unsex the possessor. It is also a well ascertained fact that women who have no ovaries possess the sexual desire like other women, and altogether, as before stated, behave as women in their sexual relations. Hence it is clear that this instinct is neither dependent upon the ovaries nor, as shown before, on the changes of puberty, although, doubtless, intensified by it.

The case of hermaphrodites might seem to cause a difficulty in regard to their secondary sexual characters; but their case is readily understood, if we look upon the body as a whole, not dependent upon any one part, but a combination of correlated parts; though one can easily conceive that, if any error were to occur in the developmental force, so that the nervous centres as well as corresponding ovaries were deficient, there might be a tendency towards a neutral form, or man-woman.

Doubtless, although we cannot admit that the development of the body at puberty is entirely dependent on the presence of the ovaries, yet we must admit that they in their turn, full of life and activity, do powerfully react on the nervous centres, with which they stand in relation directly and sympathetically; and thus any disturbance occurring in the process of growth must reflect itself upon the economy.

Our position, therefore, is this. We may assume that we agree so far—1. That the development of woman can be completed without the function of menstruation; 2. That it can be perfected without the presence of uterus and ovaries; 3. That the sexual feeling and instinct existed before puberty.

If this be granted, then we must admit that puberty is in its essence not dependent on these conditions; rather, as I have before suggested, may we not say that "the changes of puberty are all of them dependent on the primordial force which, gradually gathering in power, culminates in the perfection both of form and of the sexual system, primary and secondary?"

The period at which this culmination arrives is not by any means fixed. We have every day evidence that the capability of procreation may occur some years before the completion of the process. By some it has been compared to the unfolding of a blossom; but that is not an accurate description. It should be compared to that position of the life of a plant when it for the first time shows signs of blooming, till it arrives at full power to form and perfect the seed.

I have dwelt somewhat long upon the puberty of woman, because, being more abrupt and marked than in man, one can view the change to more advantage, and because one can also, by comparing the normal process with its abnormal conditions, arrive more certainly at conclusions as to the causation both of the perfect and imperfect states. Now, in man, the process is slower, more gradual, making less demands on the system, and consequently is less liable to variations and perturbations. It is thus that some of the diseases of puberty have been considered peculiar to woman, yet I think we shall see that this view is not correct; that it is based on an imperfect appreciation of the phenomena first discussed.

But there is one most frequent concomitant of puberty to which I must allude before considering its errors; I mean menstruation. I have already stated that menstruation is not an integral, although it must be admitted to be a very important part. Many instances have occurred where full development and capability of procreation have existed without the appearance of the menses. It is often absent for a long time in some without any very serious condition of health. It depends on the ovaries unquestionably; for, where they have been removed, it ceases; or, where they are congenitally absent, it never appears. Hence we must regard the ovaries as an essential link in the causation of menstruation. But in what way does it act? Investigations, both clinical and *post mortem*, show at the time of menstruation a state of marked hyperæmia in uterus and ovaries which did not exist during the interval. There are other features in the process, but this is the most marked. Is the origin of the monthly hyperæmia situated in the ovaries, or in the nervous centres in relation to them? I think we cannot but conclude in the ovaries; otherwise, from what we have before seen, we ought to have menstruation when they are removed, so long as their corresponding nervous structures are perfect. Concluding therefore, that there is some stimulus generated in the ovaries, which, by reflex irritation, affects the uterus, we may further ask, Does it do so through the general system or directly upon the uterus, or is there a general condition of vascular excitement or tension which, occurring during the exfoliation of the uterine mucous membrane, finds a ready relief or exit in this direction, and thus manifests itself in the flow of menses?

At present, we are not in a position to answer the question about vascular tension, because the sphygmograph has not yet given efficient information; but, if we may judge from other clinical facts accompanying the epoch, we have every evidence of general vascular and

nervous excitement; for, when this occurs in excess, or in persons of frail vessels, we find the strain too much for their delicate walls; and thus exudations or even hæmorrhages, either vicarious, supplementary, or co-dependent, occur. That this influence is conveyed by, and is reflected on, the nervous system every passage of the epoch reveals.

If we seek an explanation why this process is so different in the male, we shall not have far to go, if we consider the difference between the testis and ovary; for, whereas the products of the testis readily escape by tubes, the ovaries are much more perturbed before the ovum can escape. Dense tissue has to be penetrated, and there is severe local distension of the vessels coupled with the tonic contraction of the Fallopian tube and dartoid tissue in connection with it.

I have already mentioned that the ovary is, according to recent researches, not the exact homologue of the testis, but that it springs later and from a different spot on the genital track; that, in the future male, an ovary commences, but soon becomes effete. That we might find some condition in the male to correspond to menstruation, would not be so very wild a thought; but, at the present time, information has not been sufficiently gathered to enable us to say whether the hæmorrhages of the male partake of any approximation to periodicity.

These remarks regarding puberty will help us, I hope, to understand more clearly the disorders which will form the subject of my lecture on Friday.

ON NERVOUS SYMPTOMS WITH EAR-DISEASE.

By J. HUGHLINGS JACKSON, M.D., F.R.C.P.,

Physician to the London Hospital, and to the Hospital for the Epileptic and Paralysed; etc.

THE author thought it desirable to consider together the very different symptoms which are dependent on or are associated with ear-disease. Excepting when considering Aural Vertigo, he would speak only of cases in which there was discharge from the ear, signifying disease of the walls of the tympanic cavity, and, as it often did, disease of the temporal bone. To limit his subject still further, it was supposed that the patient had had discharge for some time before any extra-aural complications ensued: this was a simplification of the subject, as—especially in a child—it might be very difficult or impossible to tell whether there was recent acute otitis or meningitis, or both. To the aural surgeon, the condition spoken of is a disease of an important organ of sense; to those practising in general medicine and surgery, it is very often indeed bone-disease, and that of an important part of the cranial wall. The defect of hearing which accompanies it is bad enough, but this is, in comparison, nothing to such graver evils as cerebral abscess and meningitis. Old ear-disease often kills people, and sometimes kills them rapidly. Insurance-companies know this, and act upon it. Caries of a bone is bad; caries of a cranial bone is particularly bad; but, from its numerous important anatomical relations, caries of the temporal bone is worst of all. The author handed round the following reprint of two paragraphs from Tröltzsch *On the Ear* (Rosa's translation), in which the anatomical relations of the external auditory canal and of the tympanic cavity are succinctly stated.

"I have already called your attention to the short distance of the dura mater and the cerebrum from the upper wall of the *external* auditory canal, and also to the proximity of the transverse sinus and of the mastoid cells to the posterior wall. This proximity explains why these parts are sometimes involved in the inflammation, even when the caries is confined to the auditory canal. The anatomical relations are still more important in the cavity of the tympanum, since its lower wall or floor is frequently separated from the jugular vein only by a thin translucent layer of bone. Again, the largest artery of the head—the internal carotid, with the venous sinus surrounding it—takes its course on its anterior portion. These are separated from the cavity merely by a delicate and frequently defective bony lamella. Furthermore, its roof or upper wall, which, with the superior petrosal sinus, lies between the mucous membrane and the dura mater, is not unfrequently thinned, and even perforated; and besides, even in adults, there is usually a gap in the bone, the petrosquamosal fissure.

"The inner or labyrinth wall, finally, offers only slight resistance to the transition of the inflammation to the facial nerve, and through its two fenestræ, which are only closed by membrane to the external ear, and then to the meatus auditorius internus, which is covered by the membranes of the brain. Close under the mastoid process, which is intimately connected to the cavity of the tympanum, is the transverse sinus, which makes up the whole of these important relations."

The list of nervous affections is (1) neuralgic pain, (2) Bell's paralysis, (3) scrofulous tumour, (4) cerebral or cerebellar abscess and meningitis, (5) pyæmia, (6) hemiplegia, (7) epilepsy or epileptiform seizures, (8) aural vertigo. Some of these can only be said to be *associated with the ear-disease*. Pyæmia is not a nervous affection, but is conveniently considered along with the others for diagnostic purposes.

1. The neuralgic pain was cursorily considered: it was probably only symptomatic of an exacerbation of the tympanic disease—symptomatic in the same way as pain in the brow was of acute iritis, or pain down the nose of glaucoma. As a rule, *this* sort of pain did not precede or usher in cerebral abscess or meningitis; but, sometimes preceding paralysis of the face, it misled to the diagnosis of "rheumatic" paralysis of the portio dura nerve.

2. The author had seen facial palsy with double tympanic disease—a clinical rarity, but one not standing in need of special interpretation. He made the following remarks of the one-sided facial palsy. (a.) In no case of uncomplicated facial palsy had he ever seen any paralysis of the same side of the palate. An oblique position of the uvula is of no moment: it is common in healthy people. One-sided paralysis of the palate goes almost always with paralysis of the vocal cord of the same side: it depends, the author thinks, on disease of the bulbar part of the spinal accessory nerve or of its nucleus. Were he to meet with paralysis of one side of the palate in a patient who had also Bell's paralysis, he should make the diagnosis, not that it depended on aural disease, even if there were aural disease, but *intracranial disease*: there would be two lesions, and thus there would, if they came on slowly or at different times, be a step towards the diagnosis of the *nature* of the disease, for two such palsies would point to syphilis. (b.) Uncomplicated facial paralysis with ear-disease is not a cerebral symptom; it is not an intracranial symptom; it is scarcely an ear-symptom; it is rather a bone symptom. (c.) It is occasionally the precursor of fatal intracranial mischief; but, as a matter of fact, not often, and when so, it is independent of it—that is to say, the ear-disease, by distinct processes, happens to do two entirely different things at once, or in quick succession. (d.) It is erroneous to infer that because the process by which the palsy results is a gross one, recovery will not follow: complete recovery often does. In this matter the author is in accord with Tröltzsch and Roosa. (e.) The facial palsy does not even show much extension of the tympanic disease, but only slight extension in an unfortunate direction. The nerve in one part of its course is separated from the cavity by a thin scale of bone, and sometimes (Toynbee says) lies just under the mucous membrane. The occurrence of intense pain in the head would be of infinitely worse omen than this facial palsy.

3. In some cases of chronic ear-disease, the author had found in the cerebrum or cerebellum a mass of tubercle in the place, so to speak, of an abscess from ear-disease. Except, perhaps, for chronicity of the cases, there was nothing to determine betwixt the symptoms of these cases and cerebral abscess. He could not say that there was any real relation; the cases spoken of were not cases of tubercular meningitis, nor was there tuberculosis of other organs. Tröltzsch and Buhl have noted the occurrence of tubercular meningitis and acute general tuberculosis in cases of chronic otorrhœa, and they believe there is a connection between the two things.

4. The author placed together abscess and meningitis, because, since the symptoms of abscess were often very acute, he did not know how to tell whether there was meningitis or abscess in many cases of acute cerebral disease occurring with ear-disease. If an attempt were made at diagnosis, the prediction of abscess, since, at least in the author's experience, it is most common, would mostly be verified. Perhaps, the very early occurrence of optic neuritis, were the appearance well marked, would point to abscess. It was thoroughly well known that a cerebral or cerebellar abscess may be "latent"; as Wilks and Moxon put it, "a man with ounces of pus in his brain may continue to do good mental work, and have full use of his limbs". When symptoms do come on, even in cases where the abscess is well encysted, and therefore old, the course of the case is often acute; hence the difficulty in the diagnosis from meningitis. The symptoms in some cases of cerebral tumour are quite similar, and very often the only means of deciding is by finding or not finding ear-disease. This is not quite decisive, for, as stated, there is sometimes tumour (scrofulous) in cases of aural disease. Then, as a rule, the earliest symptoms of fatal cerebral or cerebellar abscess (as of tumour) are only such as severe headache and vomiting; the rule is that, in ear-cases, such unmistakable nervous symptoms as hemiplegia, convulsions, and tetanoid states, come on late, and, in many cases of cerebral or cerebellar abscess from ear-disease, they do not come on at all. The occurrence of headache and vomiting, both in

cases of abscess and tumour, misleads to the erroneous diagnosis of stomach and liver derangement. The intensity of the headache, its occasional occurrence in unusual places—at the occiput, for example—its persistence, and the "purposeless" nature of the vomiting, often with clean tongue, would negative that diagnosis. If the ophthalmoscope were used in all cases of intense headache, mistakes in diagnosis would often be corrected. There is often optic neuritis, but, as it frequently happens that this pathological condition is unattended by any symptom (defective sight), it is usually not looked for. Occasionally acute intracranial disease is erroneously inferred, in cases of ear-disease, from the occurrence of active mental symptoms (delirium). This is, the author thinks, very poor evidence of the existence of acute primary brain-disease of any kind, and should not be trusted until acute non-cerebral disease has been carefully excluded. Although the brain is the organ of mind, the trustworthy symptoms of acute affection of it, or of its membranes, are not mental, but are such as severe headache, vomiting, constipation, retracted belly, and alterations of pulse, especially slowness and irregularity. Delirium does occur in some cases of acute cerebral disease, but rarely to such a degree as in acute non-cerebral affections. It should never be forgotten that, with rare exceptions, a man who has acute brain-disease, first comes to us when he has severe headache and vomiting, and not for anything wrong with his mind. Supposing that we could be sure there was abscess, we cannot usually tell whether it be in the cerebrum or cerebellum. We can only decide when there occurs such a symptom as hemiplegia, or unilaterally beginning convulsions, or partial aphasia, to point to the cerebrum; or reeling or tetanoid states to point to the cerebellum; but in cases of cerebral abscess, however caused, these symptoms often occur late, and the author has never seen any of them in cerebral or cerebellar abscess from ear-disease. A patient may recover for a time from symptoms of cerebral abscess, just as he may from symptoms of cerebral tumour; the encysted abscess, like the tumour, mostly, especially early in the case, causes symptoms, not by destroying or squeezing nervous organs, but by acting as a "foreign body", causing a local encephalitis; it is possible that this secondary acute process passes off when recovery follows, leaving some softening. It is clinically important to know that a patient, with abscess from ear-disease, may, after being acutely ill, and yet apparently not near death, die suddenly. So it is in some cases of tumour. As in these cases there is no rupture of the abscess, and sometimes at least no rupture of vessels of the tumour, and as there is agonising pain, the author thinks it is the pain that kills, and considers it very important to relieve severe pain in such cases by narcotics.

5. *Pyæmia*.—This is well known to occur from ear-disease, and may be mistaken for meningitis or abscess. Negatively, there is no excessive pain (there may be a swollen optic disc); there are often severe rigors, and great rises and falls of temperature; the presence of delirium, especially without severe headache, would tell in favour of pyæmia. Recovery may follow. There may be both pyæmia and meningitis, as there often are after injury to the head. In meningitis from injury to the head there may be no severe pain.

6. Hemiplegia occurs sometimes in children who have ear-disease; cases were spoken of in which the paralysis was on the side opposite the ear-disease, and in which there was no convulsion and no loss of consciousness at the onset. In no such case had the author had a *post mortem* examination. But, as (excluding cases where there was valvular disease of the heart, rheumatic fever, or signs of "coarse" brain-disease) the causation of hemiplegia in children was exceedingly obscure, it was right to suggest the possibility of venous thrombosis leading to local softening to ensure definite search at *post mortem* examinations. Roosa has seen two cases of hemiplegia with ear-disease; in one patient, a boy of ten, in which the hemiplegia was of the same side as the ear-disease, as both the auditory and portio dura were paralysed on the same side as the arm and leg, it is a possible thing that there was some disease pressing on the crus cerebelli; there is no doubt that, as Brown-Séquard has long ago stated, disease here would account for the symptoms the patient had. Roosa thinks there was hæmorrhage betwixt the dura mater and the bone. Roosa's other case was a man of sixty-two, and here the hemiplegia was on the side opposite the ear-disease; in a man of that age, the paralysis might, at least, quite as well be interpreted by local softening from arterial thrombosis, a pathological process unconnected with the aural affection.

7. Epilepsy or epileptiform seizures occasionally occur with ear-disease. In a disease so calamitous and so obscure as epilepsy, we could not afford to overlook any associations. Admitting a relation, the accepted explanation would be that the ear-disease provokes the seizures by reflected irritation. The author does not accept that hypothesis; he has been erroneously said to do so. Were this the process of causation, the treatment of the aural disease is the important matter;

but, then, no medical man neglects to treat otorrhoea under any circumstances whatever. The author suggested another hypothesis, the possibility that the aural disease led to disease in Hitzig's and Ferrier's Region; for, in some cases, the aural disease was associated with epileptiform convulsions, starting in the hand, face, or foot of the opposite side. In one such case, the author had found a large tubercular or scrofulous tumour of the hemisphere on the side of the ear-disease and on the side opposite the convulsions. He thought it possible that the disease is sometimes local softening from venous thrombosis, the convulsions depending on instability of grey matter around the part softened. He had no direct evidence of this, but he thought he had some indirect evidence of it. He related a case in which a man who had phosphorus necrosis of the jaw had, during an acute illness, frequent epileptiform affections affecting the left side of his face, both sides of the thorax, and slightly the left arm. (In passing, the author remarked that this case was one of those verifying Broadbent's now well known hypothesis, that there is a double representation in the brain of the bilaterally acting muscles.) In the intervals of the attacks, there was paralysis of the face almost as complete as in ordinary Bell's paralysis of the face. At the necropsy, there was, although not ear-disease, yet an equivalent state of things, there being pus in the right lateral sinus, and from this a vein with creamy contents was traced to the part most diseased of the right side of the brain; about the anterior end of the Sylvian fissure, there was purulent softening and red softening. As the lesions were more wide-spread, and as the case was acute, the evidence was only very indirect towards the interpretation of chronic cases, but was, the author thought, worth consideration in that regard.

8. *Aural or Auditory Vertigo or Menière's Disease.*—The author believed that almost any kind of ear-disease would cause paroxysms of vertigo and reeling, with faintness and vomiting. He stated briefly various kinds of disease of the ear he had seen associated with the paroxysm, expressing his opinion that the paroxysm always depended on trouble of the auditory expansions in the labyrinth, whether from actual disease therein or disturbances from without. He insisted that besides cases with paroxysm, these were, so to speak, chronic cases. With ear-trouble, it was not a very uncommon thing to find slight giddiness and trifling reeling when the patient walked. These cases had, he thought, not received sufficient attention. He referred to the case of a medical man, deafness of the right ear occurring immediately after the discharge of a heavily loaded gun; the patient always afterwards tended to the left; to the case of another medical man, who, besides having paroxysms with right-sided deafness was always giddy if, when lying down, he turned over from right to left; to the case of a patient, the subject of Menière's disease, who would become giddy and feel as if pushed forwards whenever she suddenly bit anything crisp. The explanation suggested of this last case was, that the symptoms were, owing to contraction of the tensor tympani, a muscle acting along with the masticatory muscles. The paroxysms were generally explained by the laity, and not unfrequently by medical men subjects of the affection, as being caused by stomach and liver derangement. The author urged that the mere concurrence of deafness with the paroxysmal or chronic symptoms should not alone settle the diagnosis. He passed in brief review the most characteristic symptoms of five great varieties of vertigo: (1) Stomachic, (2) nervous (often sexual) exhaustion, (3) ocular, (4) epileptic, (5) aural or auditory. Great attention should be paid for diagnosis to what Knapp has called the limitation of the "field of audition", to the loss of perception of certain notes; if the loss were of some intermediate notes, it would, the author thinks, point to disease in the cochlea. He tried to show how we should distinguish betwixt a case of chronic unsteadiness from aural disease, that from cerebellar disease, and that from ocular palsy. Finally, he gave his speculations as to the *modus operandi* of the ear-disease. There were two sets of symptoms: a. "Vital" (faintness, perspiration, irregularity of pulse, etc.); b. Locomotor (vertigo with or without reeling). He attributed the former to disturbance of or actual disease in the cochlear division, the latter to disease or disturbance of the semicircular canal divisions; the former division was, he suggested, chiefly afferent to the medulla oblongata, the auditory nucleus having (Lockhart Clarke) close connection with the vagal and spinal accessory nuclei; the latter division, he thought, represented that part going, according to Lockhart Clarke, to the cerebellum. The "vital" and locomotor symptoms were due to disturbance of the medulla oblongata and cerebellum respectively. He referred to Goltz's theories, to the experiments by Vulpian and others on the semicircular canals. He mentioned that Pierret had recently spoken doubtfully as to the existence of relations betwixt the auditory nerve and the cerebellum. Cyon has recently found that irritation of each of the semicircular canals is followed by a particular ocular movement—a very significant thing towards the interpretation of auditory vertigo.

HOSPITALISM IN COTTAGE HOSPITAL PRACTICE, IN RELATION TO SIR JAMES SIMPSON'S THEORY.

By HENRY C. BURDETT, The Seamen's Hospital, Greenwich.
Late General Superintendent of the Queen's Hospital, Birmingham.

ON the eve of the publication of my book on *Cottage Hospitals*,* and at the request of many medical friends, I venture to submit the following statistics bearing upon the mortality in cottage hospital practice after the major operations—the various amputations of the limbs—for the consideration of the profession. I am strengthened in my resolve to adopt this course by the knowledge that I am justified in claiming for the annexed statistics the closest attention, because I can vouch for their careful preparation and accuracy. The accuracy of Sir James Simpson's statistics of the results of amputations in country and private practice has been seriously impugned by Callender, Holmes, and other authorities, chiefly on the ground of the impossibility of proving the reliability of the sources from which they were derived. No such doubt can exist with regard to the figures I have prepared. The cases I give can be definitely verified, as they are derived from the books kept by the medical staff of the different cottage hospitals mentioned in the table. Each return is signed by the honorary medical officer who has kindly furnished it; and, in the majority of instances, each surgeon has vouched for the accuracy of his own cases.

Feeling deeply the importance of great care being exercised in the preparation of the annexed table, I have sent the following circular to one hundred and sixty cottage hospitals, with whose existence I am familiar.

The following is a copy of the form which was enclosed:

Result of Amputations of the Limbs in Cottage Hospital Practice.

Seat of Amputations.	Primary, or for Injury.		Secondary, or for Disease.	
	No. of Cases.	No. of Deaths.	No. of Cases.	No. of Deaths.
Amputation of thigh ..				
Amputation of leg				
Amputation of arm				
Amputation of forearm ..				
Total				

Date..... Signature.....
Residence

REMARKS.

Note.—The cause of each death should be noted, if possible—viz., whether secondary hæmorrhage, shock, pyæmia, or other cause.

"The relative success of the graver operations in surgery as performed, first, in large town hospitals, and, secondly, in country cottage hospitals, has for years attracted much attention, and there is reason to believe that the mortality in cottage hospitals in the major operations is much less than in the London hospitals. With a view of setting this question at rest, and of proving the truth or fallacy of Sir James Simpson's theory, I shall feel deeply obliged if you will fill up the enclosed form with the results of all the amputations which you may have had in connection with your cottage hospital since it was first opened.

"However few may be the amputations of the limbs, an exact return from every cottage hospital will be regarded as a very valuable contribution to surgical statistics.

"I am anxious to make my book as complete as possible, and the return of the enclosed form in the course of next week, accompanied by any remarks as to the cause of death, and any special features of particular operations, will be esteemed a great favour."

In reply, I received answers from ninety-two cottage hospitals, in thirty-one of which no cases requiring amputations had been received, although the majority had had in addition to severe fractures, cases of herniotomy, lithotomy, extirpation of eyeball, removal of bone for necrosis, ovariectomy, excisions of knee, ankle, shoulder and breast, or other surgical cases of interest.

The cases of amputation in the sixty-one hospitals, which are given in alphabetical order in the following table, amount to three hundred and six, or one less than the number given by Mr. Erichsen in his book, as "all the amputations" which have been performed in his wards at University College Hospital from the foundation of the hos-

* *The Cottage Hospital: its Origin, Progress, Management, and Work.* London: J. and A. Churchill.