than 20/200 represents industrial blindness or 100 per cent. loss of vision, entitling the injured to the maximum compensation for monocular blindness allowed by the state law. This varies in different states, but in Illinois it entitles the injured to 100 weeks of compensation at \$12 a week, or \$1,200. The minimum to be paid for the total loss of one eye is \$6 a week. In case the maximum or \$12 a week is paid, the amount is increased \$1 a week for each child of the applicant under 16 years of age, up to and including three children. In case the minimum or \$6 a week is to be paid,

COMPENSATION TABLE FOR VISUAL LOSSES OF ONE EYE

20/20 indicates 100% of visual efficiency and no loss of vision					
20/30	94.5%	"	"	"	5.5%
20/40	89.0%	"	"	"	11.0%
20/50	83.5%	"	"	"	16.5%
20/60	78.0%	"	"	"	22.0%
20/70	72.5%	"	"	"	27.5%
20/80	67.0%	"	"	"	33.0%
20/90	61.5%	"	"	"	38.5%
20/100	56.0%	"	"	"	44.0%
20/110	50.0%	"	"	"	50.0%
20/120	41.0%	"	"	"	59.0%
20/130	36.5%	"	"	"	63.5%
20/140	32.0%	"	"	"	68.0%
20/150	28.5%	"	"	"	71.5%
20/160	23.0%	"	"	"	77.0%
20/170	18.5%	"	"	"	81.5%
20/180	14.0%	"	"	"	86.0%
20/190	12.0%	"	"	"	88.0%
20/200	10.0%	"	"	"	90.0%

the amount is increased 50 cents a week for each child of the applicant under 16 years of age, up to and including three children.

Two points in the construction of a compensation table may be said to be now finished, namely, the meaning of industrial blindness, and the maximum compensation payable for this misfortune. The latter, it must be remembered, is definitively settled by most states and we have nothing to say about it. Individuals desiring personally to assume financial responsibility for expensive accident insurance are at liberty to do so; but when insurance is assumed and paid for by the employer, \$1,200 is the maximum amount payable for the loss of one eye in Illinois. The last step to be taken in constructing a compensation schedule is fairly and equitably to grade down the percentages and compensations, to accord with the amount of vision that is lost. This has been attempted in the accompanying Chicago Ophthalmological Society table.

EXAMINATION OF APPLICANTS BEFORE EMPLOYMENT

Before the subject of compensation for monocular visual deficiencies is dismissed, it seems desirable to suggest to employers of labor a simple method for extensively reducing the frequency of claims for personal injury, not only for ocular damage, but for all other accidents as well. Reference is here made to the skilful physical examination of applicants before assignment to employment. Perfunctory examinations should be discountenanced, as errors in either direction may lead to unfortunate results. Eye and ear examinations, for instance, should be performed by competent specialists, that correct ocular and aural conditions may be ascertained. Two instances will demonstrate the necessity for such examinations before employment:

CASE 1.—A man received a slight head blow three weeks after obtaining employment. Shortly after he claimed blindness in one eye. Examination disclosed old chronic simple glaucoma with atrophied disk.

CASE 2.—A man was struck on the head by a piece of coal; no wound was produced. In five weeks he complained of

deafness and discharge from one ear. Examination disclosed an old chronic otorrhea, necrosis, foul discharge, and tympanic polyp.

In spite of convincing medical testimony, both men recovered damages. If these men had been properly examined before employment, both these diseases would have been detected, and litigation would probably not have been begun, but if begun would have been unsuccessful. The proper examination before employment of applicants for work is an economical necessity, but it is useful only if properly performed by skilful and conscientious physicians. In this way physical records are established that are bound in many instances to save, in the aggregate, enormous sums of money—much more, in fact, than the cost of proper medical examinations. Besides this, many employees have unknown physical infirmities which, when disclosed, can be cared for, and perhaps cured, to the great satisfaction of the employees themselves. Finally, when bodily imperfections are understood by both employer and employee, such knowledge can make employers more considerate of the afflicted, and inspire them to offer suitable occupation for individual needs. Some labor leaders demand the abandonment of physical examinations, thus clearly disclosing their sinister intentions, and ignoring the fact that such examinations should be welcomed by both honest employers and honest employees. Nor can the idea be ignored that, if employers are to be held liable for accidents, they certainly have a right to know the physical conditions of their employees before they assign them to work.

7 West Madison Street.

ENDOTHELIOMA OF THE PLEURA

REPORT OF CASE

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This case is reported not only because of the rarity of the occurrence of the condition, but also because of the interesting conditions which prevailed throughout the course of the illness.

REPORT OF CASE

History.—A white man, aged 31, first reported at sick call, Oct. 29, 1918, and was sent to a field hospital, where a diagnosis of ileocolitis was made. From there he was immediately transferred to a base hospital. There he gave a history of having had diarrhea for two weeks previously. He was suffering from headache, and incontinence of feces, but he had no fever; mentally he was stupid and somnolent. November 9, on the discovery that the right side of the chest was partially flat, 500 c.c. of serosanguineous fluid were removed. Apparently no pus cells nor organisms were found in the fluid. As the mental condition grew worse, and definite auditory hallucinations were present, a diagnosis of a hebephrenic type of dementia praecox was made.

December 22, the patient was sent to the psychiatric department at Bazoilles, where examination disclosed that his memory was poor, that he had persecutory delusions, and that he was confused and disoriented. After physical examination the diagnosis of fluid in the right chest, with possible empyema, was made. The mental condition was then

ascribed to the toxemia and exhaustion and the patient was transferred to the medical service. There the chest was explored with a needle, but no fluid was obtained; something solid, however, was encountered. Over the flat area, tactile and vocal fremitus were lost, and breath sounds were distant. Above the flat area there were coarse moist râles, and the breathing was only faintly heard. The mediastinal dullness was noted as widened, and the heart impulse as outside the nipple line. A needle had been inserted at numerous times and by different surgeons but no fluid had been found, and on each occasion the impression of solidity was obtained. At the time of this examination there was some bulging of the right chest, and the patient began to complain of pain in the right upper abdominal quadrant. The leukocyte count was continually around 60,000, with 94 per cent. polymorphonuclears; the temperature would often rise to 102 F. The roentgenologist consistently reported fluid in the right chest.

February 1, the patient with others was taken over by our hospital. He was unable to sit up, although he would continually ask to be allowed out of bed. His body was emaciated, and the face had a hectic appearance. He showed marked mental deterioration, with the talk and manner of speech of a boy. He was emotional, crying easily and usually begging to be sent home. He was well acquainted with his present surroundings and with all in attendance. His movements were coordinate, and there was no spasticity. He usually lay on his back, but he could easily move about in bed. The chest examination disclosed that the cardiac dullness was not increased, and the apex beat was but slightly outside the normal position. The left chest was negative. The right chest was markedly larger than the left, and at one place, anterior and just above the costal margin, bulged somewhat into a solid rounded bump. Everywhere there was absolute flatness. Percussion below the fifth rib anteriorly was like striking a board. Over the lower and midlobes, breath sounds were but faintly heard and at a great distance. They were much louder at the apex and along the spine. However, everywhere they were of transmitted quality, distantly tubular. No râles were heard. Fremitus was abolished. With the history of 500 c.c. of serosanguineous fluid having been obtained early, of the numerous dry taps with the needle meeting strong resistance later, of the wooden percussion note, of the uneven breath transmission along the spine, of the right-sided shadow on the roentgenogram, and especially of the absence of cardiac displacement, the diagnosis of a new growth was made. Opposed to this diagnosis were the disconcerting features of a very high leukocytosis with the increase in polymorphonuclears, and a consistently moderate rise in temperature. It was thought that perhaps there might be a degenerated area in the tumor mass with abscess formation. However, there were no rigors nor high elevations of temperature. The expectoration was not profuse, nor at any time blood stained, nor of bad odor. Even the urine was albumin free.

The patient was observed from almost every angle as he progressively grew weaker. One had to bear in mind that perhaps there was present a condition which could be relieved by operation. The roentgenologist could not definitely diagnose the lesion with plates, and the horizontal screen was not in good working order. Tubercle bacilli were never found. The Wassermann reaction was negative. The blood picture showed no atypical cells. The sputum typed Group IV pneumococci. The pain in the right upper abdominal quadrant came oftener and grew more intense. There were no paralyses, nor stupor, nor loss of consciousness up until the patient's death, which occurred March 14, 1919, five months after the first symptoms were noticed. Because of the patient's age and the absence of recognized signs of metastases or lung infiltration, the tumor growth was thought to be probably of connective tissue origin. Death came without any new signs appearing except in the last few days, when there was an impairment of the good lung.

Necropsy Findings.—The anatomic diagnosis was malignant tumor of the right pleura and lungs with extension into the liver, chest wall and left pleura, and metastasis into the brain and peritoneum.

The right chest, just external to the nipple line at the seventh rib, showed a distinct bulging which was slightly nodular. On removal of the skin and muscles, several grayish white nodules were found adherent to the chest wall. The right pleural cavity was obliterated by a nodular, grayish white, friable tissue from 1 to 3 cm. in thickness, being thinnest at the apex and thickest near the mediastinum. It was firmly adherent to the lung and chest wall. The diaphragm was replaced by the same tissue, which extended deeply into the liver. The left pleural cavity contained 200 c.c. of clear fluid. A few adhesions were present. Posteriorly the parietal and visceral pleurae were covered by numerous firm white tubercles, varying in size from that of a pinhead to that of a large bean. A few appeared anteriorly.

The right lung was firm, and on section appeared dry with a marked increase in interstitial tissue. In the upper lobe the bronchi were surrounded by a white fibrous tissue. Occasionally a distinct nodule of this fibrous tissue was seen. All lobes were somewhat atelectatic. The left lung was soft and air-containing, but somewhat nodular. On section the nodules were found to be white with definite strands of fiber visible. The neck organs and cervical lymph glands were not remarkable.

The peritoneum was smooth and glistening, and the cavity contained no fluid. The upper and external surface of the liver was adherent to the peritoneum with a comparatively firm, friable adhesion in which were many grayish white nodules of varying sizes. A few isolated grayish nodules, the size of a pea, were scattered over the visceral and parietal layers. The liver was pushed downward about 4 cm. Its surface, especially the upper anterior and external aspects, was covered by the same nodules. On section, the advance of the tumor was seen to extend from 2 to 5 cm. into the liver substance. The advancing margin was composed of small, round tubercles which seemed to coalesce with age.

In the intestine, about 1 meter below the beginning of the ileum, there was a gray nodule which involved the entire thickness of the intestinal wall. It was surrounded by a zone of hyperemia. On the cecum, near the appendix, there were two nodules, 1 cm. in diameter, but they seemed to involve only the peritoneum.

The spleen was moderately enlarged and the capsule was wrinkled and thickened. On section, a smooth surface the color of grape juice was presented. The right suprarenal was somewhat enlarged, and near its center there was a nodule the size of a pea and similar to those just described. The left suprarenal was not remarkable. The kidneys were small and pale. The capsule stripped easily, and the cortex and medulla were well defined. The stomach, pancreas, bladder and genitalia showed nothing of note.

The meninges were clear. The brain on section showed a cavity, 3 by 3 by 6 cm., above the left lateral ventricle. The wall of this cavity was composed of a layer of brownish red tissue, 1 cm. in thickness, and distinctly nodular. The cavity was filled with an amber fluid containing numerous cholesterol crystals and a small amount of granular debris. Several smaller cysts similar to this were seen in the white matter throughout the brain sinuses.

Microscopic Diagnosis.—Thickened Pleura: The bulk of the tumor consisted of fibroblasts and connective tissue cells. These were arranged in many bands which communicated freely with one another. In certain areas these cells were nucleated and showed active growth. Usually, however, no nuclei were demonstrated. Between these strands of cells were many nests of cells. Near the center of the thickened pleura these nests were small, and the cells markedly distorted. Near the periphery the cells were more plentiful and the connective tissue much less conspicuous. There was a marked variation in the size and in the staining characteristics of these cells. Some were large and polygonal and stained densely; others were large with pale staining protoplasm, while still others were small and pyknotic. The cells were formed in groups, and in some places had a slight glandular arrangement. Karyokinesis was seen in many cells.

Liver Metastasis: The liver cells were cloudy, and many contained fat globules. The fat was especially noticed in

the cells surrounding the central vein. The line between the tumor cells and the liver cells was marked by a thin zone of scattered round cells with an occasional polymorphonuclear. Usually this line was cleancut and distinct. Occasionally tumor cells extended beyond it. The tumor cells were identical in appearance and arrangement to those in the tumor of the pleura. There was, however, very little connective tissue in the liver tumors.

Metastatic Nodules in Left Pleura: The cells were identical to those described above. Those in advance filled the alveoli of the lung, and in many cases were limited to a given alveolus. Deeper in the tumor, however, the alveolar wall was represented only by a thin line of connective tissue.

Right Suprarenal: The tumor was identical in every way to those just described. Its extending margins were clear and distinct.

Metastasis into Brain: Here the cells were arranged in a more orderly manner. Many definite papillae were present. The margin invading the brain substance was somewhat more irregular, and frequently the cells extended deeply into the brain. However, the general characteristics of the tumor cells were the same as those of the pleura.

The microscopic diagnosis was endothelioma of the right pleura with metastasis into the liver, left pleura, suprarenal, peritoneum and brain.

COMMENT

Most likely the first symptoms in this case were produced by the metastases in the brain, as no history of the chest condition was obtained until later. The diarrhea, noted at first as incontinence of feces, the stupor, and the psychosis were the outstanding signs and the ones that caused the patient to come under medical observation. The growth proper was not detected early because it produced no painful symptoms and invaded no tissue that gave any local reaction. The pleural effusion was the first sign noticed in the chest, and this was some time after the mental symptoms had appeared. The metastases were doubtless of a blood vessel type, and those in the brain were probably the first given off. Neither the motor nor the sensory areas were attacked, but apparently the parts associated with thought activity were greatly disturbed. The nodules in the intestine may have produced the diarrhea. The liver was invaded directly through the diaphragm. The latter lost its identity on the right side and was replaced by the advancing growth. The necropsy findings in no way explained the consistently and extremely high increase in white blood cells. The metastatic areas in the brain were sterile and showed no inflammatory reaction. The fever was no doubt due to toxic resorption. The growth began in the right pleura at the mediastinum and extended along the diaphragmatic and later the costal portions, compressing the lung upward in its course. Death was the result of asthenia.

The Geographic Distribution of Diseases.—L. R. Grote declares that not enough statistics and other data have been accumulated as yet for what he calls nosogeography. This is a science of the future, to be based on geographic, climatic influences, racial differences, social and economic conditions, the biology of the causative agents, and the effect of human efforts at prophylaxis. He reiterates that there is no part of the world absolutely free from any of the constitutional diseases, or where the infectious diseases cannot get a foothold when the causal agent is imported. In discussing these five elements of nosogeography in the *Geographische Zeitschrift* 25, No. 7, 1919, he cites a number of puzzling facts, such, as the high tuberculosis death rate and the low cancer death rate—only 4 per ten thousand—in the Münster region, while the reverse prevails in the East Sea provinces, the cancer rate being 14 while the tuberculosis rate is among the lowest.

THE PRODUCTION OF AN ACUTE RESPIRATORY DISEASE IN MONKEYS BY INOCULATION WITH *BACILLUS INFLUENZAE*

A PRELIMINARY REPORT *

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Many attempts have been made to produce influenza in animals, or to transmit it experimentally from man to man by inoculation of the secretions, both filtered and unfiltered, from the respiratory tract in cases of influenza, by direct exposure of the subject to patients with influenza, and by inoculation with cultures of *Bacillus influenzae* isolated from patients with the disease. In large part, the results obtained have been entirely negative. In the few instances in which successful transmission of the disease has been reported, the methods employed and results obtained by different observers have been to a considerable extent inconsistent.

During the course of an investigation of experimental pneumonia in monkeys produced by the intratracheal injection of pneumococcus and *Streptococcus hemolyticus*, a further series of experiments with *B. influenzae* was undertaken in the hope of throwing some light on the relation which this organism bears to epidemic influenza and to the pneumonia which so frequently complicates it. The results obtained have been of such interest that it seems desirable to present a brief preliminary report at this time. The work will subsequently be reported in detail with full protocols.

Two species of monkeys were used: *Macacus syrichtus* from the Philippine Islands, and *Cebus capucinus* from Central America. All were fresh stock and had not previously been kept in captivity in this country. No preliminary procedures to lower resistance or to injure the respiratory tract before inoculation were resorted to. The strain of *B. influenzae*¹ employed was originally isolated from a case of influenzal pneumonia in a child. When received it had been in subculture on blood agar for a period of six weeks, and was found to possess no virulence for white mice. Since it was well known that the pathogenicity and virulence of *B. influenzae* are extraordinarily labile and very rapidly lost on subculture on artificial mediums, it was deemed necessary to raise the virulence of the strain to a considerable extent if successful results were to be obtained. This was accomplished, in brief, by successive animal passages, first through a series of eleven white mice, and then through a series of thirteen monkeys. These animals were inoculated intraperitoneally, the attempt being made always to give a sufficiently large dose to kill the animal within from twenty-four to forty-eight hours. Presumably because of individual variation in resistance, the desired result was not always obtained. In order, therefore, to avoid delay and possible loss of virulence because of this circumstance, fluid was withdrawn from the peritoneal cavity of the inoculated animals from eight to ten hours after injection, when the bacteria were still

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1. We are indebted to Dr. T. M. Rivers of the Johns Hopkins Medical School, Baltimore, for the strain of *B. influenzae* used.