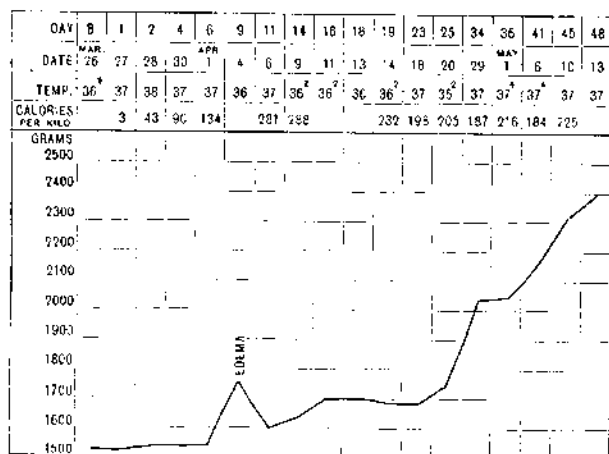


of salt is also given and 10 per cent. of the 5 per cent. barley gruel added and rapidly increased as the whey is eliminated.

It seems to me that as a rule these infants do better when the ratio of fat to proteid in the food is not more than two to one, and, while the number of calories needed for the normal infant may not be more than 100 per kilo of body weight, and can gradually be reduced as the child grows older, I have found that it is necessary



Weight chart of immature infant. Birth expected May 3, born March 26. Mother i-para; one miscarriage at third month, two years ago; symptoms of toxemia during present pregnancy.

to feed the immature and atrophic infants as high as 250 calories per kilo for several weeks at a time; and with food of this high caloric value I have seldom found signs of over-feeding, except when the fat calories ran high. However, when a baby digests fat all right it is fed fat, but is watched carefully and the fat is reduced with the first signs of indigestion.

The weight chart urges always for more food, and the clinical chart acts to hold this in check. Intelligent interpretation of these two indicates the sensible way to feed in these interesting problems of malnutrition.

240 Stockton Street.

A TERATOMA OF THE HYPOPHYSIS *

D'ORSAY HECHT, M.D.

Assistant Professor of Nervous and Mental Diseases, Northwestern University Medical School; Consulting Neurologist to the Institutions for the Insane at Dunning; Attending Neurologist to the Michael Reese and St. Elizabeth's Hospitals
CHICAGO

PATHOLOGIC REPORT BY MAXIMILIAN HERZOG, M.D.†

Neither from the earliest collation of cases nor even from the more recent ones do we seem in a position to estimate accurately the frequency of hypophyseal tumors. The cases are reported from such widely different premises, most often according to points of special clinical significance. Thus we find it necessary to search the records of ophthalmology, treatises on acromegaly, contributions to intracranial surgery, journals devoted to radiography, and so forth, in getting at information bearing on the pathology. Mindful of this difficulty encountered in making up an exhaustive tabulation of cases, I think we may, nevertheless, assume that tumors of the hypophysis and infundibulum are quite rare.

* Read in the Section on Nervous and Mental Diseases of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

† From the Pathological Laboratories of Michael Reese Hospital.

As concerns the variety of neoplasms, we meet with simple hyperplasia, adenoma, glioma, sarcoma, carcinoma and teratoma. The teratomata of the gland are, indeed, a very rare form of tumor. Boyce and Beadles, in their large collection of cases, include three of this variety reported by Beck, White and Sainsbury; in the last mentioned of these the tumor had its origin not in the gland proper, but in the region of the gland. This particularity as to the original seat of the growth should not be construed as an idle distinction, for there is a difference both in the pathologic and clinical aspects of a tumor arising from the gland or invading it from its immediate neighborhood.

The teratomata are in their nature a fetal type of tumor and present structural changes identical with those noted in the case herewith reported. Kon has very recently reported a case of cretinism with a teratoma in the hypophyseal region, a case of periepithelioma and one of angiosarcoma with extensive hemorrhage. I contend, and for reasons which the pathologic report will no doubt make clear, that the tumor in this case in all probability arises from the anterior portion of the gland.

Bearing in mind the embryonic development of the anterior or glandular portion of the hypophysis as derived from the oral ectoderm, it is to be wondered at that the teratoma is not a more frequent factor in the classification of hypophyseal neoplasms. Bruns divides the tumors of the hypophysis, which he says in the main arise in the anterior and spread to the posterior portions of the gland, into homoplastic and heteroplastic. The homoplastic growths are made to include the simple hypertrophies, colloid and cystic enlargements and the adenomata. The heteroplastic are the round-cell sarcomas, the teratomata with their epithelial, cartilaginous or bony content, the primary and metastatic carcinomas, lipomas, tubercles and gummata; of these, he states, the sarcomas are most commonly met.

The clinical notes of this case will appear somewhat abridged in favor of a more detailed report of the pathologic findings which, in my opinion, are unique and, so far as I have been able to learn, almost without precedent in the literature. My sincere thanks are due my friend and colleague, Dr. Isaac A. Abt, for the privilege of this case citation, and I owe grateful acknowledgement to Dr. Maximilian Herzog, formerly pathologist to the Michael Reese Hospital, both for his valuable interpretation and painstaking arrangement of the pathologic material.

REPORT OF CASE

Summary.—A tumor of the hypophysis, correctly diagnosed as regards neoplasm, but not localized; absence of sufficient focal symptoms; skiagraphs unsatisfactory but faintly suggestive of cerebellar involvement. Tumor not found at operation because of its deep situation. Termination in death six hours after operation. Autopsy reveals a tumor of the hypophysis proved to be a teratoma arising in all probability from the gland.

Patient.—K. F., a slender blond girl, aged 11, American born, was referred by Dr. Ticken to the care of Dr. Abt and admitted to the service of the latter at the Michael Reese Hospital, May 27, 1908. The parents were regarded as healthy; so were their direct and collateral antecedents, as far back as could be ascertained. The mother had experienced several miscarriages and a still-birth, these, however, occurring after the patient was born.

History.—The birth of the girl was spontaneous, at full term, and in all respects normal. Except for whooping cough, measles and varicella, her childhood was uneventful. At 8 she experienced three distinct attacks of appendicitis with general

peritonitis. During a free interval the appendix was successfully removed and she regained her health, remaining perfectly well for the next two years. About one year before examination, at the age of 10, she complained of disturbed vision and headaches that made it difficult for her to pursue her studies. The headaches were frontal, most often occasioned by mental strain during study hours, and in their earlier exhibition were, on the whole, quite irregular. Five weeks after their onset they became increasingly severe and diffuse, extending well back to the nape of the neck, and attended with a feeling of more acute pain back of the eyeballs and in the ears. At this time vomiting appeared, at first only occasionally at breakfast, but later with regularity after each meal. The vomiting, far from being projectile, was preceded by a feeling of nausea, affording the patient sufficient time conveniently to leave the room and use some receptacle. Five weeks prior to admission the right eye turned strongly inward and remained so. Periods of dizziness were occasional. Always a sound sleeper, the patient now rested well only in the fore part of the night, after that tossing about with headache. Nervous irritability was marked at times and induced by the slightest noises, such as the ordinary footfall or the low-pitched soft voice. The mentality, ac-

symptoms were absent. A positive Babinski was obtained on the right side. The skin and tendon reflexes were everywhere present and equally brisk. Ankle clonus was absent; likewise spasticity. The stereognostic sense was not tested. Hearing was normal; vision was equally defective in both eyes to the extent that the patient could not read type, but was able to discern objects and differentiate those persons having access to the sick-room.

Clinical Notes.—On day of admission an afternoon temperature of 99; thereafter a daily variability of from 97.3 to 99. Pulse rate, 80 to 104.

Laboratory Data.—A. Blood findings, May 27, 1908: Hemoglobin, 95 per cent.; white cells, 10,600; red cells, 5,372,000. May 30: Leucocyte count, 82,000.

B. May 31: Von Pirquet vaccination test on right arm (Dr. Davenport), negative.

C. May 31: Ocular tuberculin test, one minim of a 1 per cent. solution injected in the left eye, likewise negative.

D. May 31: Blood. Tuberculo-opsonic index taken and found to be 1.19.

E. Skiagraphs doubtful, it having been thought by several who saw them that the shadow cast was, if anything, in the

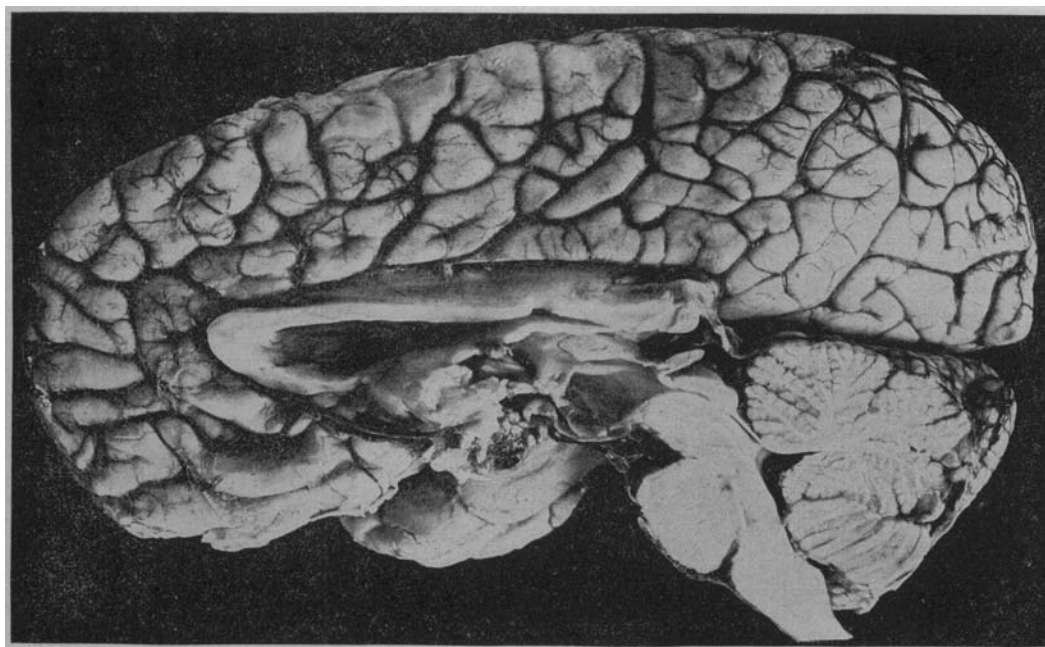


Fig. 1.—Median sagittal section of brain showing tumor of the hypophysis (Hecht and Herzog).

cording to reports, seemed in no wise impaired, nor had the child's disposition changed except for the late outbursts of irritability. Convulsive seizures had never occurred. Neither weakness of the extremities nor clumsiness in any of the voluntary movements had ever been noticed. There was marked constipation, but no difficulty with micturition. During the last five months of her illness there was an increasing aversion for food.

Examination.—The physical examination, made and noted under date of May 28, was as follows: The general nutrition was fair. The head seemed slightly retracted. Pupils were large, equal, regular, with normal response to light and accommodation. Photophobia was present, and in this connection it should be added that the eyes had received atropin for fundus examination. There was complete right external rectus paralysis. Dr. E. F. Saydacker reported bilateral choked discs, with two or three diopters of swelling in each eye. Ear examination made by Dr. Ira Frank proved negative. The teeth, somewhat irregular as to shape and arrangement, were otherwise normal. Some neck rigidity was present. There were no palpable glands. Heart, lungs and abdominal viscera were negative. Muscular strength seemed normal. The gait was not much disturbed, but on finer tests in the recumbent posture some loss of coordination in the legs was evident. Sensory

cerebellar area, thus prejudicing one in favor of a diagnosis of cerebellar tumor.

F. Daily urinalysis negative.

The patient was seen by Dr. A. Church, and later by Dr. L. L. McArthur, who performed the operation on June 8. The operative notes in very abbreviated form read as follows:

Operation.—June 8, 1908, by Dr. McArthur, Dr. Hoover assisting. Anesthetic, ether. Head prepared in the usual manner for brain operations for two days prior to operation. Fissures of Rolando mapped out on either side. Brain punctured near the left occipital and left posterior parietal regions. Punctures made with fine drill and aspirating needles. No fluid obtained in occipital puncture, but about 3 or 4 c.c. of a clear fluid containing three or four white, hard floccules was obtained by puncture in the posterior parietal region. Fluid saved for diagnosis. Semicircular incision, base downward, through skin and subcutaneous tissue to periosteum. Incision began a little above Reed's base line, about in a vertical line drawn through the left external auditory meatus, arching upward and backward, describing a semicircle, and ending about four inches posterior to its own origin. All bleeding vessels caught and ligated with fine gut ligatures. Periosteum incised in similar manner about 0.75 cm. inside scalp incision. Edges of periosteum raised with an elevator. Trephine hole.

About three-eighths of an inch in diameter, made in anterior lower angle of wound and the bone cut through from before backward with a rongeur forceps. Base not cut through. Upper edge of bone flap raised and steadily increasing pressure applied on elevators until bone fractured across the base. Bone and scalp flaps now laid back together. Dura found intact and apparently normal, but ballooning up strongly through skull opening, showing a greatly increased intracranial pressure. Aspirating needle again passed into posterior parietal region, needle passing inward, upward and slightly forward. Several cubic centimeters of fluid withdrawn. Dura carefully washed with warm normal saline; all rough edges of bone smoothed, and the bone flap replaced. Scalp incision closed with continuous waxed silk suture. Wound sealed with gauze and collodion, excepting about 1 cm. at posterior inferior angle. A large dry dressing applied. Stimulating enema given on table. Patient put to bed in poor condition. Foot of bed elevated.

Cerebral Fluid.—A smear of the cerebral fluid sent to the laboratory was reported on by Dr. Herzog as follows: A very few mononuclear cells seen in the sediment after centrifuging; some red blood corpuscles; no bacteria of any kind. Small solid particles and carbonate of lime, soluble in dilute hydrochloric, with giving off of carbon dioxide. No tubercle

tumor substance itself looks rather irregular, heterogeneous, and contains small calcareous particles. The cavities of the lateral and of the third ventricle, although markedly enlarged, may, nevertheless, be considered of moderate size. The aqueduct and the cavity of the fourth ventricle are of normal configuration. In removing pieces of the tumor for microscopic examination, portions of the floor of the third ventricle had to be taken along with the tumor substance.

"The tumor tissue is composed of a variety of cellular elements. It appears that the original tumor parenchyma has been formed by epithelial cells of the anterior portion of the pituitary body. The proliferating cells have formed quite irregular gland-like or alveoli-like spaces in a stroma, of very loose vascular embryonal connective tissue composed of stellate cells. Where the proliferated tumor cells have arranged themselves into more or less globular spaces we find these alveoli either completely filled with epithelial cells, or there is present only an outer shell of epithelial cells and an inner mass of hyaline material. The latter, however, is not perfectly homogeneous, like typical colloid, but rather scaly and shows clearly its derivation from degenerating cells which have been moulded together in the interior of the follicles, but have not become completely fused into a homogeneous mass. On the whole, these bodies in the interior of the follicular spaces look some-

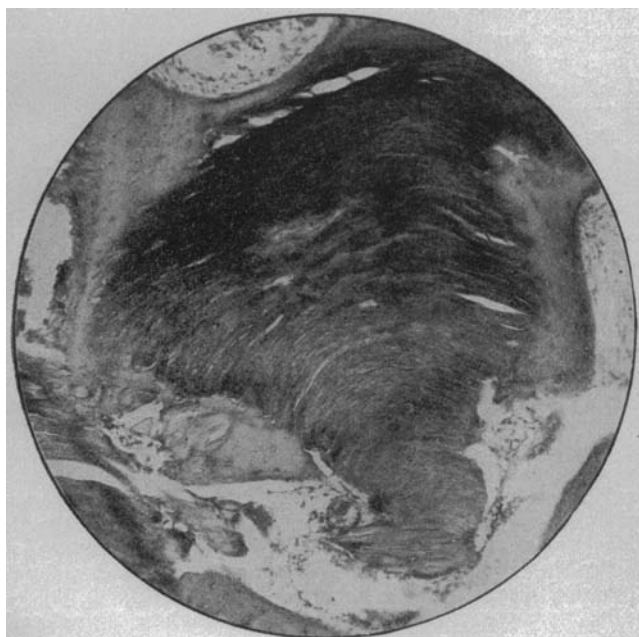


Fig. 2.—Section of decalcified osseous portions of tumor, showing strongly calcified bone fibrils. Magnified 100 diameters.



Fig. 3.—Same as Figure 2, showing marrow spaces and lamellated bone. Magnified 100 diameters.

bacilli. No evidence of cysticercus or echinococcus. Shortly before exitus, which followed operation in six hours, one-half ounce of fluid was aspirated through the wound by Dr. McArthur, examination of which was negative.

The autopsy was performed within six hours after death.

DESCRIPTION OF TUMOR

The following description of the tumor and histopathologic comment by Dr. Herzog is of interest:

"When the tumor was removed with the brain, it was found that it had markedly corroded, thinned out and excavated the sella turcica, on which it rested. The neoplasm (Fig. 1) is more or less globular in outline and has a diameter of about $\frac{3}{4}$ inch from above downward, and about one inch from before backward. Its longest axis is not absolutely horizontal, but is oblique, so that the anterior attached pole of the tumor is on a higher level than the posterior free end. At the anterior pole the tumor is attached in such a manner that it has become fused with and presses on the optic commissure. It is also fused to the corpora mamillaria and to the floor of the third ventricle. The pedicle of the hypophysis has disappeared. The neoplasm is apparently everywhere surrounded by a capsule, except where it is fused to tissue of the cerebrum proper. The

what like the epithelial pearls of cornifying carcinomata, although the material does not show any true cornification. It stains with Van Gieson from an almost pure yellow to deep yellow with some red, and even to a deep reddish orange. The epithelial cells forming the follicular spaces are cuboidal or short columnar. The latter shape occurs in situations free from pressure. Here the basal vesicular nuclei are oval, while the shorter cubical cells have spherical nuclei. The latter possess a rather finely granular chromatin, while here and there one or two nucleoli are visible. The protoplasm of these cells is very finely granular and takes but a very faint stain. These cells have not only formed the follicular or alveolar spaces, but have also proliferated in a very irregular manner, and this has led to the formation of irregular masses and tracts of cells. In some places giant cells with numerous centrally located nuclei are seen. The origin or derivation of these cells is not clear.

"It is found on microscopic examination that the hard portions of the tumor which were noticed when it was cut consist of osteoid tissue. Part of the latter is composed of very coarse primitive fibrils and fibril bundles which are variously infiltrated with lime salts, some very little, others abundantly. Aside from the fibrillar structure, the bone substance here

shows no other differentiation. Again, other portions of the bone show all of the osseous elements of bone—corpuscles, Haversian canals, concentric lamellæ and cellular marrow spaces.

"Where the tumor has become fused with the floor of the third ventricle, we find a loose edematous connective tissue, with numerous coarse and delicate wavy fibers, forming a wide-meshed reticulum. To the outside of it is seen a portion of the chorioid plexus; its ependymal cells have proliferated and formed branching villous excrescences. No cartilage was found in the tumor, nor any glia cells or fibers.

"This tumor, then, of a mixed type, shows epithelial elements derived from the anterior portion of the pituitary body, and osteoid tissue, very probably derived from any early embryonal inclusion."

DEVELOPMENT AND NORMAL STRUCTURE

Essential to any epicritic consideration of the pathologic features in the case at hand is a thorough understanding of the development and normal architecture of the hypophysis.

This structure, for so long called the glandula pituitaria, is a somewhat flattened oval body, slightly broader than long, of grayish-red color, with an average weight of 0.69 gm. (Boyce and Beadles), resting in the sella turcica of the sphenoid bone. Bilobate gland that it is, it consists of an anterior and posterior portion, united and enveloped in a fibrous capsule, which is a special prolongation of the dura. These portions are histologically and histogenetically dissimilar. The anterior lobe, the larger and darker of the two, is bean-like in shape and concave behind, where it embraces the smaller posterior lobe. It is glandular in structure, and, being developed embryonically from a hollow protrusion, derived from the primary oral ectoderm, is sometimes referred to as the oro-hypophysis. The distal end of this protrusion (Böhm and Davidoff) or pouch comes in contact with the anterior surface of the lower portion of the infundibulum and becomes loosely attached to it. As the bones at the base of the skull develop, the attenuated oval end of this pouch atrophies, the distal end becoming finally completely severed from the buccal cavity. When this has occurred, the anterior portion of the gland is situated in cartilages, which later on become parts of the sphenoid bone, and, as Dr. Herzog suggests, it is easy to see how some of these sphenoidal cartilages might become included in the anterior portion of the hypophysis and thereby become the matrix of a tumor containing bone. It is fair to assume that this is what actually occurred in this case.

Several writers have ventured the opinion that any variations noted in the size of the gland as a whole are perhaps due to the variable dimensions of this glandular portion.

Its close resemblance to the thyroid has been a matter of repeated comment.

The vascular supply to the anterior lobe comes from the internal carotid by five branches coming from the trunk within the cavernous sinus. The posterior lobe is supplied by arteries that pass down with the pia mater of the infundibulum.

The posterior lobe, connected by a solid stalk with the infundibulum and regarded as a continuation of it, is developed from that part of the embryonic brain which later goes to form the third ventricle. In marked contrast to the anterior lobe, it is in its nature a cerebral structure, and for that reason by some called the neurohypophysis.

103 State Street.

ABSTRACT OF DISCUSSION

DR. HARVEY CUSHING, Baltimore: I think it important in relation to tumors of the hypophysis to distinguish between tumors arising from the hypophysis itself and tumors merely in the infundibular region. Tumors in the interpeduncular space may exist with or without disturbance of the hypophyseal function. That is what we are especially interested in. Tumors which disturb the hypophyseal function may be associated with over-activity or under-activity of the gland. Those are things which, as physicians and neurologists, it is incumbent on us to distinguish. The case that has been reported by Dr. Hecht is very similar to a case that was in my care a few years ago (also a teratoma), in which there were glandular elements, and I doubt not that there were active glandular elements in this case of Dr. Hecht's sufficient to enable this child to continue to live, for I emphatically believe that the hypophysis or a portion of it is necessary to maintain physiologic equilibrium.

It will be necessary, I think, in every case before one can say that this is a tumor of hypophysis or a tumor in its neighborhood, that serial sections be taken, and it is important in this case that a careful search be made for remnants of the flattened, possibly distorted pituitary gland. These elements which have been demonstrated are suggestive of the fact that the tumor actually may have been of hypophyseal origin; but we should bear in mind the developmental character of structures in this neighborhood, the favorite site for teratomata. The important thing to determine, of course, is what the growth in the neighborhood has done to the gland.

Dr. Hecht has devoted some of his investigations to considering the effect of the growth on neighboring structures. Of course, disturbance of the optic nerves and other structures in the neighborhood, such as pressure on some of the oculomotor nerves, often occur whether the hypophysis has been affected or not; but I think that primary optic atrophy is the usual early symptom of pressure here. That is the striking thing—a primary optic atrophy without an associated choked disc. One can have a choked disc, or optic neuritis if you chose to call it that, superimposed on primary optic atrophy. But I think you will always find in these cases, and I think it will prove to have been present in Dr. Hecht's case, that there was an internal hydrocephalus present when the child died, if it had choked disc of three or four diopters. The pressure of the nerves themselves, without the associated condition of hydrocephalus will induce a primary optic atrophy, and it is only when the growth in this neighborhood reaches such size that it interferes with the outflow of fluid through the foramina of Monro that it causes dilatation of the optic sheaths and leads to choked disc.

DR. MAXIMILIAN HERZOG, Chicago: Dr. Cushing has referred to the embryology, which has also been discussed in the paper; but in order that you may fully understand the histogenesis of the tumor, it is perhaps desirable that I should refer briefly to the development of the hypophysis. The latter takes its origin from a double source, one part develops from that portion of the brain which later becomes the floor of the third ventricle, it is called the infundibulum, while the posterior or lower portion is developed from an offshoot of the primitive oral cavity. So that, from an embryologic standpoint, the hypophysis is quite complicated.

I have not made a complete serial section examination of the tumor in question because that would have necessitated a destruction of the specimen, which was not desirable. The tumor shows epithelial portions which arise from the posterior portion of the hypophysis, that portion which develops from the early oral epithelium. Evidently those proliferating epithelial cells have retained their physiologic function; they have formed a material somewhat colloid in character; and as I understand the clinical history of the case, there was no disturbance of nutrition at all in the child, which would indicate that the hypophyseal physiologic function was not entirely missing nor greatly disturbed. The child did not die from the tumor, but the operation led to a fatal issue.

There are three types of mixed tumors or teratomata, one type which imitates a certain organ of the body, for instance, an ordinary dermoid of the skin; the second type, which imi-

tates an entire embryonic region, the best type of which are the embryonal adenosarcomata of the kidney; and then, thirdly, tumors which may contain all the tissues of the body, and these are the most complicated mixed tumors, arising from the germ cells of the ovary or testis. This tumor belongs to the second type. It shows epithelial structures derived evidently from the early oral epithelium, and shows bone which is probably derived from the early cartilages which later form portions of the sphenoid bone.

PROF. MAX NONNE, Hamburg, Germany: I wish to speak of a case of a woman of 27 who has suffered for two or three years with a hypophyseal tumor which has caused acromegaly. Her hands increased gradually in size. At the time of her marriage her wedding ring was No. 8, whereas she now wears a No. 13. The size of her shoes has been changed from 5½ to 8; her frontal bones are very prominent; her nose has changed; the rows of front teeth do not meet, on account of the changes in the size of the jaws. She has complained of slight headache; there have been no eye symptoms; but she suffers from rheumatic and neuralgic pains all over her body. A radiogram shows excavation of the bone which makes the diagnosis of hypophyseal tumor certain. The patient has not consented to an operation as yet.

DR. WILLIAM G. SPILLER, Philadelphia: After a number of years the bitemporal hemianopsia from tumor of the pituitary body may diminish, as in a case reported by F. A. Packard about 1890 in the *American Journal of the Medical Sciences*. Some years later I obtained the specimen through Dr. Cattell, and found a large tumor filling the third ventricle. It had greatly enlarged the sella turcica, and the relief of pressure on the chiasm afforded in this way had lessened the hemianopsia. Recently, in consultation with Dr. Zentmayer, I examined a similar case in which the bitemporal hemianopsia diminished as other symptoms increased. Tumors in this region are frequently of slow growth. In the last case referred to the symptoms began many years before death. The patient was a woman over 40, and one of the earliest symptoms was cessation of menstruation occurring about the age of 20; other signs, such as bitemporal hemianopsia, have since developed. The early cessation of menstruation in this case indicates that the tumor probably has been growing more than twenty years.

SIR JAMES GRANT, Ottawa: I recall a case sent to Sir Victor Horsley by Sir Richard Gower, diagnosed as tumor in connection with the spinal cord. Horsley diagnosed it differently, cut down on the tumor, took out a large amount of material between the theca and spinal cord, scraped it out, injected it with bichlorid of mercury, and the individual shortly recovered and went back to his business, entirely restored as regards function of his extremities, and to-day enjoys perfect health. That shows the advances that surgery has made in the treatment of diseases of the spinal cord as well as of the brain.

DR. HUGH T. PATRICK, Chicago: That a central scotoma with this optic atrophy is relatively frequent I did not know. Within a week I have seen a case which bothered me exceedingly, and except for the fact that the patient had a large central scotoma on one side and a small one on the other, I should at once have made a diagnosis of hypophyseal growth; but not knowing that that was a symptom of hypophyseal pressure I was not willing to come to that conclusion, but now I feel certain. I might add that in this case menstruation ceased at 20. I have in mind also another case in which menstruation also ceased at 20, in which there was unilateral optic atrophy. I think we are apt to demand schematic cases when we have classical bitemporal hemianopsia and we are loath to recognize cases of unilateral optic atrophy with irregular fields as mentioned by Dr. Hecht and Dr. Cushing. I think if we keep this in mind we will more frequently make the diagnosis of tumor of the hypophysis and less frequently that of tabes with optic atrophy as the first and as yet only symptom.

DR. JULIUS GRINKER, Chicago: I recall a case in which optic atrophy was almost complete on one side, while there was temporal hemianopsia on the other. From the history I learned that it began as a bitemporal hemianopsia. The noteworthy feature in this case was the almost total absence of the knee and Achilles jerks. The diagnosis rested between

tabes with beginning optic atrophy and tumor of the hypophysis. I decided in favor of tumor, but had no opportunity to verify the diagnosis. Recently I observed another case of tumor of the hypophysis in which bitemporal hemianopsia was pronounced. In addition there were intermittent dull headaches, which had lasted for several months. The temporal halves had been blind for six months. Acromegalic enlargement is only slightly indicated in the face, but on comparing the patient's photograph with one taken several years ago, the difference is not apparent. A radiogram shows distinct enlargement of the sella turcica. In marked contrast with my first case, this patient has normal reflexes.

DR. D'ORSAY HECHT, Chicago: Dr. Cushing's point in reference to the differentiation between tumors of the hypophyseal region and tumors of the gland proper is very well taken. I find in the literature that most writers are prone to refer rather loosely to tumors in the hypophyseal region, without due regard to the site of origin in the gland itself or its neighborhood. Dr. Cushing's remarks relative to optic atrophy are well borne out by Bartels' statistics, which tend to show that 50 per cent. of the cases are primarily optic atrophies. What Dr. Spiller has said with reference to the variation in the visual fields is most pertinent, but I may add that, particularly in the ophthalmologic literature, these variations in the visual fields and the extent of hemianopsia have been noted. In one instance, reported by Bartels, and observed by Erdheim, I think, the fluctuations were explained on the ground of cyst evacuation, which explanation was subsequently confirmed on postmortem. This variability, therefore, should be borne in mind. Dr. Patrick's point with reference to the type of tabes that presents early optic atrophy is well taken, and he is right in saying that in those cases, when other symptoms are conspicuous by their absence, we should be on the lookout for hypophyseal growth. Professor Nonne's citation of a case in point is most interesting and instructive.

THE CLINICAL VALUE OF RADIOGRAPHY OF THE MASTOID REGION *

SAMUEL IGLAUER, B.S., M.D.
CINCINNATI

The difficulties encountered in radiographing the temporal bone are due to its position at the base of the skull, to the thickness of the parts that the Roentgen rays must penetrate, and to the liability of superimposing the shadows of other portions of the skull on the skiagram of the temporal bone. By directing the rays in the anteroposterior (posteroanterior) axis of the skull Kuhne and Plagemann^{1,2} have taken radiograms of the projecting portions of both mastoid processes, and have drawn clinical deductions therefrom. Voss³ and Winckler⁴ have obtained more detailed Roentgen pictures of the temporal bone by directing the rays in the transverse diameter of the skull.

During the past year Dr. S. Lange, radiologist to the Cincinnati Hospital, to whom I am greatly indebted, has been kind enough to undertake the radiography of the mastoid region for me. After some experimentation, at my suggestion, the radiograms were taken in an oblique profile; i. e., the rays coming from the target were made to center just below the parietal eminence on one side of the skull and were directed through the cranium in the direction of the temporal

* Read in the Section on Laryngology and Otology of the American Medical Association, at the Sixtieth Annual Session, held at Atlantic City, June, 1909.

1. Kuhne and Plagemann: Fortschr. a. d. Geb. d. Roentgenstr., Sept. 1, 1908, xii, No. 1.

2. Plagemann: Verhandl. d. Deutsch. Roentgen-Gesellsch., Sept., 1908, iv.

3. Voss, O.: Verhandl. d. Deutsch. Otol. Gesellsch., Mar., 1907, reprint pub. by Gustav Fischer in Jena; also abstr. in Ztschr. f. Ohrenh., July, 1907, liv, 208.

4. Winckler: Abstr. Ztsch. f. Ohrenh., July, 1907, liv, 209.