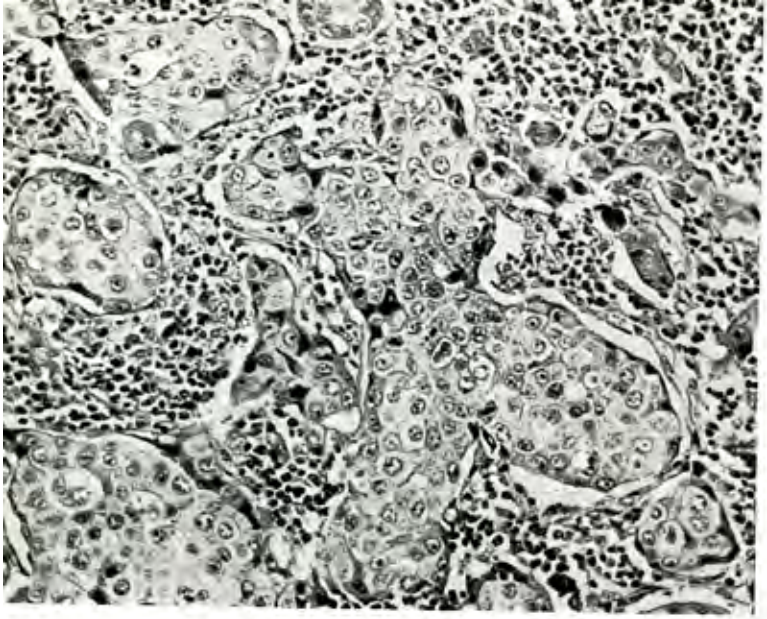


Fig. 2—Photomicrograph. Chorionepithelioma. The syncitial masses with dark nuclei inconspicuously outline some of the larger masses of cuboidal cells.

occasionally about the periphery inconspicuous more darkly stained elongated cells which might represent either cell degeneration or the formation of syncytial masses.

I confess that although I thought of the possibility of chorionepithelioma because of the pigmentation of nipples, I abandoned the idea when I found that the tumor cells frequently contained droplets of what I assumed to be mucin. The syncytial masses which outline a few of the tumor cell groups were so inconspicuous that I supposed they were cells in degeneration and not trophoblasts. I felt strengthened in this opinion because in the central portions of some of the large cell masses there are true cells in degeneration with pyknotic nuclei and sometimes a fuchsinophile material demonstrated by the Masson stain. This made me consider the possibility that the tumor in the lung although discovered after the mediastinal mass might be a bronchial squamous cell epithelioma of which the mediastinal metastasis was the first manifestation. As a second possibility I envisaged a malignant mediastinal teratoma in which the epithelial elements had become dominant and obscured all other elements. Again I considered the pigmentation of the nipples and the few syncytial masses outlining some of the larger cell cords as without importance in the diagnosis. At this point in my deliberations I learned from Dr. del Regato that the man had a positive Friedman test. This I could not overlook and on re-examination of the sections I realized that the few inconspicuous syncytial cells outlining some of the larger tumor cell masses were similar to those found in much greater profusion in Case 4 and that the case must be considered a chorionepithelioma of the mediastinum with metastases in the mediastinal nodes and the lung. The cuboidal tumor cells of an epithelial aspect which predominate seem to be considered by most writers as representing the substantia propria of chorionic villi or as decidual cells. Just exactly what the relationship between these cells and the syncytial trophoblasts remains a matter of debate. I could not find any statement in papers on the subject of chorionepithelioma which described secretion vacuoles in some of the cuboidal tumor cells which contained a mucicarminophilic material. At the moment of this writing I do not have any intelligent explanation to offer concerning it.

We seem to be dealing in this case with a mediastinal chorionepithelioma with metastasis to the lung. Whether the tumor in the mediastinum is primary in a teratoma or metastatic from an occult chorionepithelioma of the testis, pineal gland, or retroperitoneum can only be decided by a thorough investigation of all of those regions which are known to have been the primary sites of chorionepitheliomas in the past.

Dr. Stout's diagnosis: CHORIONEPITHELIOMA OF THE MEDIASTINUM AND LUNG.

Dr. Regato: A histologic diagnosis of embryonal carcinoma with choriocarcinomatous changes was supported by five anonymous votes of the Department of Pathology of the University of Omaha; they had no other clinical information than that which was made available to other participants. After Doctor Stout submitted his first impression I revealed to him further information for I was certain in advance that he would only elaborate to the advantage of all of us, without deceit.

Subsequent history: An Aschheim-Zondek test was found positive (1,975 mouse units in 24 hours); the pituitary gonadotropin was also found positive (80 mouse units in 24 hours). One of the testicles appeared atrophic; the other was of normal size; the latter was removed and showed no abnormalities. Roentgentherapy was administered with resulting diminution of the mediastinal mass. The pain in the epigastrium persisted and the patient continued to lose weight. Hemoptysis became frequent and treatment was discontinued. In August 1951 the patient expired; permission for autopsy was not obtained.

Erving F. Geever, M. D., Colorado Springs, Colo.: Many sections of this tumor apparently failed to show the syncytical type giant cells. As a matter of record, I missed the diagnosis on the first blocks which I examined about six months ago. Certainly when both trophoblastic elements are present in a section this tumor is an easy one to diagnose. I think that was proved earlier this morning when the great majority of pathologists made the correct diagnosis of chorionepithelioma on Case No. 4.

Dr. Regato: It is noteworthy that this and Case No. 4 (page 69) had much in common. There was gynecomastia and burning sensation in the epigastrium; whether or not this indicates a possibility of a retroperitoneal primary lesion could not be ascertained in either case. In both cases the tumor was found to be hemorrhagic and the diffuse nodularity of the lungs was also very vascular. Yet, although we had unanimity in the histologic diagnosis of Case No. 4, few pathologists recognized this case as one of chorioepithelioma.

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11. Metastatic Granulosa-Cell Tumor

Contributed by LEO G. RIGLER, M. D., Minneapolis, Minnesota

THE PATIENT was a woman 51 years old who in November 1950 complained of pain in the right shoulder. Physical examination revealed the presence of a right supraclavicular adenopathy; biopsy was reported as showing metastatic carcinoma. A mass was felt in the region of the tail of the right breast, which was adherent to the chest wall. The roentgenogram of the chest showed a lobulated mass to the right of the mediastinum extending to 6.5 cm from the midline; there was also a dense soft tissue shadow just below the interlobar fissure of the right upper and middle lobes, lying against the lateral chest wall.

Radiologic Impressions Submitted by Mail	
Metastatic carcinoma of the breast	57
Metastatic carcinoma	33
Metastatic carcinoma of the bronchus	29
Metastatic carcinoma of the thyroid	10
Primary bone tumor	15
God only knows!	1
Others	10

Histopathologic Diagnoses Submitted by Mail	
Metastatic carcinoma	59
Metastatic carcinoma of the breast	35
Metastatic carcinoma of the bronchus	19
Metastatic carcinoma of the ovary	2
Poor slide!	1
Ten others	28

Dr. Hodes: Knowing Leo Rigler as I do, I look for the worse in this case. I shouldn't be at all surprised if this patient proves to have three different conditions. We are told that this patient has metastatic carcinoma in one of the nodes in the right supraclavicular fossa. Had we but the single lesion in the superior mediastinum to deal with, we could with justice consider it a bronchogenic carcinoma which had extended into the supraclavicular lymph nodes. Complicating the picture, however, are the metastatic lesion in the fifth rib and the mass in the tail of the right breast. Primary bronchogenic carcinomas usually do not invade ribs until late; they do, however, seek out the supraclavicular lymph nodes. The gastric carcinomas usually go to the left supraclavicular nodes; right sided colonic cancers can go to the right supraclavicular nodes but this patient had no colon symptoms. We may learn eventually that the mass in the breast and the rib lesion were one and the same. For the sake of argument, I am going to accept the record and consider them separate lesions.

In some respects, this patient reminds me of one of our patients who had a carcinoma of the breast, was operated upon and remained well. Years later she developed a mass in the superior mediastinum not unlike the one demonstrated in the films submitted to this seminar. For months we considered her mass metastatic from the breast. Eventually she developed an erosion in the second rib on the side from which the breast had been removed, which we also considered metastatic. At autopsy, that patient revealed no evidence of metastatic lesion from the breast. The rib lesion proved to be a primary osteogenic sarcoma that metastasized to the lung and mediastinum. That two such rare cases should be seen by one man seems unreasonable. Therefore, even though I think of the two patients as somewhat similar, I am inclined to look elsewhere for the diagnosis.

If this patient had cancer of the breast it would also be unusual for it to attack but one rib to the exclusion of all other bones in the body. And carcinomas of the breast do not invade lung like this, as a rule. Could the lung lesion have spread to the tail of the breast? I doubt it.

Fig. 1—Roentgenogram showing a lobulated mass in the mediastinum.

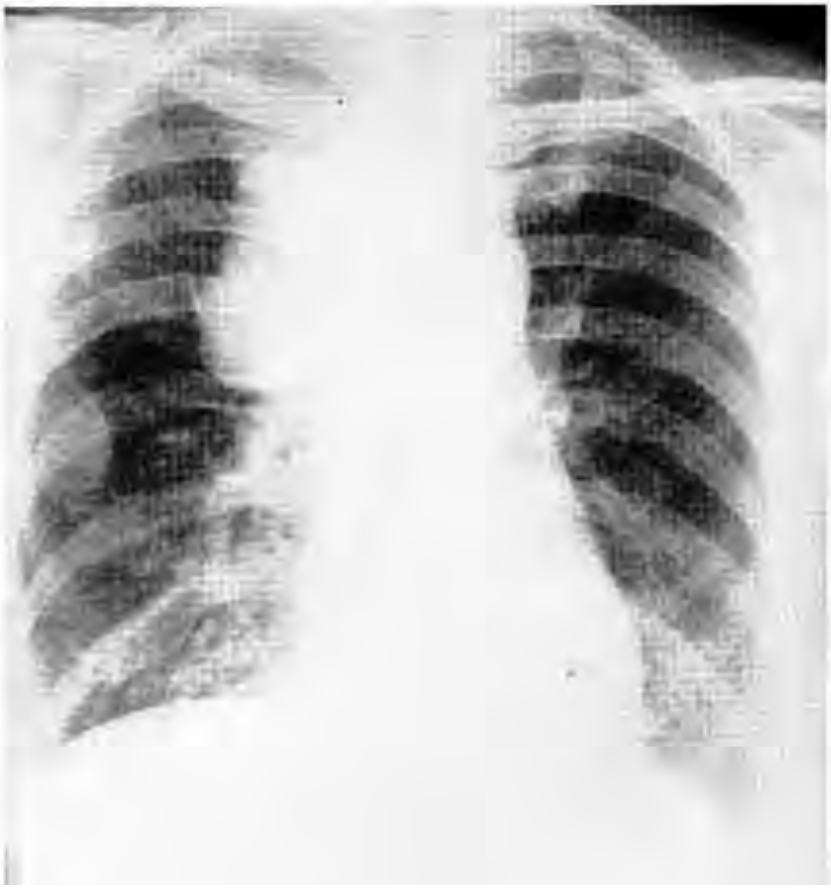
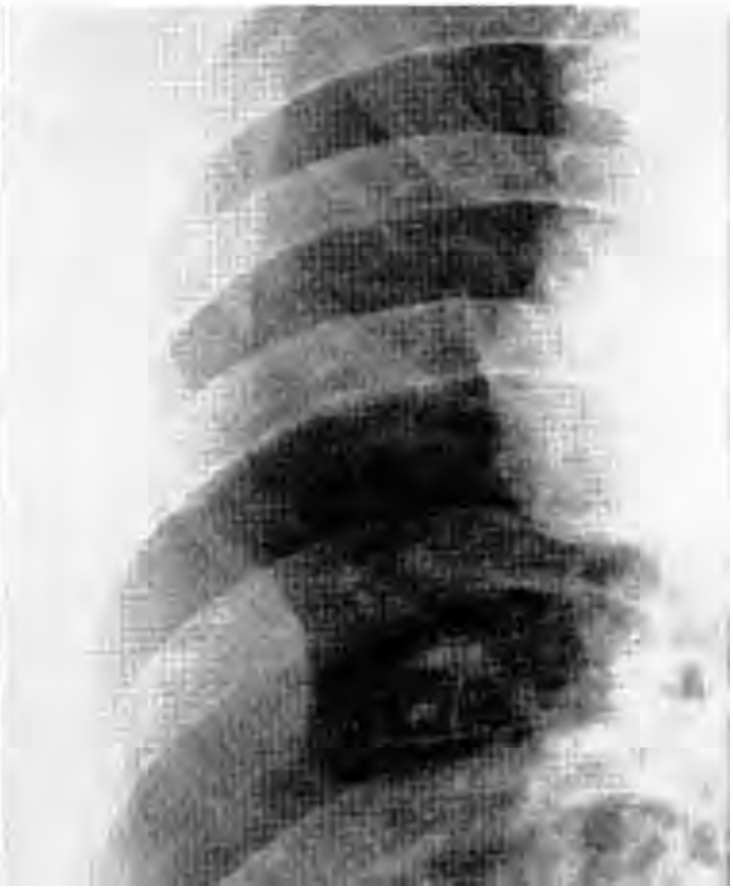


Fig. 2—Close-up view showing additional shadow against chest wall.



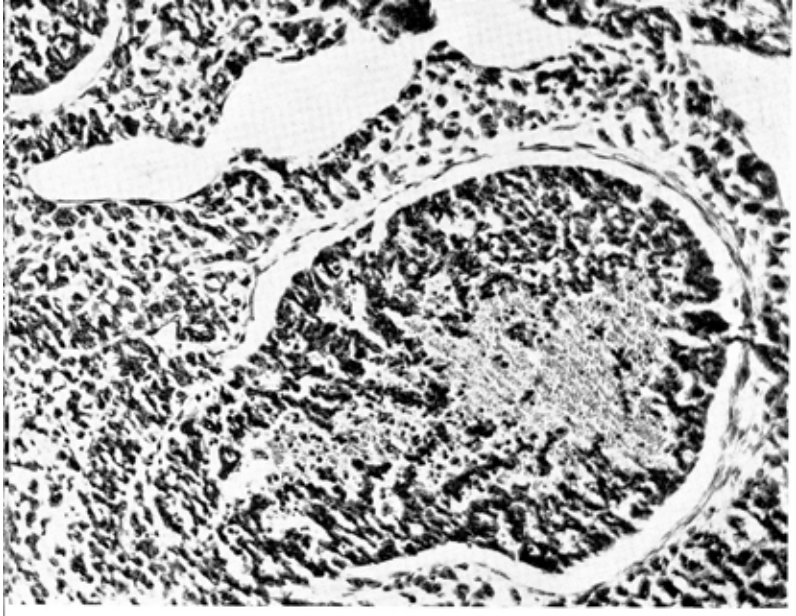


Fig. 3 — Photomicrograph. Metastatic granulosa cell tumor, from an area showing the so-called cylindroid arrangement of cells. This also shows the marked resemblance of some of the cell concentrations to structures suggesting embryonic organ development in some malignant teratomas.

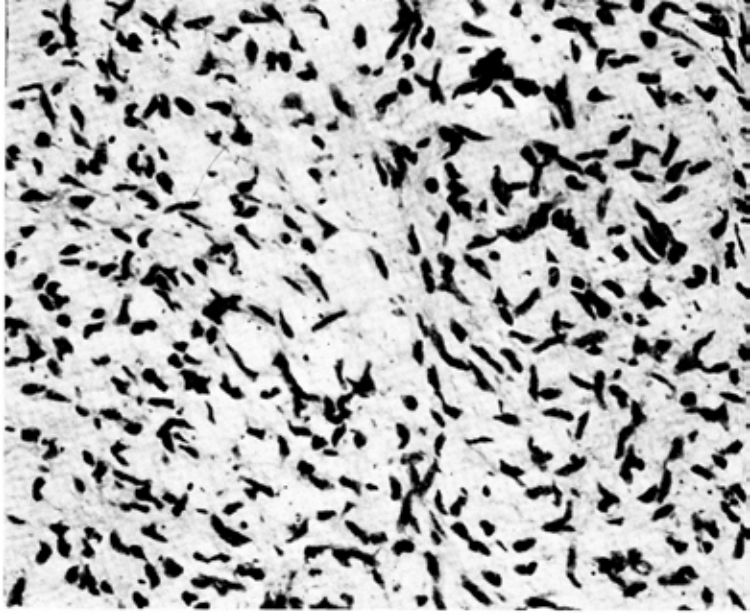


Fig. 4—Photomicrograph. Metastatic granulosa cell tumor. A myxoid area with spindle and stellate cells.

I do not know what this patient has. Playing a hunch rather than medical acumen I am inclined to believe this patient had three separate lesions. Such logic as can be mustered in this case suggests this patient had carcinoma of the breast or lung with metastases; her breast lesion could have been benign, however.

Dr. Hodes' conclusion: I have no convictions in this case. Forced to offer one conclusion I should favor PRIMARY CARCINOMA OF THE LUNG WITH METASTASES; unless it is a case of RIGLER'S DISEASE, a rare condition characterized by a variety of clinical manifestations possibly, but not necessarily, related.

Hymer L. Friedell, M.D., Cleveland, Ohio (by mail): This is obviously a malignant tumor; it appears unusual for a carcinoma of the breast. I would not rule out a bronchogenic carcinoma, in spite of the fact that this is a woman. I would consider of equal importance a primary in the pelvic organs, possibly the ovary.

Dr. Stout: The sections show a bizarre tumor composed of cells, having on the whole an epithelial aspect, which are arranged in solid masses or more often in tortuously twisted cords. There is one myxoid area with stellate cells. One area shows groups of smooth muscle cells.

When I first studied this case I was impressed by the generally undifferentiated aspect of the tumor except for the denser concentration of cells in some areas and the myxoid area. There are features which I have seen before in malignant teratomas, of the mediastinum and which have been described by Schlumberger and Willis. Malignant teratomas arising in the mediastinum develop either from a pre-existing benign teratoma or more commonly are malignant from the start. We have recorded in the Laboratory of Surgical Pathology of Columbia University only three cases of mediastinal teratoma. Two were differentiated and benign, one in an 18 year old girl and the other in a rooster. The third case was malignant. It developed in an infant and resembled the present case.

I was later informed by Dr. del Regato that an ovarian tumor had been subsequently removed; a section of the ovarian tumor which I examined shows a tumor made up exclusively of the slender twisted cords of cuboidal cells, having an epithelial aspect. I presume this tumor might be called either the diffuse type or the cylindroid type of granulosa cell tumor. It seems necessary to point out that metastasis of a granulosa cell tumor to the lung and mediastinum must be an extremely rare event, only a small number of these tumors are malignant and most of these demonstrate their malignancy within the abdominal cavity. I have never before seen a case which metastasized in this fashion. I am afraid if I encountered the same situation and morphology again I would think first of an undifferentiated malignant teratoma and only second of a metastasis from a granulosa cell tumor.

Dr. Stout's diagnosis: MESTASTATIC GRANULOSA CELL TUMOR.

Dr. Regato: Dr. R. Willis of Leeds submitted a diagnosis of metastatic anaplastic carcinoma and commented that the structure of the growth is not distinctive enough to suggest the primary source. M. B. Dockerty of Rochester wrote that the disposition of the cells leads him to choose carcinoma rather than sarcoma; he felt that it was probably an adenocarcinoma but admitted that the burden of proof was heavy. E. Izquierdo of San Juan, P. R., submitted a diagnosis of metastatic carcinoma of the ovary.

Pierre Masson, M.D., Montreal, Canada (by mail): The slide that I have is so bad that a diagnosis is impossible. I can only say that this is a malignant tumor. I would not be surprised if there is no unanimity of opinion. I am often amazed at the bad quality of preparations on which many a pathologist would stake an opinion. I make part of a Committee that studies difficult diagnostic problems submitted by Canadian pathologists: divergence of opinion prevails among the arbiters. I believe that inadequate preparations and illegible resulting images are in great part responsible. But it is also evident that a great number of pathologists do not know their tumors well and also that histopathology of tumors is not the exact science that many believe. Clinicians do not seem to be aware of this and often trust that we know everything.

Subsequent history: A diagnosis of granulosa cell tumor was rendered by Doctor McCartney on the metastatic lymph node. An exploration revealed the presence of an ovarian tumor 4 cm in diameter with metastasis to the tail of the pancreas. Roentgentherapy was administered to the chest and pelvis. In June 1951 the patient presented new metastatic lesions to several bones.

(No audience participation in the discussion of this case.)

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12. Malignant Soft Tissue Tumor of the Arm with Metastases (Hemangiopericytoma?)

Contributed by JAMES R. MAXFIELD, M. D., and JOHN L. GOFORTH, M. D., Dallas, Texas

THE PATIENT was an 18-year-old girl in 1944, when she complained of numbness of the left arm. In 1946 a mass developed in the middle of the left arm, following a bruise; the mass was removed and a diagnosis of malignant tumor was rendered. Shortly afterwards a mass developed in the axilla and in May 1949 an interscapulo-thoracic amputation was done. Later, pain developed in the abdomen and chest, and rapid weight loss took place. In October 1949 the roentgenogram of the chest showed several large, discrete, peripheral masses varying in size from one to ten centimeters; no mediastinal pathology was seen.

Radiologic Impressions Submitted by Mail

Metastatic sarcoma	73
Metastatic Ewing's	18
Metastatic carcinoma	9
Metastatic melanoma	8
Metastatic synovioma	3
Nine others	48

Histopathologic Diagnoses Submitted by Mail

Fibrosarcoma	65
"Neurogenic" sarcoma	13
Spindle cell sarcoma	12
Synovial sarcoma	8
Seven other sarcomas	31
Hemangiopericytoma	3
Three others	12

Dr. Hodes: Numbness of the left arm was this patient's original complaint. Two years elapsed between the onset of numbness and the appearance of a mass, which was removed and diagnosed as a malignant tumor. Soon thereafter a mass was discovered in the axilla but the radical amputation was not done until almost three years after the original operation. In other words, this patient got along fairly well for at least five years before our roentgenogram of the chest was obtained. The history suggests that this young lady had a primary sarcoma of the soft tissues of the left arm which eventually extended to the lungs and pleura.

We have the whole gamut of soft tissue sarcomas to consider for any one of the group could have produced this pulmonary picture. Whereas synovial sarcoma is a diagnostic possibility we exclude it because the mass developed in the middle of the arm rather than the region of the joint; it is noteworthy that 80% of the synovial sarcomas are found in the lower extremities. Rhabdomyosarcoma is a distinct possibility which merits consideration: these tumors occur most frequently in the inter-scapular region and in the popliteal and gluteal regions. The liposarcomas could also produce this picture but these tumors also are found in areas where fat usually is present such as the thigh, popliteal space and gluteal regions rather than in the middle of the arm. Fibrosarcomas including neuro-fibrosarcomas do occur in the upper extremities not infrequently. They are slowly growing tumors which tend to recur and ultimately attack the lungs.

The fact that this patient's first symptom was numbness leads me to believe that this patient had a neuro-fibrosarcoma. Direct invasion by tumor of a large nerve is relatively unusual in the course of a malignant disease. Thus it would seem that this patient's original growth may have started within the nerve itself and then gradually taken on its more malignant manifestations. There are relatively slow growing tumors which might also account for the time factor.

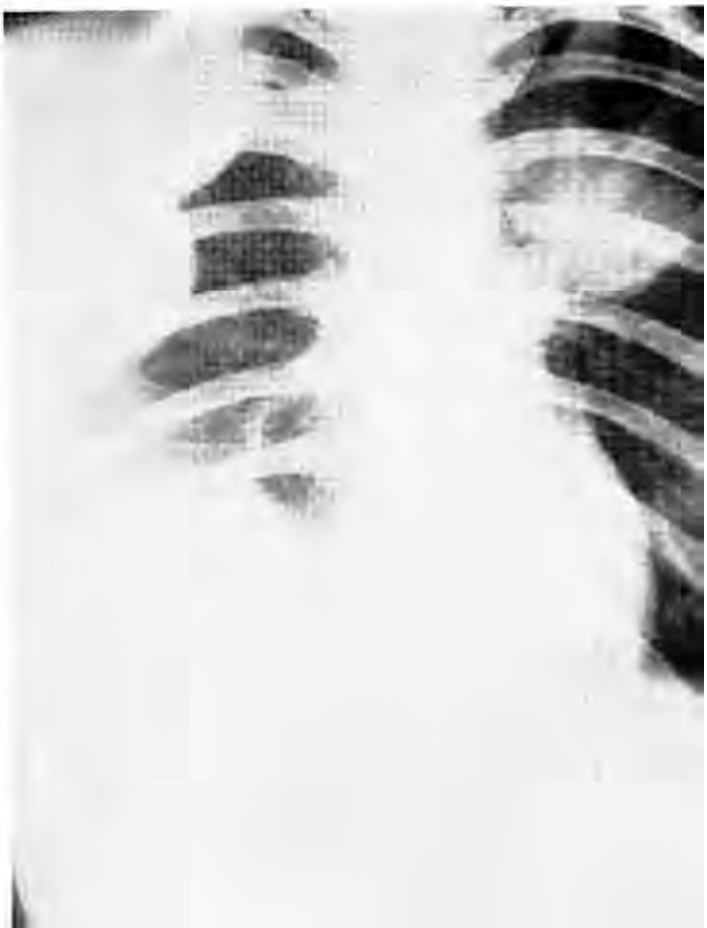
Dr. Hodes' conclusion: METASTATIC TUMOR; probably a NEURO-FIBROSARCOMA or a RHABDOMYOSARCOMA.

Dr. Regato: Dr. J. A. Campbell of Indianapolis also submitted a radiographic impression of metastatic neurofibrosarcoma; Galen M. Tice of Kansas City commented that he has seen menaloma reproduce this picture.

Dr. Stout: The seminar slide shows a loosely knit tumor composed of spindle cells which have rather long cytoplastic polar processes with a tendency to anastomose forming a syncytium. In places the cells are somewhat more compact and plumper. There are a good many capillaries scattered about, in some places the cells appear oriented about them but in most places this is not true. A Laidlaw silver reticulin impregnation shows the presence of fine reticulin fibers coursing among the cells with some tendency for the fibers to parallel the long axis of the cells and to curl around some of them but without any definite set pattern. Since Dr. Goforth had previously sent me a different section of this tumor made from a metastasis in the pancreas, I can state that the tumor cells in that nodule are much plumper and more closely packed and that there are many more capillaries scattered among them and the cells appear more as if they were oriented about them. The capillaries sometimes have no lumens and the swollen endothelial cells appear like the fibrous spindle cell strands seen in synovial sarcomas.

I am not able to arrive at a definitive diagnosis in this case because the pattern of tumor growth varies in different areas and is not sufficiently clear in the sections available for me to form a decisive opinion. When I studied the section of the pancreatic metastasis sent me by Dr. Goforth in

Fig. 1 — Roentgenogram showing several large intrathoracic masses without apparent mediastinal pathology.



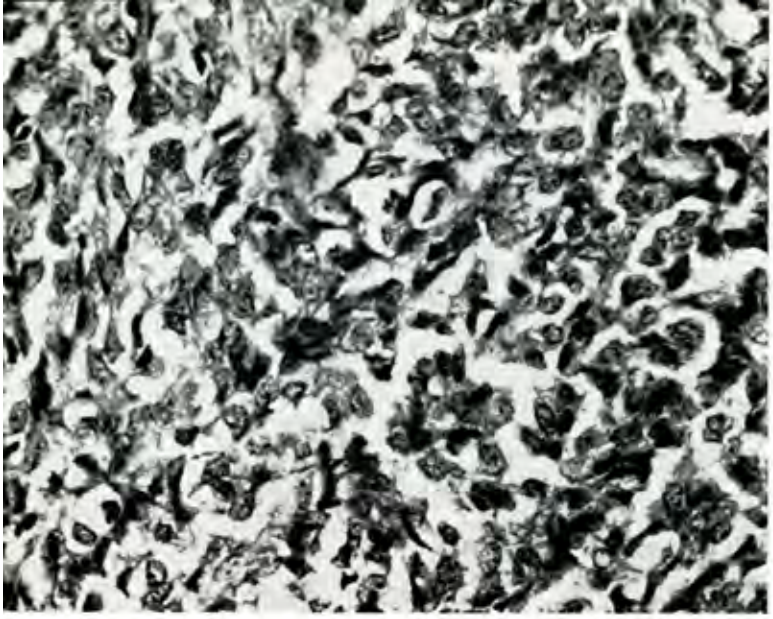


Fig. 2—Photomicrograph. Hemangiopericytoma (?). From an area showing capillary proliferations suggested by the slender dark endothelial cells surrounded by larger pericytes.

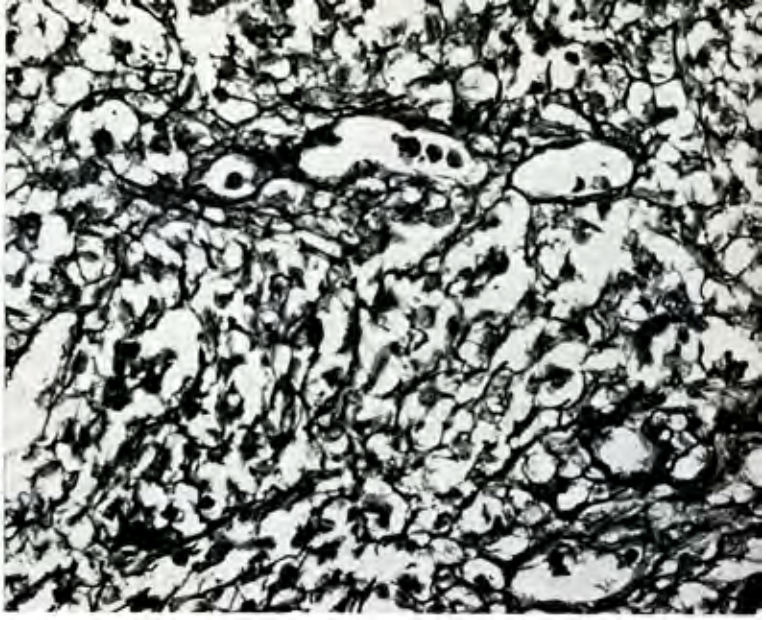


Fig. 3—Photomicrograph. Hemangiopericytoma (?). Obvious and occult vessels outlined by their reticulin sheaths.

June 1950, I suspected it might be a metastasis from a synovial sarcoma. This I now believe was an unjustified assumption because I did not appreciate that the strands of cells which are found at frequent intervals among the chief tumor cell masses are really all capillaries with inconspicuous or invisible lumens. It would have been much more in keeping with the morphology to suggest that the tumor is a hemangiopericytoma. But the seminar section hardly justifies such a diagnosis, although of course sometimes these tumors can lose their characteristic morphology. I shall therefore have to leave the classification of this tumor undecided—it is a mesodermal tumor and malignant, of this we can feel reasonably confident. Possibly it is a hemangiopericytoma.

Dr. Stout's diagnosis: MALIGNANT TUMOR OF THE ARM WITH METASTASES (hemangiopericytoma?)

Dr. Regato: A histologic diagnosis of spindle-cell sarcoma, possibly of nerve origin, was submitted by C. Oberling of Paris and by R. Willis of Leeds; M. Wheelock of Chicago made a diagnosis of metastatic synovioma.

Subsequent history: The patient was given radioactive phosphorus, and in addition, roentgentherapy was administered to the larger mass in the right lung. There was considerable subjective improvement, but little change in the pulmonary lesions, except for the one which received roentgentherapy. In May 1950 she expired as a direct consequence of a pancreatic hemorrhage; slides were prepared from several of the metastatic foci.

Mark Wheelock, M.D., Chicago, Ill.: I made a diagnosis of synovial sarcoma on a case last year and was proved in error. At no time would I ever challenge Dr. Stout on lesions of this type and I am more than happy to change my impression to his (page 33).

John L. Goforth, M.D., Dallas, Tex.: This case has rather unusual and interesting features. It is regrettable that the tissue from the original tumor of the arm has never been made available and it is, of course, hazardous to make a diagnosis on the appearance of metastases. I classified this case as a synovial sarcoma, believing that some of the cells at least, look like synovioblasts. It is interesting that some of the metastatic masses showed some regression in response to roentgentherapy. A large mass was found in the tail of the pancreas which had not been suspected; it eroded into the peritoneum and was the source of a hemorrhage.

13. *Thymoma*

Contributed by WILLIAM A. D. ANDERSON, M. D., Milwaukee, Wisconsin

THE PATIENT was a 58-year-old lady who had been treated for tuberculosis and released as "arrested". She submitted to a radiographic survey and upon being recalled she complained of asthenia, dyspnea, chills, mildly productive cough and weight loss. In September 1950 the roentgenogram of the chest showed a rounded discrete mass, 7 x 8 cm lying on the right cardiophrenic angle in the anterior mediastinum. At operation in October 1950 a mass 9 cm in diameter framed by pinkish, friable tissue, was found in the anterior mediastinum, to the right of the heart, and adherent to surrounding structures.

Radiologic Impressions Submitted by Mail	
Mediastinal cyst	53
Primary mediastinal tumors	25
Teratoma	24
Primary lung tumor	17
Thymic tumor	9
Six others	19

Histopathologic Diagnoses Submitted by Mail	
Hemangiopericytoma	45
Sarcoma (fibro, neuro, hemangio, etc.)	43
Thymoma	25
Lymphosarcoma	15
Six others	20

Dr. Hodes: Here again we are faced with a tumor mass located in the anterior mediastinum. Is it thymic, teratoid, fatty or fibrous? Or is it an inflammatory process, a possibility suggested by the patient's history of chills? We are told that it was framed by pinkish, friable tissue which could mean that the tumor was solid and had a pinkish border, or it could also mean the pinkish friable tissue framed a cystic mass.

Obviously, this is not the usual cystic congenital lesion. The latter usually are asymptomatic and often discovered by accident. It seems reasonable to presume that this was an actively growing tumor, probably solid, possibly cystic. This patient had tuberculosis and still bears the pulmonary scars of that disease. The normal impulse is to connect this mass with the patient's tuberculosis. Whereas caseating tuberculous nodes often become sizeable and cause chills, weight loss, and asthenia, they rarely attain the size of this tumor and usually lie higher in the mediastinum. Yet it is something to think about particularly if thoracotomy is planned.

Because I have postulated that in an adult, the congenital lesions, solid or cystic, would have been picked up earlier I shall not consider the teratomas (dermoids), reduplication cysts of the bronchi and intestine, or mesothelial pericardial cysts. Cardiac aneurysms can look like this, particularly aneurysms of the sinus of Valsalva. This mass has the general density of such aneurysms but usually they lie a little higher and closer to the base of the aorta and often there is accompanying evidence of passive congestion. Fat and fibrous tissue sarcomas could do this and cannot be excluded.

Thymic tumors, benign or malignant, may occupy almost any portion of the mediastinum. We have seen them in this region, even larger than this mass. The asthenia could be of thymic origin as could also the cough, expectoration and loss of weight. With central necrosis we could explain the chills.

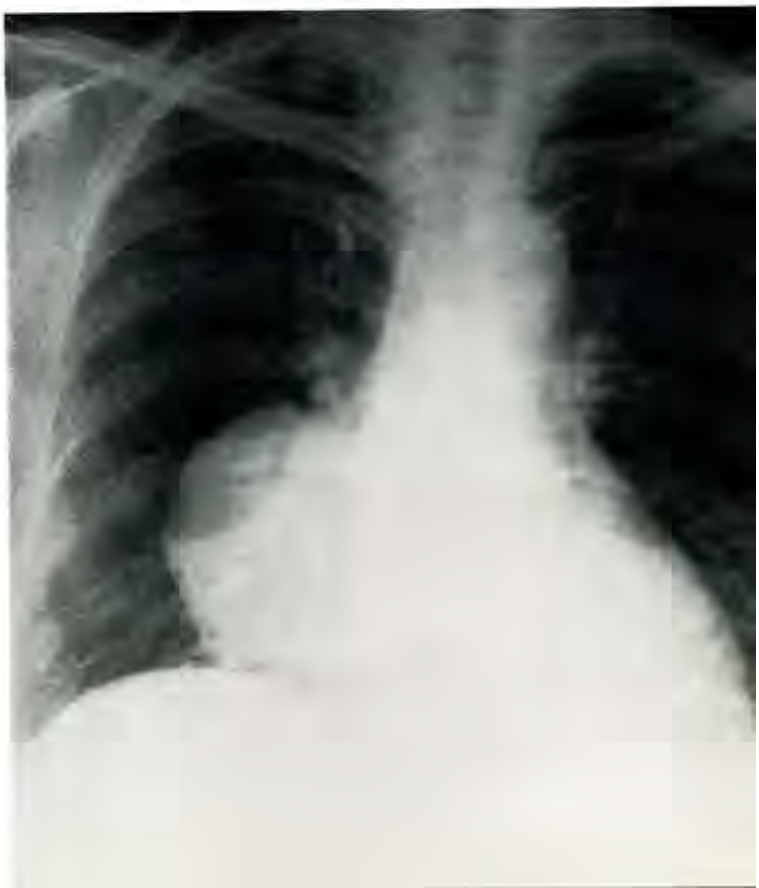
Dr. Hodes' conclusion: MALIGNANT THYMIC TUMOR with central necrosis; a connective tissue sarcoma, a diagnosis to be conjured with.

Paul C. Swenson, M. D., Philadelphia, Pa. (by mail): I believe we are dealing with a pericardial cyst or an aberrant enterogenous cyst.

Hymer L. Friedell, M. D., Cleveland, Ohio (by mail): A dermoid cyst should be considered as a first diagnostic possibility; a pericardial tumor would also produce this appearance.

Dr. Stout: This mass is composed of two varieties of cells resembling lymphocytes and reticulum cells. The proportions of the two vary in different areas, sometimes one predominates, sometimes the other and sometimes they are evenly divided but always they are inextricably intermingled.

Fig. 1 — Roentgenogram showing discrete mass in the right cardiophrenic angle.



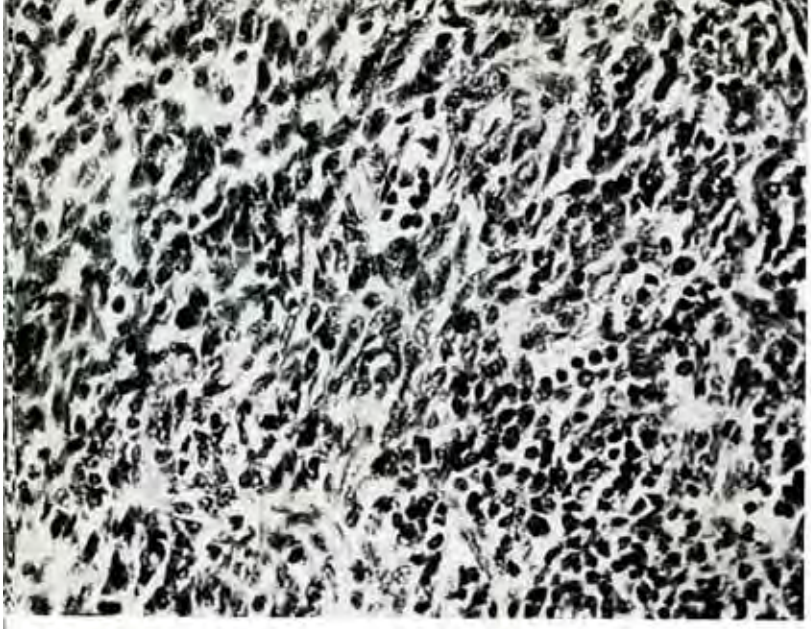


Fig. 2—Photomicrograph. Thymoma showing mixture of two cell types.

The reticulum cells are sometimes ovate and sometimes spindle shaped. This tumor differs from the usual variety because it is quite vascular and the septa are so slender as to be almost invisible in the hematoxylin-eosin stain. This makes the tumor look as if the cells were oriented around the capillaries as in a hemangiopericytoma.

In spite of its somewhat unusual situation and deceptive architecture, I believe this tumor is a thymoma because of the dual cellular composition. I should like to emphasize that I never make a diagnosis of hemangiopericytoma in any vascular tumor with cells oriented about the vessels if there is any possibility of explaining it in any other way, for there are a number of tumors other than hemangiopericytoma and glomus tumor which have this type of growth. In this tumor the intermingling of cells of the reticulum and lymphocytic type is the dominant feature, the vascular peculiarities of secondary importance. This tumor is low for a thymoma but not impossibly so—we have examples of a similar location of thymoma in our collection. Of interest is to know whether this tumor is benign or malignant. I cannot give the answer with assurance; the absence of mitoses, of bizarre cells and of proof of invasion or metastasis is against malignancy but not definite proof because of the adhesions to surrounding structures.

(The reader is referred to Case 1, page 63, for further details of Dr. Stout's views on thymomas.)

Dr. Stout's diagnosis: THYMOMA.

Malcolm B. Dockerty, M.D., Rochester, Minn. (by mail): I believe this is an angioendothelioma of a low malignancy; I hate to make this diagnosis but we must all have at least one waste basket. I feel that it is much too vascular for a malignant pleural fibroma.

Dr. Regato: Dr. R. Willis of Leeds submitted a histologic diagnosis of thymic carcinoma. E. Koppisch, D. Babb and E. Izquierdo, all of San Juan, P. R., made a diagnosis of malignant thymoma.

Subsequent history: The patient was last seen in May 1951: the fatigability, dyspnea and cough had improved and the patient appeared quite well.

(No audience participation in the discussion of this case).

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14. *Primary Lymphosarcoma (Benign Lymphoma?) of the Lung*

Contributed by HERBERT C. MAIER, M. D., New York, N. Y.

THE PATIENT was a 50-year-old man who in October 1944 complained of gastric symptoms; a routine fluoroscopic examination of the chest discovered an opacity of the apex of the left lung; there were no chest symptoms. The roentgenogram revealed a uniform density of the upper lobe, narrowing of the intercostal spaces, displacement of the mediastinum to the left and elevation of the left side of the diaphragm. On bronchoscopy, no abnormalities were found. A thoracotomy was done and the left upper lobe was found mildly indurated and gray in color; there was no mediastinal adenopathy.

Radiologic Impressions Submitted by Mail		Histopathologic Diagnoses Submitted by Mail	
Carcinoma of lung	70	Lymphosarcoma	43
Bronchial tumor	23	Chronic pneumonitis	29
Chronic pneumonitis	21	Undifferentiated carcinoma	27
Benign atelectasis	19	Plasmocytoma	17
Lymphosarcoma	5	Blank	28!
Seven others	29	Three others	12

Dr. Hodes: That this patient had no cough or other chest symptoms seems important, for lesions this size almost invariably produce symptoms. The partially collapsed left upper lobe, attraction of the mediastinal structures, and elevation of the left hemidiaphragm all suggest a bronchogenic carcinoma affecting the phrenic nerve. Under ordinary circumstances I would not hesitate to call this a bronchogenic carcinoma. The fact that this patient never complained of cough suggests that at no time did he have an open wound in his tracheo-bronchial tree. It also suggests a "dry" process because no secretions were found bronchoscopically. I find it difficult to accept this as being due to congenital hypoplasia of the left upper lobe in the absence of bronchoscopic findings and secondary manifestations of infection.

Several years ago at one of our conferences a patient was presented with pulmonary changes that led most of us to suspect erroneously a bronchogenic cancer. That patient had a primary sarcoma of the lung but I do not remember what type. I am also reminded of the plasma cell myeloma of the knee and larynx that I missed at this seminar last year. On looking up the literature at that time I learned that plasma cell myelomas can do almost everything. Simlilarly, considering the rare pulmonary lesions one must consider primary amyloid disease of the upper lobe.

Dr. Hodes' conclusion: MALIGNANT TUMOR: PLASMACELL MYELOMA or SARCOMA.

Dr. Regato: Col. F. Y. Leaver of Denver suggested the probability of a malignant lymphoma.

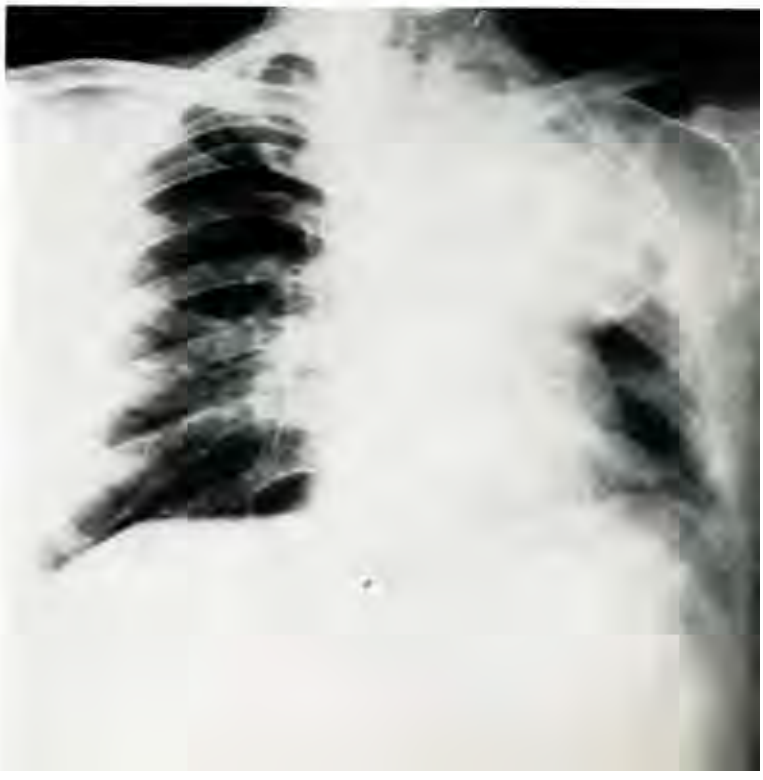
Dr. Stout: There is a sharply circumscribed although not truly encapsulated area in the lung which is made dense partly by patchy fibrosis but chiefly by an infiltrate of cells, the majority of which are lymphocytes but mixed with them somewhat larger cells with more cytoplasm, the exact nature of all of which I am not sure. Some may be lymphoblasts, some are surely reticulum cells, while still others I cannot identify. I cannot recognize any carcinoma cells, plasma cells, Reed cells, nor any cells of the myeloid series, although possibly the latter may be present. This tissue has solidly infiltrated the lung and largely replaced it.

I would feel more assurance in discussing this case if I knew more about the rest of the investigation. If it is proper to assume that examination of the gastrointestinal tract and blood were negative, we must suppose we are dealing with another case of lymphoid tumor of the lung. It differs from Case 2 in that although the majority of the cells are lymphocytes there are also a number of larger cells, the exact nature of which I cannot recognize. I can find no suggestion of Hodgkin's disease; it does not appear to be a plasmocytoma. I can only suggest it is probably another example of what has been called lymphosarcoma of the lung but which, as has been pointed out in the discussion of Case 2, is a lesion localized in the lung and perhaps should be classified as a benign lymphoma.

Dr. Stout's diagnosis: LYMPHOSARCOMA (benign lymphoma?) of the LUNG.

Malcolm B. Dockerty, M. D., Rochester, Minn. (by mail): Lymphoblastoma. Many of the elements have 'plasma cell' nuclei but they are of small average size and somewhat overstained; I cannot rule out plasmocytoma for this reason.

Fig. 1 — Roentgenogram showing uniform density of the left upper lobe.



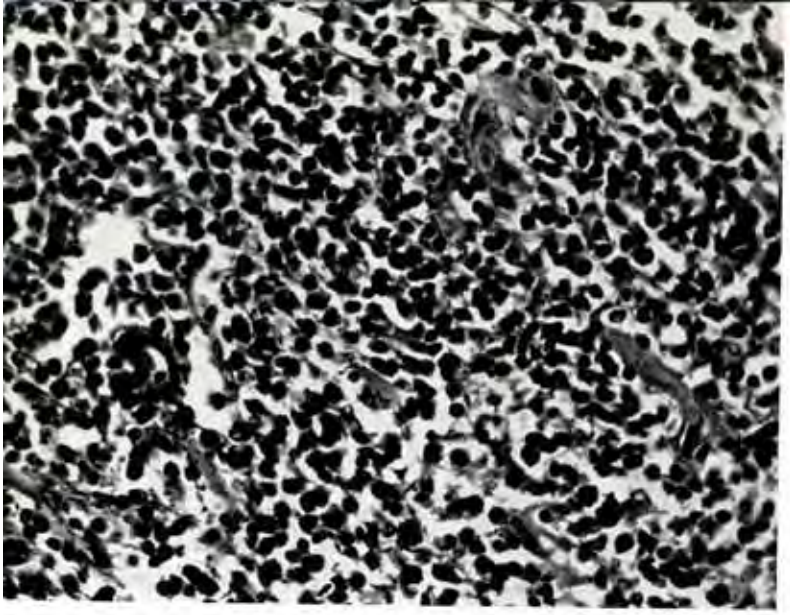


Fig. 2—Photomicrograph. Lymphocytoma (lymphosarcoma ?) of the lung. Dense concentration of lymphocytes and supporting framework.

Dr. Regato: Dr. M. Wheelock of Chicago, R. Willis of Leeds and O. Severance of San Antonio all made a diagnosis of lymphosarcoma.

Subsequent history: A pneumonectomy was done in October 1944, and the patient was well until May 1946, when a small area of density was observed on the right upper lobe; it grew slowly. In December 1946 roentgentherapy was administered by Doctor Maurice Lenz and the area of opacity disappeared. The patient was last seen in April 1951 when he appeared in good health; the roentgenogram of the chest shows no abnormalities in the right lung, and replacement fibrosis in the left hemithorax.

Dr. Regato: Primary lymphosarcoma of the lung seems to be a rare, but well established entity. Like lymphosarcomas of the orbit, of the stomach and rectum, those arising in the lung seems to take a rather benign clinical course; they are slow growing and often asymptomatic. The present case, previously published by Doctor Maier, has now been observed for several years and appears to demonstrate their curability, both by surgery and radiotherapy.

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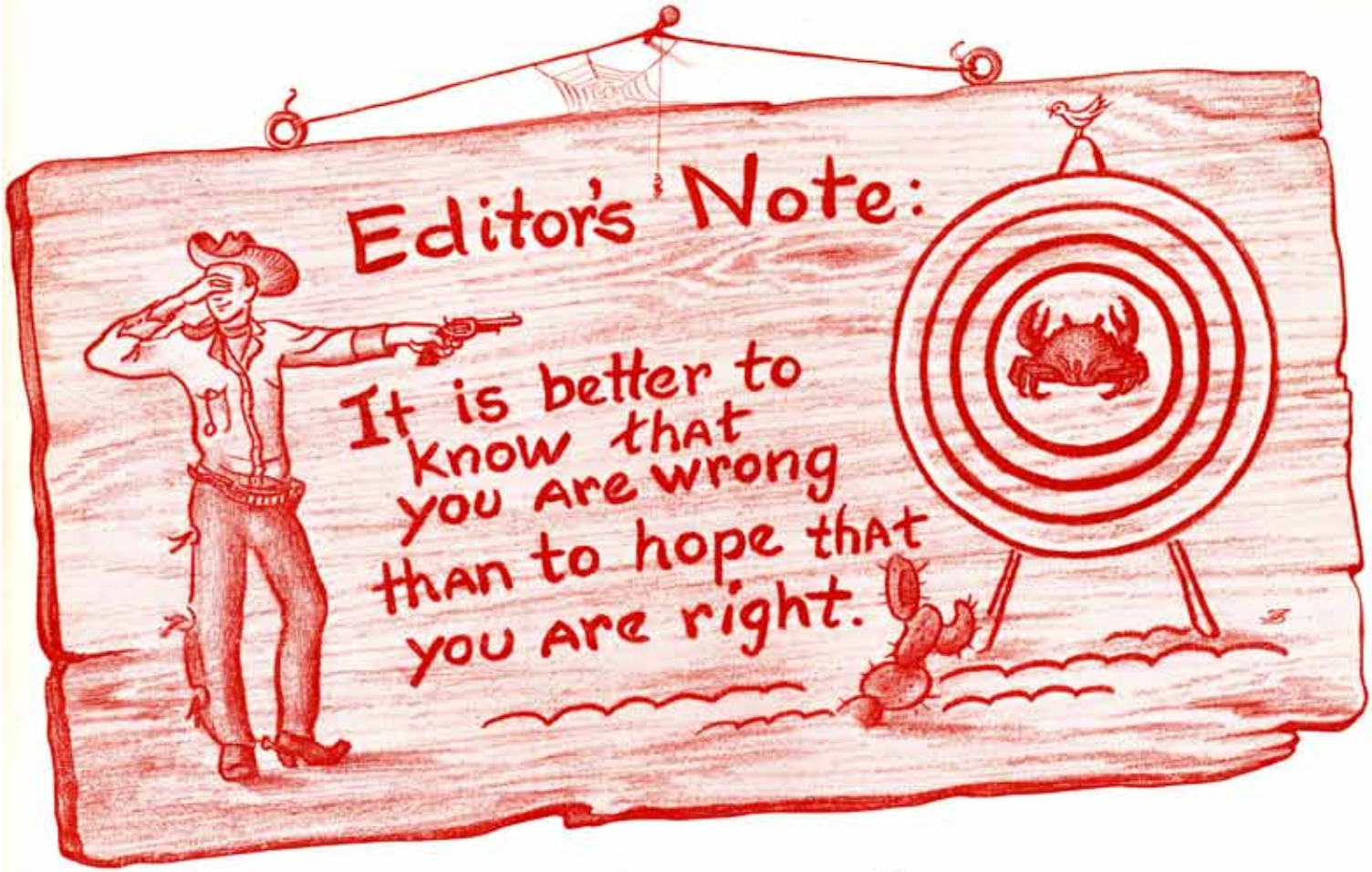
Beck, W. C. and Reganis, J. C.: Primary Lymphoma of the Lung, J. Thoracic Surg. **22**:323-328, 1951.

Maier, H. C.: Primary Lymphosarcoma of the Lung, J. Thoracic Surg. **17**:841-845, 1948.

15. *(Deleted)*

This case has been withdrawn from publication at the request of the contributors. It was a case very similar to Case No. 5, presenting, in the roentgenogram, mottled patches of infiltration throughout both lungs. There was a great variety and disparity of radiographic and of histopathologic diagnoses, and naturally, this motivated a very lively discussion with wide audience participation. The contributors had an established diagnosis which was not corroborated at the Seminar; they felt that this was due to error in the selection of fresh and embedded material, submitted to us by a third party, for preparation of the Seminar slides. Since this could not be proved or disproved, it was felt that the case had lost its value for purposes of publication.



16. *Thymoma (?)*

Contributed by ISADORE LAMPE, M. D., Ann Arbor, Michigan

Fig. 1 — Roentgenogram showing mass projecting over right hilum.

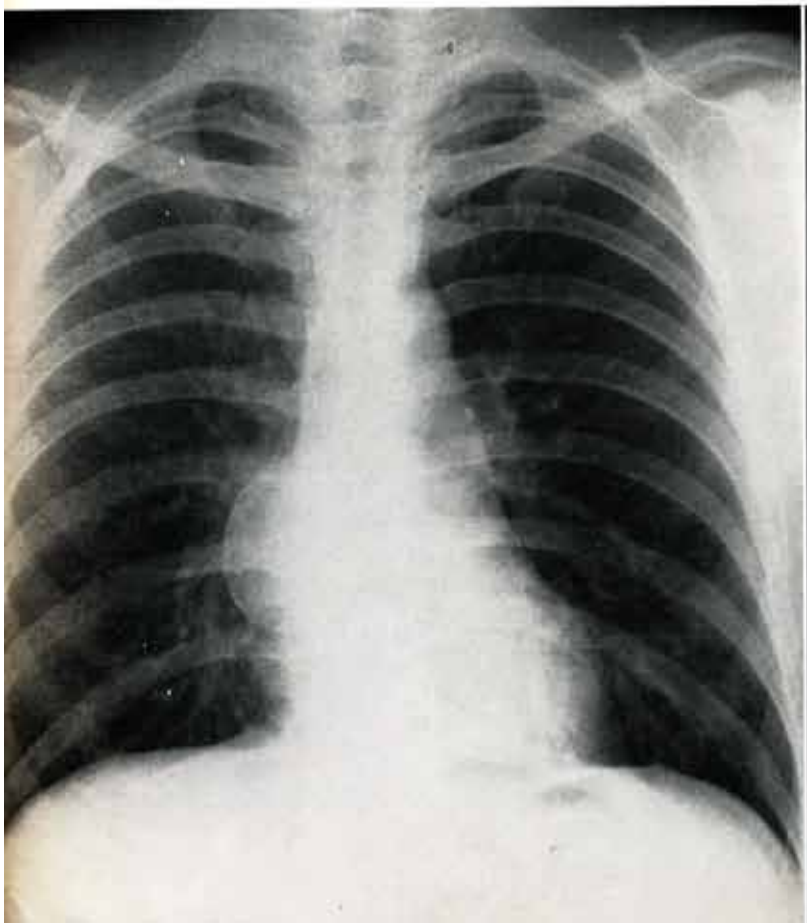
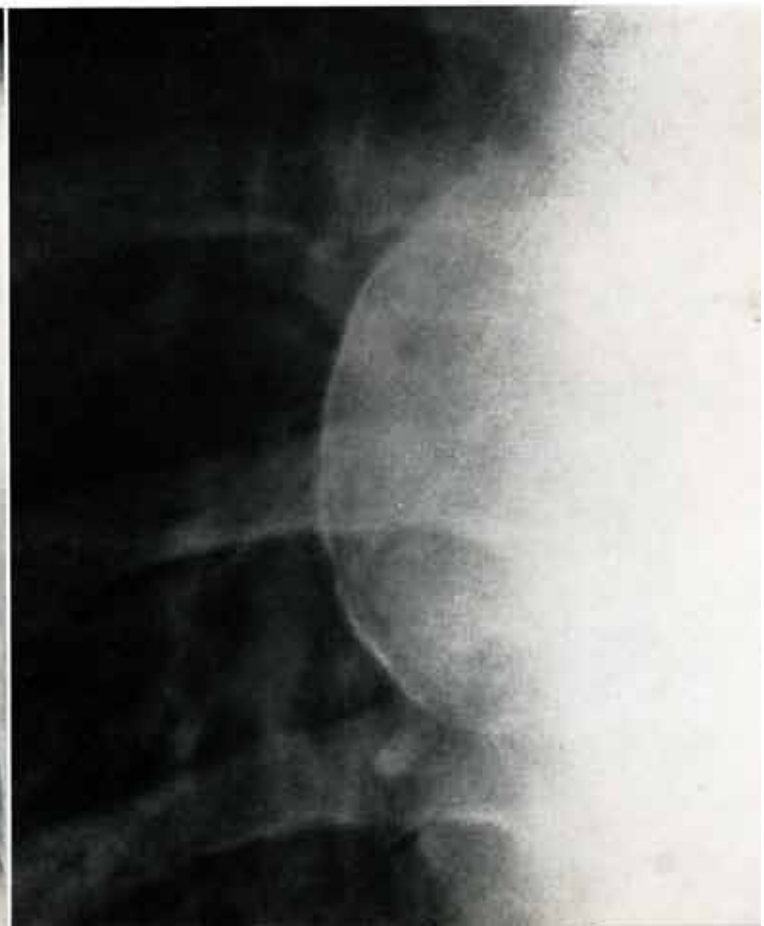


Fig. 2—Close-up view showing thin calcification in the periphery of the tumor.



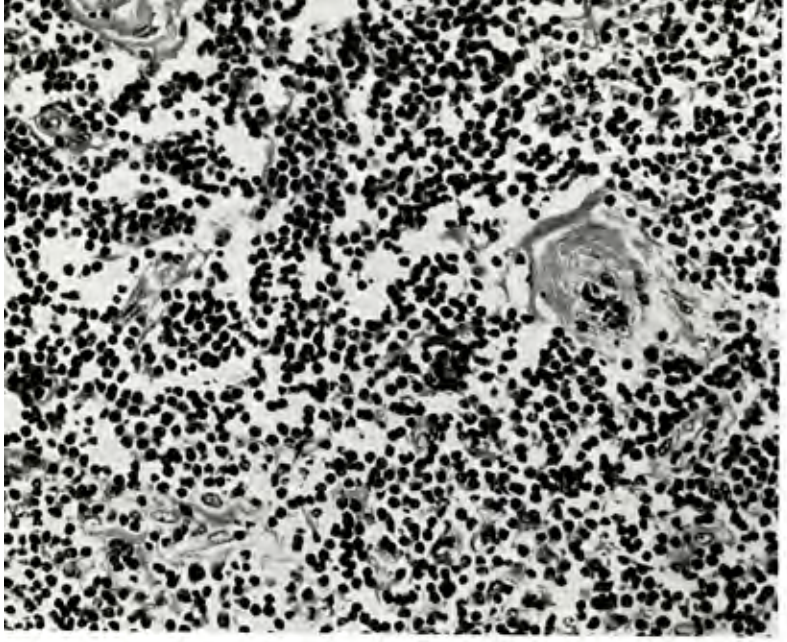


Fig. 3—Photomicrograph. Thymoma or lymphocytoma? The predominating cell is the lymphocyte; there are a few reticulum cells. Two dense fibro-vascular septa are shown.

THE PATIENT was a man 31 years of age, who in September 1942 complained of frequent colds, cough, blood-streaked expectoration, dyspnea, and a pain in the right side of the chest. A roentgenogram revealed the presence of an abnormal shadow projecting over the right hilum and presenting a thinly calcified outline. In October 1942 a thoracotomy was done and a mass was found adherent to the right lung and to the pulmonary hilus.

Radiologic Impressions Submitted by Mail	
Cysts (pericardial, bronchial, etc.)	65
Dermoid cyst	41
Teratoma	24
Aneurysm	19
Lymphosarcoma	9
Thymoma	3
Seven others	18

Histopathologic Diagnoses Submitted by Mail	
Lymphosarcoma	57
Thymoma	42
Neuroblastoma	19
Benign lymphoma	9
Sympathicoblastoma	8
Five others	10

Dr. Hodes: The calcification in the periphery of the mediastinal mass seems highly significant. Of all anterior mediastinal tumor masses, the one most prone to develop calcification of this type is the teratoma (dermoid). Whereas no one could gainsay the possibility that we are dealing with an enlarged calcified lymph node, an echinococcus cyst with calcification, an aneurysm, or even metaplasia in a fibroid tumor, we favor the teratomatous origin of this growth. In the past we have felt confident the lesions with this calcified periphery were often teratomas. With the current change of heart on the part of pathologists, perhaps this will prove to be thymic in origin.

Because this patient complained of dyspnea and pain in the right side of the chest, the possibility that this tumor has undergone malignant change must be entertained.

Dr Hodes' conclusion: TERATOMA (dermoid) or a MALIGNANT THYMOMA.

Dr. Regato: Dr. H. L. Friedell of Cleveland, P. C. Swenson of Philadelphia and J. T. Case of Santa Barbara submitted an impression of mediastinal cyst.

Dr. Stout: The section shows that the lesion is encapsulated, with calcification of the capsule and that dense fibrous septa tend to divide it up into ill-defined incomplete lobules. The major portion of the growth consists of small lymphocytes. With higher magnification it is possible to see that almost everywhere these lymphocytes are set down in an inconspicuous background of reticulum cells. There is no follicle or sinus formation. No Hassall's corpuscles or Reed cells are detected.

This is largely a lymphoid structure. The cells are so well differentiated and the capsule so thick and calcified, that it is difficult for me to believe we are dealing with a malignant lesion. It seems necessary to choose between an enlarged lymph node and thymoma. Since there is no evidence of follicle formation or lymphatic sinuses nor of any of the diseases which affect lymph nodes, I could not believe this was a lymph node. On careful analysis with higher magnification, the tissue seems to be composed of an admixture of lymphocytes and reticulum cells everywhere intermingled—this together with the presence of fibrous bands dividing the tissue up into incomplete lobules made me favor interpreting this as a thymic growth and the diagnosis I favor is thymoma. The diagnosis is not as sure as in Cases 1 and 13, but I feel fairly confident it is correct.

Dr. Stout's diagnosis: THYMOMA (?)

R. Willis, M. D., Leeds, England (by mail): This is an unusual picture of massive lymphoid growth in calcified capsule. I suggest a lymphosarcoma in calcified lymph node, but I am not very confident about this.

Dr. Regato: Dr. M. B. Dockerty of Rochester and C. Oberling of Paris submitted a diagnosis of thymoma.

Subsequent history: In October 1942 the mass was excised. The patient was well when last seen in February 1949.

Dr. Regato: Few participants suspected a thymoma on the roentgenograms; the probable reasons were the location and the presence of peripheral calcification. Deposits of calcium in thymomas have been previously reported: they usually give the appearance of calcified walls or of a cystic mass (Good). Thymomas may arise in contact with the diaphragm.

(Editor's note: This case has been published elsewhere by Drs. Haight and Evans.)

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Our Guest Speakers

ARTHUR P. STOUT, M.D., Professor of Pathology at Columbia University, Pathologist to the Francis Delafield Hospital of the city of New York. Doctor Stout was graduated from Columbia University in 1912. He is the author of a book on Human Cancer and is widely recognized as one of the foremost authorities on tumor pathology. Doctor Stout was the guest of the Regional Section of the College of American Pathologists.

PHILIP J. HODES, M.D., Professor of Radiology at the University of Pennsylvania, Chief Consultant in Radiology to the Veterans Administration in Philadelphia. Doctor Hodes was graduated from the University of Pennsylvania in 1931. He has made numerous contributions to the radiological literature and is well known as a teacher of radiology. Doctor Hodes was the guest of the Penrose Cancer Hospital.

L. HENRY GARLAND, M.D., Clinical Professor of Radiology at Stanford University; past President of the American College of Radiology and of the Radiological Society of North America. Doctor Garland was graduated from the University College of Dublin in 1924 and served in the Second World War as Commander in the United States Navy Medical Corps. Doctor Garland, the guest of the Penrose Cancer Hospital, was the banquet speaker.

The Penrose Cancer Hospital

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