INTERNAL SECRETIONS OF THE OVARIES

Dr. Edgar Allen

The functions of the ovary have been determined by the so-called replacement methods; removal of the organ and the subsequent administration of one or more of the chemical fractions of ovarian tissues. Such procedures have made it evident that there are several specific hormones which govern the various functions. Of these the follicular element, called theelin, folliculin, etc., is perhaps the most important. Many experimental studies have shown this element to be responsible for the growth and development of the genital tract, for the mating instinct, for the spontaneous activity of the reproductive organs, and for the cyclic growth of the mammary glands.

After ovulation begins two other hormones become active. Both require the follicular hormone and are derived from the corpus luteum. One, progestin, is responsible for the transformation of the premenstrual endometrium, thus preparing the uterus for implantation of the fertilized ovum, and governs the development of the mammary glands. The other, known as relaxin, is probably responsible for the enlargement of the birth canal. It is possible that there are changes in the pelvic girdle, with actual dissolution of the symphysis pubis, in certain animals.

During pregnancy the action of the hormones is somewhat altered, as indicated above. That theelin accumulates in the blood and is excreted in the urine during pregnancy is well known. This accumulation of theelin in the mother’s blood may explain the increased size of the uterus, the secretion of “witches’ milk”, and the occasional menstruation of the new-born. The primary rôle of the ovary in the regulation of tides of growth and its possible connection with the abnormal, malignant growths of the female reproductive tract were emphasized.

RAT-BITE FEVER

Dr. Stanhope Bayne-Jones

The organism which is responsible for the disease of rat-bite fever, or sodoku, has been the subject of much controversy because of the uncertainty of its morphology and the difficulties attending its observation. Apparently the organism is a spirochete and it is doubtful if anyone has ever been able to cultivate it artificially. The organism responsible for the disease has been found in rats in New Haven, and more careful observation will undoubtedly discover cases of the disease among the poorer classes.
The use of rat-bite fever instead of malaria in the treatment of paresis was discussed. It is a disease so completely controlled by the arsenicals that its use is practicable in any condition in which such a type of therapy is indicated.

The nature of the disease in the guinea pig, the mouse, and the rat makes rat-bite fever one of the few conditions in which it is possible to analyze the problem of natural susceptibility. It also lends itself readily to experimentation in the field of chemotherapy. The disease has many points of resemblance to syphilis, aside from its etiology. For these reasons further studies of the disease may be profitable to the worker willing to experiment with an organism which has long puzzled the bacteriologist.

L. B.

YALE MEDICAL SOCIETY

October 25

PERIPHERAL PARALYSIS OF THE VASOMOTOR SYSTEM INDUCED BY BENZOL

Dr. Lucien Dautrebande

(Published in full in this number.)

HARRY BURR FERRIS LECTURE IN ANATOMY

October 27

THE FIRST HEART BEAT AND THE BEGINNING OF CIRCULATION OF THE BLOOD OF THE EMBRYO

Dr. Bradley M. Patten

Associate Professor of Histology and Embryology, Western Reserve University

In a 28- to 29-hour chick the first signs of restlessness occur before the original paired primordia which are to form the heart have completely fused. This restlessness which begins in the convex (right) side of the fusing organ spreads to the left side. At first the beat is very irregular and originates in the posterior atrial region, that which may be considered the atrial beat being three times as fast as that of the ventricle. Eventually strong, regular pulsations become established. At first the heart is filled with fluid and beats without purpose or result, but after about 10 hours the blood flows into the heart from the blood islands and the circulatory system is opened.

In the developing wren the muscle fibers of the amnion are seen to cause the whole amnion to beat and rock the embryo as if it were in a cradle. This is believed to be valuable in preventing adhesions of the growing parts.

M. H.
I. Early Experiments and Fundamental Concepts of Experimental Embryology

The unravelling of the skein of embryonic development is extraordinarily difficult. Direct observation has given a wealth of descriptive fact, the meaning of which is obscure. With the introduction of the experimental method and its interference with the normal course of development, new and illuminating data have been collected. Out of the early isolation experiments of Roux, Pflüger, Driesch and Weismann, grew a number of theories of development. The killing of one blastomere with a hot needle by Roux, led to the concept of "postgeneration", since as a result of the injury an imperfect embryo developed. Weismann, as a result of the isolation of individual blastomeres, introduced a "mosaic theory". Driesch also, as a result of a wide acquaintance with the results of experimental interference with the early growth of embryos, was led to postulate the presence of a guiding principle to which he gave the name "entelechy". While all of the above theories have been discarded or greatly modified, Driesch made one important contribution. He demonstrated that the fate of any growing cells in any system was a function of its position in the whole embryo.

Although isolation experiments have yielded valuable results, even more important have been the findings of experimental embryologists who have used the technic of embryonic transplantation. Many new and interesting analyses of the relations of the component parts of an embryo to each other and to the whole system have been made. All the available data seem to indicate that the growing embryo is an extraordinarily harmonious system. In this system the fate of any part is dependent upon three things. The first of these is the genetic constitution of the nuclei, as has been demonstrated by Hertwig, Morgan and many others. The second is the position of the component in the whole biological system, as demonstrated by Driesch. The third is the interrelationship and interdependence of the component parts, as demonstrated by the experimental embryologists.
II. FACTORS INVOLVED IN THE DEVELOPMENT OF A COMPOUND ORGAN
(THE VERTEBRATE EYE)

Experimental studies of the developing eye of the amphibia indicate that
the components have a considerable capacity for self-differentiation. This
capacity, however, is not complete, since there is a mutual dependence of the
comprising units.

It has been shown experimentally that the cells from which the optic cup
is derived lie in a portion of the presumptive medullary plate. Moreover, as
will be shown later, the medullary plate in turn is dependent upon influences
derived from the underlying mesoderm. The lens, on the other hand,
develops from cells lying outside of the medullary plate in the adjacent ecto-
derm. These two rudiments possess an early relationship which is more than
a mere topographic one. In some anurans, the lens-forming ectoderm is
determined at an early period, since extirpation of the rudiment of the optic
cup does not prevent the formation of a lens. In other forms, removal of
the optic cup is followed by an absence of the lens. In still other instances,
the absence of an optic cup is associated with a rudimentary thickening of the
epithelium in the lens region. These experiments indicate clearly the impor-
tance of a time factor in the relationship between optic cup and lens. More-
over, it seems evident that the lens rudiment lies in that part of the ectoderm
which is normally in contact with the rudiment of the optic cup.

Further experiments show that indifferent body ectoderm, transplanted
over the optic cup, is capable of forming a lens. Likewise, transplanting the
optic cup under the ectoderm in remote regions of the head and body results
in the induction of a lens from the indifferent ectoderm. Corroboration of
the above findings is to be seen in the fact that a small optic rudiment induces
a small lens. Reciprocally, a large cup induces a large lens. The reverse is
also true, inasmuch as a small lens retards the development of an optic cup
and a large lens accelerates it. Finally, extirpation of an early lens also
retards the optic development. The above experiments indicate a close and
important relationship between components of the optic system.

III. EMBRYONIC DEVELOPMENT AND INDUCTION

Discussing the development of the amphibian egg, its patterns and
potencies up to the earlier gastrula stage, Dr. Spemann further elaborated
the relationships between the lens and the optic cup. This relationship con-
sists of an action system in the developing eye and a reaction system in the
ectoderm. Together, these form an induction system since the eye can be
said to induce the lens. This induction is effective only on ectodermal struc-
tures, since an interposed layer of mesoderm prevents the appearance of a
lens, the mesoderm being unaffected by the process. Moreover, if the lens
is extirpated at an early stage, a new lens will regenerate from the dorsal
pupillary margin. The dorsal position of the regenerate becomes fixed during the development of the eye, since the very early optic cup possesses a totipotent pupillary margin so far as lens formation is concerned. Later the point of regeneration becomes fixed.

This same fixation of potency occurs in the ectoderm, for in the early stages of development nearly all parts of the ectoderm will develop a lens when transplanted over the eye cup. At about the tail-bud stage, this potency becomes restricted and only certain regions definitely related to the medullary plate are lens potent.

The nature of the inducing agent is unknown. While it may be blocked by the mesoderm it, nevertheless, acts at a distance. It has been suggested that it is either a chemical or a dynamic agent. It is apparently not mechanical. It does not lie in the reacting system but in the action system. However, heteroplastic lens transplantations show that the action system in the optic cup releases potencies inherent in the ectoderm. Hence there is present what Braus called a "double assurance", due to the interaction of the two systems. This is particularly illustrated by the perforation of the frog operculum by the anterior limb. The aperture of exit is present though small, even in the absence of the limb rudiment.

Finally, a brief review was given of the movements of the parts of the egg in gastrulation. It is clear that this process exhibits a unity or dynamic wholeness, which is striking. Nevertheless, the individual components of the process may occur independently of one another. This unity, however, is not mechanical but dependent upon formative influences resulting in a mosaic of tendencies, regulation of which is a function of the unitary character of the whole.

IV. EXPERIMENTAL INDUCTION OF A SECONDARY EMBRYO AND THE RÔLE OF INDUCTION IN NORMAL DEVELOPMENT

In gastrulation, each component process is capable of independent realization of its eventual fate, even when isolated. Presumptive ectoderm develops into epidermis and medullary plate; mesoderm becomes notochord and somites; entoderm develops the digestive system. These potencies persist even when the presumptive tissue is isolated or transplanted. However, the presumption is not rigidly fixed, for separation of the gastrula into right and left halves results in twins which are somewhat defective on the opposing aspects. This suggests that within definite limits the presumptive fate of the material is labile. Dorsiventral separation of the gastrula results in development of only the dorsal half. With the technic of hair loop and pipette, homoplastic and heteroplastic transplantations show that the presumption of any given material is, within certain limits, a function of the position of the transplant in the host. Implantation of presumptive medullary plate into the region of presumptive epidermis results in the tissue losing its medullary plate potency
and becoming epidermis. Heteroplastic transplantation indicates, however, that the histological character of the cells is that of the donor. Transplantation at a sufficiently early period indicates that mesoderm and endoderm as well, may be induced to alter their presumptive fate.

The determination of the fate of the tissue transplanted is a function of the distance of the transplant from the dorsal lip of the blastopore. In its immediate vicinity is a dominant area in the embryonic field which imposes an irrevocable fate upon the tissue therein contained. Transplants from points distant from the dorsal lip possess a potency which is more labile. The extent to which it can be modified is directly proportional to the distance. The dorsal lip of the blastopore is the dominant area of a center of a gradient of determination. Explants from this region retain their presumptive potency. Moreover, such transplants are capable of inducing a new or secondary embryo. This was demonstrated by H. Mangold, who transplanted the dorsal lip of cristatus to the gastrula of taeniatus. A secondary embryo was induced in the latter, of which the notochord, the major portion of the somites, and of the floor of the neural tube were histologically donor tissue, while the major portion of the neural tube, a part of the somites, and the adjacent epidermis, were of host material. The transplanted presumptive mesoderm was regulated toward the formation of the whole unit, the notochord and somites, even though it occupied a strange position in a strange host. It is important to know at what time in the developmental history this induction occurs. Is it before or after gastrulation? Furthermore, it is necessary to know the importance of orientation and of regional determination in the induction system.

V. **Time Correlation in the Induction System; Regional Determination; the Embryonic Field**

It is clear from the preceding lectures that as a result of transplantation the host provides some of the material and an organizing factor in the process of inducing a secondary embryo. Analysis of this organizing factor or organizer, reveals a number of interesting facts. When the dorsal lip of the blastopore is transplanted on to an early gastrula, the secondary embryo which results, lies parallel to the axis of the host with the same orientation. When the axis of the transplant is turned, little effect is noted upon this orientation except when the transplant is rotated 180°. Following this there is a high mortality and the medullary plate is usually wide. Factors inherent in the transplant seem to be opposed to influences resident in the host.

This tendency to normal orientation can be blocked if the transplant is introduced beneath the blastopore lip. Following this the orientation of the transplant remains fixed and uninfluenced by the longitudinal axis of the host.

The specificity inherent in the material of an induction system is evidenced by the following experiment. If the left half of a taeniatus gastrula
is fused with the right half of a hybrid gastrula, a free swimming larva develops which is half taeniatus and half hybrid. Moreover, if two right halves are fused or two lefts so that the dorsal lip of one blastopore is opposite the ventral lip of the other, then invagination goes forward in both blastopore lips and two medullary plates are formed with opposite orientation. Rotation of the dorsal half of the gastrula through 90° results in normal gastrulation.

Not only can medullary plate be induced by transplanting the dorsal lip of the blastopore, but it also follows the introduction of presumptive mesoderm into the blastocoele. Moreover, Bautzman has shown that ectoderm which invaginates into mesodermal surroundings, is capable of inducing a medullary plate when introduced into the blastocoele. Holfretter has shown that the fate of the medullary plate is not irrevocably determined, since in the absence of mesoderm, as in exogastrulation, the medullary plate does not develop.

Regional determination of the tissue occupying the dorsal lip of the blastopore has been studied by Lehman. His experiments show that the first tissue invaginates forms the mesoderm of the head and trunk; the last tissue to be invaginated forms the mesoderm of the tail. Moreover, he was able to show that the 180° rotation of a piece of tissue containing one-half presumptive medullary plate and one-half presumptive epidermis, resulted in a retarded development of the medullary plate on one side. As a result of these and other experiments, Lehman concluded that the medullary plate was not irrevocably determined, but was "prepared" for induction. Vogt applied the word "Bahnung" to this, intimating that it was a preparation for induction, a smoothing of the way, so that induction might proceed easily and successfully.

VI. **The Means of Induction; Its Character as a Stimulating Factor; the Tendency of the Organizer to Form a Whole**

The induction of a medullary plate by mesoderm introduced into the blastocoele presents a number of problems for further analysis. First, it is necessary to know whether the factor of induction lies in the action system or in the reaction system. In order to determine this, four series of experiments were performed. When a head organizer is introduced into the presumptive head region of the gastrula, a secondary embryo is formed which is nearly normal. This is an example of almost perfect induction. In a similar manner, trunk organizer into trunk region produces a fairly normal secondary embryo which, however, lacks perfect development of the cranial region. This indicates that the medullary plate is not an harmonious equipotential system. Furthermore, if the head organizer be introduced into the trunk region, a secondary embryo is developed within an imperfectly developed cranial region. Auditory vesicles are present but the eyes are fused in the mid-line. This indicates that capacity to induce a brain lies in the presump-
tive head mesoderm. Finally, the transplantation of the trunk organizer into the head region results in a secondary embryo with cranial development fused to the brain of the host. It is clear from this that a part, at least, of the capacity of induction of the brain lies in the head region of the host. In the head region the host is dominant while in the trunk region the donor is dominant. Induction is, therefore, a factor of the relationship between the action system and the reaction system.

A second factor in induction is demonstrated by homeogenetic induction. An example of the latter is the union of the mesoderm of the host and the donor to form a regulated mesodermal system. It has also been demonstrated that the introduction of the right anterior quadrant of the medullary plate into the blastocoele of a young gastrula results in the homeogenetic induction of a new medullary plate from which evidently develops a complete cranial mechanism. On the other hand, introduction of the caudal region of the medullary plate into the blastocoele induces a complete tail without a cranial mechanism. Moreover, pieces of functional brain tissue from a free-swimming larva, when introduced into the blastocoele, will induce a secondary embryo. However, it has been demonstrated that there must be contact between mesoderm and presumptive medullary plate before the latter is capable of induction.

One contrast is to be seen between these later experiments and those earlier reported. Fragments of the medullary plate are unable to regulate so as to induce perfect wholes. On the other hand, small pieces of presumptive mesoderm possess this capacity.

The implantation of young presumptive ectoderm into old gastrulae results in a regulation which evidently becomes complete. It is, however, somewhat retarded. The lens induced by the younger action system of the host shows a retarded development.

The general conclusion which can be drawn from the above is that the function of this induction system is a general releasing of underlying potencies. Moreover, it suggests that the induction system is a part of an embryonic field which controls and regulates development.

VII. The Application of the Facts Presented; Experiments on Other Forms; Conceptions and Theories

It may be concluded from the early studies of the induction system that a very large factor in induction is its position in the whole embryo. Attention was called to this by Driesch many years ago. To this influence of the whole upon the activity of a part, Spemann gave, in 1921, the name “embryonic field”. The validity of this conception is strengthened by the fact that a normal inducing agent is capable of forming a nearly typical embryo. The induction of an harmonious embryo is not possible when the organizer is older than the host. On the other hand, Holfretter has shown
that mesoderm from an embryo is still capable of inducing a medullary plate. These factors suggest that in spite of differentiation the power of induction remains latent. Even the relatively well-developed mesoderm in exogastrulae is capable of inducing medullary plate material from young ectoderm. It is to be noted, however, that in all instances of such and similar induction, the region induced is greater than that from which the inducing agent was taken. There is, in other words, an overlapping of the regional forces of the embryonic field.

Not only does the whole embryo have a field but organs have their own fields. In the optic cup is a field, a product of whose activity is the induction of a lens. An analysis of the process in this organ was made in order to determine whether the forces inherent in the system were chemical or dynamic. If, for example, the dorsal pupillary rim, which is capable of regenerating a lens, is transplanted into the posterior chamber of the optic cup in the presence of the normal lens, a new lens fails to form. In the absence of the original lens, however, this tissue regenerates a new lens. This suggests that the presence of a normal lens is a source of some chemical agent which inhibits regeneration.

Analysis of the chemical aspect of the embryonic field has been made by killing organizers with heat or cold, by drying, by extraction in acetone, alcohol and acetic acid. Presumptive mesoderm when heated, frozen or dried will induce a medullary plate in a young gastrula. Moreover, an organizer which has been so treated, will bring about organization when it is placed between two slips of ectoderm. In like manner, a piece of presumptive medullary plate when placed on a strip of killed organizer, results in a primitive differentiation. Bautzmann, however, has shown that living presumptive ectoderm, normally incapable of induction, acquires that power when it is killed. The chemists have shown that in all probability glycogen is associated with the induction process and it has been experimentally demonstrated that bits of agar, charged with glycogen, are capable of induction. On the other hand, purified glycogen fails to bring about induction. The independent work of Woerdeman, Childs and Needham has indicated that glycogen furnishes the energy required by the process of gastrulation. If this be true, then it is possible that the killing of cells by heat, cold or extraction, destroys an inhibiting agent in the living cell and releases a latent inducing agent. The further attempt to determine whether the inducing agent lies in the action system or in the reaction system, has led to the following result.

If epidermis from the flank of a young tadpole is transplanted into the mouth region of a newt, there eventually develops a mouth apparatus, morphologically that of the donor. It consists of the horny jaw of the tadpole and the accompanying suckers. Indifferent ectoderm, when occupying a specific region of the embryonic field is induced to form the structures normally to be found in that region. But the histological character of the tissue, as well as the intercellular relations, are determined by the genetic
constitution of the donor, and the result is the mouth parts of a frog on a newt. Dr. Spemann likened this process to the conditions which might occur if an American soldier entered the German Army. When called upon to salute, under the new conditions, he would salute in the American fashion to the command of the German officer.

In a few concluding words, Dr. Spemann called attention to his use of psychological terms in describing the induction process. Such terminology vivified the exposition and also suggested many and valuable problems.

H. S. B., L. S. S., J. B. H., A. A. L., and T. W.

LECTURES OF THE TUMOR CLINIC OF THE NEW HAVEN HOSPITAL

October 17

DOSAGE FACTORS IN THE APPLICATION OF RADIUM AND X-RAY

Dr. George T. Pack

Radium and X-ray dosage are dependent upon four factors, the size of the tumor being treated, the distance of the tumor from the source of radiation, the filtration of the rays, and, in cases of prolonged application, the disintegration of the radium itself. In general only the gamma rays, about 6.5 per cent of the total emanation of rays from a source of radium, are used, since they have the greatest power of penetration. The destructive alpha and beta rays may be removed by various filters, the alpha rays by as ordinary a means as a sheet of paper, the beta rays by 0.5 mm. of platinum. The dosage is calculated in milligram-hours, that is, the amount of radium multiplied by the time of application. A larger amount of radium, however, will be required to get the same dosage if the distance of the source of radiation from a tumor is increased. This last factor is especially important in treating tumors beneath the skin.

M. H.

October 24

PHYSICS IN ROENTGEN THERAPY

Dr. G. Failla

The basis of all the properties of X-rays is ionization, and the biological effects of X-rays are chiefly the result of ionization changes in the cell, leading ultimately to the death of the cell. The treatment of tumors by X-ray depends upon the absorbability of the tissue, the penetration of the rays, and the sensitivity of the tumor, as well as time and distance factors which vary for the individual tumors.

In order to have X-ray emanations, a source of high-speed electrons, such as those given off from a hot tungsten filament, is necessary. These, while
travelling at high velocity in as complete a vacuum as it is possible to obtain, must be stopped suddenly by a target, usually of some metal of high atomic weight which will withstand great temperatures. In the process of being stopped suddenly heat rays and the valuable X-rays are given off from the electrons as they hit the target.

November 7

RECENT DEVELOPMENTS IN ROENTGENOLOGY OF THE GASTRO-INTESTINAL TRACT

Dr. Richard Schatzki

Within the past 10 years a means of studying the gastro-intestinal tract by the so-called "relief method" has been developed. Since carcinoma of the gastro-intestinal tract usually begins in the mucosa, that method which shows the mucosa best is the most adequate. The object of the relief method is to cover the inner surface of the gastro-intestinal tract by only a very thin layer of barium. Since the appearance of the normal esophageal, gastric, and intestinal rugae is very characteristic it is often possible by the study of "relief" X-ray plates to detect very small changes. The advantages of the "relief method" are therefore the possibility of early diagnosis of carcinoma, polyp and varices, as well as the ability to describe the extent of the tumor, and to some extent foretell its shape, character and operability.

NEW HAVEN MEDICAL ASSOCIATION

October 4

EPIDEMIC ENCEPHALITIS

Epidemiology—Dr. Millard Knowlton

For the 12-year period 1921-1932 there were 503 cases of encephalitis in Connecticut. The incidence of the disease was greatest in 1923 when 110 cases were reported. Last year there were 14 cases, and so far this year 17.

Connecticut is at variance with the rest of the world in regard to the age distribution; elsewhere, between 1915 and 1927, the incidence was greatest in people between 20 and 39 years of age, whereas here children under 10 comprise most of the victims. Males are somewhat more frequently affected. This year 14 of the patients were males, 3 females, and for the total period 262 were males and 228 females. For 30 patients neither age nor sex were given.

Whatever the etiology of encephalitis, its communicability is low. No cases of definite contact infection have been established in this country. Perhaps mild or abortive forms of the disease often escape recognition.

A. A. L.
Pathology—Dr. Harry M. Zimmerman

In the acute form of encephalitis the lesions in the gross as regards dura and pia are usually confined to congestion and edema. Occasionally hemorrhages occur in the membranes and in the brain substance which is often hyperemic, especially in the region of the basal ganglia. When examined microscopically the walls of the blood-vessels, particularly of the venules of the cortex and basal ganglia, show an infiltration with lymphocytes, or sometimes with macrophages or granule cells. The third ventricle, the floor of the fourth ventricle, and more rarely the gray matter of the spinal cord are at times affected. This infiltration is accompanied by a glial reaction, especially in the thalamus, occasionally in the red nucleus, and frequently in the hypothalamic nuclear group. Here the glial and mononuclear cells are arranged in rosettes. Many nerve cells are seen in satellitosis.

The microscopic changes in the chronic form of encephalitis resemble those of the acute, except that the substantia nigra is damaged in greatest degree. Here the cells are much reduced in number and large amounts of pigment are in evidence. Changes in the cortex are less frequent, but the thalamus is usually affected. Very frequently many lesions can be seen in the wall of the third ventricle, the region of the sleeping center. The changes about the aqueduct of Sylvius may explain the ocular palsies that sometimes occur. Occasionally the medullary nuclei are involved. Perivascular lymphocytic infiltration is very marked in the places mentioned. At the sites of injured neurons there is often a glial proliferation. An outstanding feature of the chronic cases is that altered nerve cells may be observed without perivascular or glial response.

These lesions differ in degree and localization, rather than in kind, from those of acute encephalitis, poliomyelitis, general paresis, rabies, canine distemper and the Born disease epizootic in horses.

A. A. L.

Diagnosis and Treatment—Dr. George Blumer

In epidemic encephalitis not only the basal ganglia and substantia nigra are involved, but also other parts of the central nervous system, such as the cord, cranial nerve nuclei and extra-pyramidal tracts. For this reason the clinical picture is extremely varied. A peculiar feature is its relation to preceding infections, particularly influenza. In some cases the patient may give a history of a preceding infection which was undoubtedly influenza, while in other cases it is suspected that an influenza-like attack represents the first stage of encephalitis.

Consensus of opinion places the incubation period at about two weeks. The method of onset is variable, being either acute, chronic, or fulminating, although the first is more frequent.
There are many clinical types of the disease of which those most common are described. All types are preceded by prodromal symptoms referable to the upper air passages. The first type is that with somnolence and ocular paralyses. The somnolence is unique in that the patient is easily aroused and answers questions intelligently. Diplopia is also an outstanding symptom. The second type is characterized by restlessness and myoclonia. Pain is associated with the myoclonic movements and in some cases it may be the original symptom. The restlessness, likewise, may be associated with delirium. The myoclonic type is more frequent than the choreiform type. The third type is that showing the Parkinsonian syndrome. The mask-like facies, tremor, fever, somnolence, weakness and rigidity of muscles are some of the more common symptoms. The progress in this type is more acute than in the cases of postencephalitic Parkinsonism.

Additional types are self-explanatory and are as follows: cataleptic, hemiplegic, postencephalitic, meningitic, anterior poliomyelitic, epilepto-maniacal, acute psychotic, polypneic, and abortive.

The diagnosis is exceedingly difficult, especially in sporadic cases because of the many clinical types and their combinations. Epidemic encephalitis must be differentiated from tuberculous meningitis, epidemic cerebrospinal meningitis, influenza, cerebrovascular changes due to arteriosclerosis, syphilis, brain tumor, poliomyelitis, multiple neuritis, multiple sclerosis, and uremia.

The blood-picture may be normal, although usually there is a leukocytosis. The differential count may be within normal limits. There may be an increase in mononuclear cells and an increase in protein and sugar content in the cerebrospinal fluid.

Treatment is mainly symptomatic. Somnolent cases may be improved by repeated lumbar puncture, and barbital compounds may be helpful in the restless type. Hyoscine and powdered stramonium are given in the cases with Parkinsonian syndrome. During convalescence the patient must be carefully watched for the development of sequelae.

Experimental Work—Dr. John Paul

The term epidemic encephalitis is generally used to denote the lethargic type so prevalent during the years 1917 to 1924. This type is at present infrequent. The present St. Louis epidemic differs from this form in that it affects an older age group, and is accompanied by less ocular paralysis and lethargy. It should, perhaps, be properly called epidemic encephalitis “B”. Dr. Lee calls attention to the similarity of the present epidemic in St. Louis to the one in Japan during 1924, in which the mortality rate reached 65 per cent. There, likewise, the epidemic was most severe during the summer months. The Japanese have classified their epidemic as the “B” type.

The etiology of encephalitis is still unsettled. It is possible that the agent responsible may be a toxin, a bacterium, or a virus. The Japanese workers
believe it to be either a virus or spirochete. The production of encephalitis in rabbits by the injection into the cornea, of herpes virus isolated from human sources suggests some relationship between the two. Furthermore, herpes virus has been demonstrated in the brain in some persons dying of encephalitis. It has also been possible to produce encephalitis in the mouse with the yellow fever virus. Post-vaccine encephalitis suggests another possible relationship.

The fact that it has been possible to produce encephalitis in monkeys by injections with autopsy material of the present epidemic only, suggests that this epidemic is not the lethargic type of the past.

J. H.

NEW HAVEN MEDICAL ASSOCIATION

October 18

THE USE OF DEXTROSE FOR THE TREATMENT OF OBESITY

Dr. William H. Ryder

The value of dextrose as a food was first demonstrated in feeding marathon runners. The routine procedure in the treatment of obesity consists in substituting dextrose tablets for the extra "snacks" likely to be indulged in, and in placing the patient on a rigid diet with carefully regulated exercise.

Ten patients were studied over a period of 20 weeks, with observation of weight, blood-pressure, blood sugar and urine. In two cases the blood sugar level was markedly decreased, and in several cases the blood-pressure was reduced. In all cases there was a general improvement of the physical condition concomitant with weight loss.

M. H.

THE HUMAN OVARY

Dr. Edgar Allen

Although DeGraaf, in 1672, first began to describe the function of the ovary, it was not until 1928 or 1929 that the follicle of a rabbit ovary was actually seen to rupture and extrude the egg. Even with recent advances in knowledge of ovarian function the exact relation of the hormones and the interrelation of glandular functions, especially that of the anterior pituitary, are as yet unknown. In the rabbit, ovulation has been found to occur regularly within 10 hours after mating. If the anterior pituitary is removed an hour after mating ovulation still occurs, showing that any anterior pituitary change occurs 9 hours before ovulation.

The purpose of studies conducted in conjunction with the Henry Ford Hospital and Washington University was (1) to obtain ripe human eggs by washing out the Fallopian tubes at the time of laparotomy, (2) to analyze the follicular hormone quantitatively, and (3) to find a ripe human egg in a follicle, and so check the time of ovulation.
Only 5 ripe human eggs were found, although all stages of unripe eggs were secured. It is believed that although a large number of eggs begin to develop only a few reach maturity, fully 85 per cent being eliminated, and that new eggs form in the ovary well into mature life. The time of ovulation was found to be between the thirteenth and fifteenth days of the menstrual cycle.

Large amounts of follicular hormone were found in the corpora lutea during pregnancy, as well as in cystic corpora, although at term the corpora contained no follicular hormone. In the cystic follicles in cases of amenorrhea no follicular hormone was present.

NEW HAVEN MEDICAL ASSOCIATION

November 1

THE RELATIONSHIP BETWEEN RHEUMATIC AND SUBACUTE BACTERIAL ENDOCARDITIS

Dr. William C. Von Glahn

It is believed, as a result of observation, that a heart once damaged by rheumatic fever is more susceptible to infection by anhemolytic streptococci. There is no reason for believing that there is an antagonism between rheumatic fever and subacute bacterial endocarditis, or that the two are mild and severe forms of the same disease. The etiological agent in rheumatic fever is thought to be an hemolytic streptococcus, that in subacute bacterial endocarditis a non-hemolytic streptococcus.

In 34 cases of subacute bacterial endocarditis, with the bulk of the cases falling within the age groups of 21 to 50 years, 22 cases, or 64 per cent, gave a history of previous rheumatic infection, 15 cases having had one attack of arthritis, and 7 cases having had more than one attack. Post-mortem study of these cases revealed active rheumatic lesions, both endocardial and myocardial, with Aschoff bodies present in many instances, the acute rheumatic and subacute bacterial endocarditis lesions appearing together in 23 cases. While it is possible that the increased vascularity of a valve which is the site of a rheumatic infection may predispose that valve to bacterial invasion, it is notable that the bacteria are implanted on the surface and not deep within the valve. One may even go so far as to say that the acute rheumatic lesion offers a site for secondary invasion, and that in the rheumatic individual this invasion occurs only when the rheumatic process is active, since the subacute lesion is found almost coexistent with the acute rheumatic lesion and not with the old rheumatic lesion.

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