this hypothesis is correct the sooner a dose is given after infection the more likely it will be to answer its purpose. for we must assume that the microbes are localized at first in the lymphatics and glands and lymphatics. we should also like to know how often salvarsan must be given and at what intervals, remembering that it is desirable to give as few injections as possible, though i do not know it is certainly desirable to get rid of the spirochaete. i hope that these points will be emphasized and that we shall obtain answers from those who will take part in the discussion with a larger and more special knowledge than 1 possess.

combined treatment.

what is the best treatment for syphilis in the present state of our knowledge of the disease? taking, for the sake of example, the case of a surgeon or of a nurse who is inoculated in the course of professional duty, the wound should be well washed under running water, like a wound obtained in the post-mortem room. it should then be dried and covered with an ointment consisting of 10 grams of colonel in 30 grams of lanoline. this mercurial ointment should be gently rubbed into the wound for five minutes, and a dose of salvarsan (600 ft.) should be given intravenously. the prophylactic action of the mercurial ointment appears to end—at any rate experimentally—within twenty-four hours of inoculation; the salvarsan is said to be so unreliable in checking the generalization of the disease even when the seat of inoculation has become characteristically indurated and the lymphatic glands are enlarged. but, however, that the lymphatic glands do not return wholly to their natural condition after the administration of salvarsan in early syphilis rather inclines me to distrust the drug as a sole remedy, and should lead one to give mercury in some form or another as soon as possible.

a wassermann test should be made at an early period after inoculation, although it will probably be negative in the very earliest stages, for, as has been stated already, our present knowledge shows that it is usually positive in five to eight weeks after infection; it is positive in 55 per cent. of cases during the secondary stage, and in 75 per cent. during tertiary manifestation, but it is only positive in 50 per cent. of cases where syphilis is latent. mercury should be given at once when the infection is undoubtedly, but in the more difficult cases, where the diagnosis is doubtful, it may be withheld until a positive wassermann's reaction has been obtained.

preferably the mercury should be given by intramuscular injection, and colonel lambkin's formulae are quite satisfactory as far as i have used them. if, for any reason, the intramuscular method cannot be employed injection may be employed. but when, as in ordinary private practice, the drug has to be given medicinally, i think the intravenous method is better. the grey powder salvarsan has been used in england for a long time past. it seems to me that so long as mercury is given in small doses, systematically, and for long periods of time, the exact preparation used does not matter very much. the mercury should be given with regulated periods of rest, and a wassermann's test should be made at the end of each period just before the mercury is recommenced. if the test is negative an intravenous injection of salvarsan may be given with a view to eliciting a positive result. if the test still remains negative after this injection the mercury may be discontinued for a further period so long as there are no signs of syphilis, and at the end of a further period of two months the test should be again employed. marriage may be permitted under these conditions when the wassermann test has remained negative and there has been no syphilitic symptoms for at least a year.

in this manner we shall avoid giving mercury for a longer time than is absolutely necessary, whilst the drug would, until the syphilis is cured, even when the absence of symptoms might seem to make a further mercurial course unnecessary. we shall also have taken a step in advance of colonel lambkin, who was obliged to take a wassermann's test with absence of symptoms as a guide for discontinuing a mercurial course because the scientific test had not yet become available.

there are two objections to the use of wassermann's test to the question whether or not an individual is cured of syphilis. in the first place, it is purely a laboratory test, and we are consequently at the mercy of the pathologist who makes this examination. this objection is easily surmounted by always employing the same pathologist. the second objection is more serious. it involves the fallacy that wassermann's test is an absolute proof of the presence or absence of spirochaete-infection, and even in the light of our present knowledge it is certainly not a complete disarming of the spirochaete. i hope that these points will be emphasized and that we shall obtain answers from those who will take part in the discussion with a larger and more special knowledge than 1 possess.

electro-cardiography and its importance in the clinical examination of heart affections.

by thomas lewis, m.d., m.r.c.p.,* lecturer in cardiac pathology, university college hospital, medical officer to out-patients, city of london hospital.

part 1.

the method employed in obtaining electro-cardiograms.

the electro-cardiographic method is one by means of which curves are obtained of electric changes which result in the body from the activity of the heart muscle. the installation required for this work comprises a sensitive galvanometer and its accessory switchboards, and an arc light and camera. the galvanometer used for the purpose is a peculiarly sensitive one; it is composed of a heavy electromagnet, the poles of which are closely approximated. between the poles, and lying in the magnetic field, an extremely light conducting fibre is stretched, which consists of a finely drawn platinum or silvered quartz thread. it is this thread which acts as the recorder. if a small current is passed through it while it lies in the magnetic field, it becomes deflected and takes up a new position, a position which is governed by the direction in which the current flows through it, by the strength of the current and the sensitivity of the instrument. the sensitivity of any given instrument is controlled by the magnification of the string and its tension. the magnification is arranged by means of a microscope driven through one pole of the magnet; the other pole is bored to contain a condenser. a beam of light, falling through the condenser and concentrated upon the string, projects the magnified image of the string upon the screen of the camera. the magnification usually adopted is approximately 600 diameters, it is kept constant. the sensitivity of the instrument, in time to time, consequently depends upon the tension of the conducting fibre, and this is arranged to give a standard deflection for a given electric change. the standard adopted by all who practise human electro-cardiography is the same. when the ends of the string are connected to form a circuit and an electro-motive force of 1aby volt is introduced into this circuit, the deflection of the projected string image amounts to 1 cm. the deflection of the string is in exact proportion to the strength of current which passes through it. thus, if 1aby volt are introduced into the circuit a deflection of 2 cm. results. if, instead of introducing an electro-motive force from a battery, the human body is connected to the string by suitable means, the string moves in response to changes of potential produced in the body as a result of the heart beat; and the movement of the string's shadow in response to these natural cardiac electric effects is of sufficient amplitude to permit it to be photographed upon a piece of sensitized photographic apparatus consists of a moving plate camera, the string is vertical, and its shadow falls upon the vertical screen on the front of the camera. its movements are from side to side across the front of the plate, and across a horizontal slit in the front, behind which the plate

* working the tenure of a beit memorial fellowship. such a galvanometer is supplied by the cambridge scientific instrument company.
travels. As the plate travels the shadow of the moving string projects the sensitive surface of the plate from the light, and when the plate is developed the record of the movements remains upon the plate as a white band upon a black background. Prints from this plate, such as are here reproduced, show a black bar upon a light background. The plate falls on its end in the camera, the print is turned upon its side for reproduction. As the plate moves the light is also prevented from falling upon its surface. In each reproduction of which five lines are ruled at intervals of 1 mm. These lines are horizontal in the records and serve to facilitate measurement; each is equivalent to 0.007 volt (see Fig. 1). The light is also reflected to a vibrating time marker, which records thirtyths of a second upon the plate.

The object of standardizing the movements of the string is as follows: If allowance is made for the whole resistance of the circuit, consisting of string, the human body, and the connecting wires, the development of a given potential difference at the points of the body from which the current is led off gives rise to a deflection of the string of a definite value, which may be compared with the deflection resulting from the employment of a potential difference of known amount. The same heart will give electro-cardiograms similar in outline and magnitude from time to time; and it will yield similar records with different instruments, providing that the body is connected to the galvanometer in the same manner. Thus an absolute comparison may be made of curves taken from the same subject from time to time; and to a lesser extent of curves from patient to patient. The electro-cardiograms from no two subjects are the same; they differ slightly both qualitatively and quantitatively. Such being the case, and the type of electro-cardiogram remaining constant in any healthy person for long periods, the identification of any individual from his electro-cardiograms is a matter of no great difficulty.

It is customary in leading off the heart currents from the patient to adopt three leads: I, horizontal, from the right arm to the left arm; II, oblique, from the right arm to the left leg; and III, vertical, from the left arm to the left leg. I shall speak of these leads hereafter simply as leads I, II, and III. In the illustrations these leads are marked in the upper left-hand corner of each strip of curve. The limbs are connected to the instrument by plunging them in baths of salt water, the baths being themselves connected to the string. As soon as the string is placed in circuit with the body in this fashion its movements commence, and may be recorded when appropriate adjustments have been made. And within certain limits it is a matter of indifference how far away the patient sits from the instrument, or what wires which carry the current from his body may be several miles in length. Providing that they are properly protected, and that their own resistance is allowed for, the records remain unchanged.

The Form of the Human Electro-cardiogram.

The form of the human electro-cardiogram varies according to the points of the body from which the current is derived. As I have said, three leads are commonly employed. For the time being let us consider a single one, the most serviceable—namely, that which is from a normal subject usually consists of five separate phases, and these are called P, Q, R, S, and T (see Fig. 1). It is necessary to examine but briefly the meaning of these phases. P, the first phase, is due to the simultaneous contraction of the two auricles. Q, R, S, and T (of which R and T are the most prominent) are the result of simultaneous contraction of the two ventricles. We will be content with this statement for the time being, without further attempting the explanation of the various summits and depressions of the curves. We have in electro-cardiography the only certain method of obtaining separate records of the movements of the upper and lower chambers of the human heart; and, as we shall shortly see, these records may tell us a great deal as to how the separate chambers are fulfilling their functions.

The curves from the other leads, I and III, are not altogether dissimilar to those derived from lead II; though they never duplicate it (Fig. 2). The main summits, P, R, and T are still seen, and Q and S also appear in varying degree. We shall understand the special values of these leads almost immediately.

The Direction of Lead.

In speaking of the value of electro-cardiograms in the diagnosis and management of cardiac affections, we may choose certain illustrations; in selecting them at the present time, I shall not only choose them as illustrations of the method, but I shall also specially select those which have an immediate and unquestionable practical value. And the first illustration is a simple one; it shows that the direction of lead is all-important, and demonstrates the particular value of a given lead under certain circumstances. Supposing that in a normal subject we lead off from right arm to right arm (lead I). The curve which results will be similar to that shown in Fig. 3a. But supposing that we lead off in the reverse direction—that is, from left arm to right arm, what will result? We change the direction in which the same currents flow through the same general movements will consequently be of similar amplitude and similar form, but opposite in direction. The two pictures will be exactly the same, from each other in one respect, and one only. The second will be upside down (Fig. 3b). The practical value of this fact is seen when we turn our attention to transposition of the heart. Considered from the front of the subject, the right arm in the subject of heart transposition is in the left; the left is where the right should be. Consequently an electro-cardiogram from lead I in a subject who has a transposed heart will be similar to an electro-
cardiogram from a normal subject from lead I, but it will be inverted. In other words, all the summits and depressions of the curve will be upside down. This reversal of the picture applies to lead I alone, for it is the only symmetrical lead. Now transposition of the heart is a rare condition, but it not infrequently happens that the human heart is displaced, and it is also by no means uncommon that the cause of its displacement cannot be found; in all such instances the question of transposition may arise. The electro-cardiographic method returns a perfectly clear answer to the question, Are we dealing with a transposed heart? Displacement of the heart certainly alters the form of the electro-cardiogram, and deforms the normal curve in definite and known ways, which I do not propose to consider at the present time.

It is sufficient to know that displacement never yields the completely inverted electro-cardiogram; transposition always does. The electro-cardiographic test is the most certain means of differentiating the two conditions.

**Enlargement of the Heart.**

The chief object of recording the electro-cardiographic curves of one subject by means of three leads is the attempt to differentiate between right-sided and left-sided hypertrophy of the heart. If curves are taken from normal subjects, it is the rule to find that the summit R is a prominent upward deflection in all leads (see Fig. 2); if present, is a small downward deflection. If, on the other hand, the same leads are adopted in a case in which there is clear evidence of right-sided hypertrophy, certain changes in the shape of the curves are discovered (Fig. 4). In lead I, R is small or absent and S is deep. In lead III, S is small or absent, and R is relatively high. If the curves (Fig. 4) are examined it will be seen that the prominent deflections in question, R in lead III, and S in lead I, point towards each other; the deep S of lead I and the tall R of lead III are directed upwards and downwards towards the centre of the figure. If the same three leads are adopted in a frank instance of left-sided hypertrophy the reverse picture may be anticipated (Fig. 5); R is large in lead I, S is small or absent; R is small or absent in lead III, S is large.

The electro-cardiographic curves are not the least valuable indications which we possess to-day; and they may be of special service in several groups of cases. Apart from the intrinsic value of the differentiation, it is of special importance to ascertain the relative degree of right and left-sided hypertrophy in cases where there are murmurs at the base of the heart. It may be that, with the presence of a diastolic murmur in the aortic area in a patient who has a rheumatic history, a presystolic sound or actual murmur is heard at the apex; and the question arises as to whether stenosis of the mitral valve is present, or whether the apical murmur is of the kind described by Flint and attributable to the aortic lesion also. If it can be decided that left-sided hypertrophy predominates, such a fact emphasizes the aortic lesion; if right-sided hypertrophy predominates, the presystolic murmur may be attributed to constriction at the mitral orifice. Confusion not uncommonly arises in young subjects between the diagnosis of pulmonary and aortic lesions. The two valves which guard the respective arteries are near to each other; lesions of the former are accompanied by right-sided, and lesions of the latter by left-sided, hypertrophy. Again, how frequently one meets with cardiac patients—patients who have mitral stenosis, but in whom the presystolic murmur is absent; in such cases electro-cardiographic examination is often of great value, for it indicates that the muscle of the right side predominates. And this is especially the case, as will appear hereafter, when the heart's action is irregular. (To be continued.)

The Section of Balneology and Climatology of the Royal Society of Medicine held its annual meeting this year at Woodhall Spa, in Lincolnshire, on June 1st. The proceedings included a reception given by the directors of the Spa Company, an inspection of the hydroelectric establishment, and a demonstration of the various methods of treatment adopted theret.

The American Medical Association held its sixty-third annual meeting in Atlantic City from June 3rd to 7th. Dr. Abraham Jacobi was installed as President in the room of Dr. John B. Joffre, and delivered an address on the best means of combating infant mortality. The report of the secretary stated that the membership of the association on May 1st, 1912, was 34,283, a net increase for the year of 323. The report of the treasurer showed that the total assets of the association were $15,299 dollars (a little over £105,951); the net income for the year was 55,815 dollars (£10,765).
The interesting points of this case were the facts:
1. That the aneurysm must have been one occurring in the superior mesenteric artery in its course behind the pancreas, remnants of the arterial wall being found lying flat on the posterior wall of the cavity.
2. That the gradual dilatation of the large aneurysmal cavity had exercised a traction on the aorta itself, so that a fusiform aneurysm was formed.
3. That there was a rotation of the aorta, in that the opening of the coeliac axis artery and what must have been the opening of the superior mesenteric artery originally, were found on the right side of the aortic aneurysm.
4. That there must have been a gradual and persistent dissection in the upward direction to the lower surface of the liver where the rupture eventually took place, as is evidenced by the thickening and induration of the walls.

For permission to publish this case I am indebted to the Medical Superintendent of Addington Hospital.

Electro-cardiography and Its Importance in the Clinical Examination of Heart Affections.

By Thomas Lewis, M.D., M.R.C.P.

Electro-cardiography and its importance in the clinical examination of heart affections.

The summit P, which corresponds to the contraction of the auricles, is small and pointed or rounded in most normal electro-cardiograms from lead II. As a rule its height does not extend for more than one scale division. In mitral stenosis, where there is hypertrophy of the auricular musculature, this summit is considerably more pointed and is of diagnostic importance. It is generally broad, flat-topped, and bifurcates in its centre (the last-named feature is not of necessity pathological), its height is greatly increased, it often extends to two scale divisions (Fig. 6; see also Fig. 4 II of previous article) and may amount to three or even more millimetres.

The sign is of chief clinical value in cases of mitral stenosis in which murmurs are absent or obscure, and in such cases galvanometric examination may decide an otherwise doubtful diagnosis.

As V_s Interval.

The normal heart beat consists of a sequence of chamber contractions. The contraction begins in the auricle and having passed through it is transmitted to the ventricle through the specialized tract of tissue known as the auriculo-ventricular bundle; the ventricle having received both its charge of blood and impulse from the auricle, contracts. There is an appreciable delay between the contractions of auricle and ventricle in a normally acting heart, and the length of interval between the onsets of the contractions is taken as a measure of the functional efficiency of the bundle in question. This interval is readily ascertained in human electro-cardiograms. It is represented by the distance from the commencement of the auricular summit P to the commencement of the ventricular summit Q. In normal electro-cardiograms this P-Q interval measures between 0.12 and 0.18 second.

But in pathological hearts the interval is often greatly increased; it often reaches 0.3 second (Fig. 7) and may extend on occasion to as much as 0.4 second. Prolongation of this interval is the first of a series of extremely interesting and important phenomena which are spoken of collectively as "heart-block," phenomena which are due to impairment of the tissue functions in the tract which conveys the contraction impulse to the ventricle. The impairment of bundle function produces delay or hesitancy of the impulse transmission, which can be discovered with certainty only in graphic records taken from the heart. It leads to no disturbance of the beats which is evident during ordinary clinical examination. Yet we cannot afford to neglect it. It is a frequent sign in heart disease; it may be a forerunner of grave disturbances of the heart's mechanism, which will be spoken of later; it is in itself always serious. The length of the P-R interval is one of the important diagnostic signs in mitral stenosis, for such hearts when regularly exhibiting prolongation of the interval are habitually so, and the damage is not necessarily confined to the auriculo-ventricular bundle, but is usually manifest throughout the heart muscle. A prolongation of the P-R interval is not at all an infrequent sign during the course of acute infections, especially those of rheumatic type. It may be that a patient who seems to have slight enlargement of the heart, or in whom a systolic murmur of rheumatic origin is present, develops a sore throat or slight febrile attack or soreness of the joints. At the same time prolongation of the interval is likely to be noticed. It may even occur apart from other manifestations of infection. Whenever it develops it is a sign of considerable consequence, for it indicates involvement of the heart muscle. Clinical medicine has recognized lesions of the heart valves for many years; it has looked almost in vain for signs of early muscle damage. Advanced rheumatic disease of the heart has essentially a long history behind it; it probably results from repeated infection and repeated slight damage of the valves and muscle. Transitory prolongation of the interval between auricular and ventricular contractions is one of the very few signs which we possess of these invasions. The greater part of the ventricular musculature may be spoken of as silent, in the same sense that large areas of the cerebral substance are termed silent. The auriculo-ventricular bundle, like the pyramidal tracts of the spinal cord, gives, when damaged, early indications of such damage, though the lesion may not be, and usually is not, confined to it. The electro-cardiogram thus serves an extremely useful purpose, for it not only gives us an accurate index of the manner in which the functions of the auriculo-ventricular bundle are fulfilled, but it also throws light upon the condition of the myocardium as a whole. A single manifestation of bundle deficiency is spoken of at the present time: others will be noted at a later stage.

Lesions of the Bundle Branches.

The auriculo-ventricular bundle divides into two large branches near the ventricular septum and these run and arborize under the endocardium on the course of the ventricle. Just as lesions of the main stem of the bundle give rise to electro-cardiographic signs, so do lesions of its branches; and a number of such lesions may be recognized to-day, and their significance much appreciated. A lesion of a bundle branch results, not in a prolongation of the conduction interval, but in profound modification of the type of electric curve which represents the auriculo-ventricular contraction. The type of curve thus chiefly dependent upon the point or points at which contraction starts in the muscle from which it is recorded.

Fig. 7.—An electro-cardiogram from a case of subacute infection of the bladder. The P-R interval is prolonged; there is hesitancy in the transmission of the impulse through the auricle and ventricle, and consequently evidence of damage of the tissues joining the auricle and ventricle. The disturbance in conduction was the sole sign of myocardial disturbance in this patient at the time when the curve was taken.
If there is a lesion, let us say, of the main division of the bundle which runs to the right ventricle, the auricular impulse, instead of travelling to both ventricles and starting contractions in them almost simultaneously, runs to the left ventricle alone; the contraction consequently starts on this side of the heart, and spreads in an abnormal manner throughout the chambers. The result is an electro-cardiogram of a definite but abnormal shape. A curve of this sort is shown in Fig. 8.

Following upon each auricular contraction (P) is the representative of the ventricular contraction; it consists of a small upward peak, a deep depression of long duration, a short almost horizontal line and a rounded summit, not dissimilar to P. The type of curve is well known, and is only produced in the manner described.

Damage of the main division of the bundle is not at all uncommon, and is usually the result of fibrosis. Electro-cardiographic examination alone will reveal such lesions; the single example which I have given is sufficient to illustrate the manner in which they may be diagnosed.

It has been said that prolongation of the P-R interval is usually accompanied by more or less widespread muscle change. So also are the curves which indicate damage of a bundle branch. The two signs are not uncommonly found in the same heart, as in the patient from whom Fig. 8 was taken. The auriculo-ventricular interval is prolonged to 0.21 second in this curve; the heart from which it was obtained was damaged in at least two places, namely, in the main bundle and also in its right branch, as demonstrated electro-cardiographically. The actual condition was in all probability one of diffuse cardiac fibrosis.

Curves in Congenital Heart Disease.

Electro-cardiography reveals many other changes in the shapes of ventricular curves in hearts beating regularly and at normal rates, and a number of them are of practical significance. I have already referred to the types of curve which are found in mitral stenosis. It will suffice if I give a single additional illustration. In my first article I spoke of standardization of curves, and it is known that the height of the greatest peak in normal curves rarely exceeds 10 or 15 scale divisions. In congenital heart disease values of 25 or even 30 scale divisions are not at all uncommon (Fig. 9) and sometimes values of 45 and more are found; such exaggerations are consequently of value in the recognition of these malformations.

The Nature of Bradycardia as Portrayed by Electro-cardiograms.

When the pulse-rate is slow its slowness may be due, as is well known, to one of two causes. The ventricular rate may be retarded, or a number of the heart-beats may fail to reach the wrist. The last condition will be dealt with more fully at a later stage. The first, or "bradycardia," (a term generally used for slow action of the ventricle), is not, as was formerly thought, a simple condition. It may result from slow action of the heart as a whole, or from deficiency in the conduction of impulses as they travel through the heart from its upper to its lower chambers; and the two states must be carefully distinguished, for, as the life-histories of such hearts are different, so the prognosis and treatment are different. Electro-cardiograms readily distinguish between them.

The ventricular beats are seen in both, and they occur at similar and widely spaced intervals (Figs. 10a and 10b); but while in slowing of the whole heart a single auricular summit P precedes each ventricular contraction (Fig. 10c), when there is deficient conduction many such auricular summits are found, and they may fall, as in Fig. 10d, with varying relations to ventricular systoles. Two rhythms are established, the one auricular, the other ventricular; each is regular and independent of the other. This is the condition, spoken of as complete heart-block or complete dissociation, which is so often associated with attacks of loss of consciousness (Stokes-Adams syndrome). It is the last stage in the series of phenomena which result from damage to the auriculo-ventricular bundle, and results from grave impairment of this tract, so that no auricular impulses are conducted to the ventricle. If a patient has a ventricular rate of 30, 40, or 50, we are no longer satisfied in describing his symptom as "bradycardia"; a further analysis of the nature of the heart's mechanism, to determine the cause of the slow ventricular action, is essential before we can forecast the future history of the heart or suggest those measures which are best calculated to prolong its action.

The Nature of Regular Tachycardia as Portrayed by Electro-cardiograms.

When the pulse and ventricular beats are regular and rapid, the acceleration may often be ascribed to fever, infection, poisoning, or some specific disease such as exophthalmic goitre. But there is a large class of patients...
in which the causation of tachycardia is by no means easy to determine by ordinary clinical means.

A number of patients, who are in reality sufferers from paroxysmal tachycardia, come under observation during the attacks (which may have a duration of a few hours or minutes at most) and the true condition readily escapes detection; a number have persistent tachycardia of cardiac origin. The tachycardia, whether paroxysmal or persistent, may be from 120 to 300 in rate. Electrocardiography is especially valuable in such cases. When the heart is accelerated as a result of fever, poisoning, or exertion, the general form of the electro-cardiogram is retained. The summits corresponding to the auricular and ventricular contractions are clearly visible (Fig. 11) and are of normal outline. But in the special group of heart cases to which I refer such is not the case. It is customary to find either that the auricular summit has vanished or is obscure (first half of Fig. 14) or that it is inverted (Fig. 12).

These signs are invaluable, for they immediately acquaint us with a pathological fact which has only recently been discovered, namely, that the site of origin of the heart-beat may suffer displacement.

The normal heart-beat is now known to start in the region of the union of the superior vena cava and the right auricle. The abnormal or dislocated rhythms may start at several other points, for example, near the coronary sheaths. The absence of auricular summit or its inversion is a sign of the awakening of new impulses in a portion of the heart muscle at some distance from the normal starting point, and the tachycardias with which such signs are associated are known to belong to a specific and essentially cardiac group; they run their own special courses. Such tachycardias react to rest, drugs, and other agencies in a manner quite their own. Thus, where tachycardia exists, electro-cardiography is not only a valuable aid in diagnosis, but is also most helpful in guiding treatment.

Amongst the tachycardias of elderly subjects one form exists which is of special interest. The pulse-rate and the rate of beat at the apex may be 120 or perhaps 150. The rate persists and the cause is not determined. Electro-cardiography reveals the unexpected fact that the true rate of heart-beat is much greater, for while the ventricle beats at 120 or 150 the auricular rate is 240 or 300 (Fig. 13). The type is of importance not only because it has its own peculiar prognostic features, but also because it reacts in a special manner to drugs of the digitalis group. Often, by the normal heart-rate being restored. These cases are not uncommon. I have seen an instance of a similar kind in which, while the auricles beat at 300 per minute, the ventricles beat at 75, or exactly

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*That they signify displacement of the "pace-maker" is known from experimental observations.*
EDINBURGH OBSTETRICAL SOCIETY.

[June 29, 1912.]

MEDICAL, SURGICAL, OBSTETRICAL.

A NOTE ON "GRANULE-SHEDDING" IN TREPONEMA PERTENUE.

Several examinations of the spirochaete of yaws have been made here by dark ground illumination. It is a spirochaete of a very delicate character and varies in length from two to three diameters of a red blood corpuscle. In the majority of instances small spherical bodies "granules" are present—usually terminal—one at either end; others may be seen in the course of the spirals, but these gradually gravitate towards a pole.

After prolonged observation extrusion of these granules was observed.

This spirochaete does not show the "corkscrew" action of T. pallidum, nor is there any translation across the field. It exhibits, however, a lateral vibratory movement, and, presumably by means of this, the "granule" is shot with some force from the body of the spirochaete into the surrounding medium. Immediately after extrusion it is stationary, but soon it begins to make its way through the surrounding fluid, apparently turning over and over on itself. Motility is distinct, but I have not seen any suggestion of a flagellum.

The spirochaete of this "infective granule" is a very striking phenomenon, and its occurrence in yaws may be of interest, following, as it does, on the work of Balfour on syphilis and spirochaetosis of Sudanese foxes, and his observation on "granule-shedding" in those conditions.

H. S. RANKEN.

YeI, Lado Enclave, Sudan. Lieut. R.A.M.C., attached E.A.

NOTE ON THE OCCURRENCE OF A SPIROCHAETE IN CIRCOPITHECUS RUBER.

In the course of examination, by dark ground illumination, of the blood of a C. circopticus ruber, experimentally infected with Treponema gambiae, a spirochaete was observed.

This spirochaete was short and thick—roughly 8 to 12 μ in length—and showed no slow or progressive movement across the field. Spherical terminal refractile dots were present, but extrusion of granules was not observed.

Castellani and Chalmers describe S. macaci and S. pithecus was observed by Thibou and Dufourz in Circopithecus patau in Senegal.

This monkey was captured in the Lado Enclave, Sudan.

H. S. RANKEN.

YeI, Lado Enclave, Sudan. Lieut. R.A.M.C., attached E.A.

Reports of Societies.

EDINBURGH OBSTETRICAL SOCIETY.

Wednesday, June 13th, 1912.

Dr. HAI FERGUSSON, President, in the Chair.

Axial Rotation of the Myomatous Uterus.

Professor Kynoch, in a communication on this subject, recorded the case of an unmarried woman, aged 56 years, who had been aware of an abdominal tumour for twelve years. A month before admission to hospital she had been suddenly seized with acute pain, retention of urine, and extreme constipation. The abdomen was the size of a seven months pregnancy, and more, and the condition resembled a concealed uterine haemorrhage. At operation the tumour was found to be dark purple in colour from haemorrhage into its substance, and the cervix formed an elongated pedicle as thick as a finger, with two and a half twists from left to right. The fibroid grew from the top of the uterus. The tubes and ovaries participated in the torsion. It was suggested that pain associated with a fibroid might, more frequently than was supposed, be due to a slight degree of torsion.

Dr. Barbour asked if the dark colour was due to actual haemorrhage into the substance of the tumour or to transudation of blood pigment, as occurred in necrobiosis.

Dr. Haughton inclined to the opinion that the specimen was an example of necrobiosis. In a case reported by him two years ago the cervix did not form a pedicle, but the whole organ was twisted.

Dr. Fordyce said that on section of some fibroids vessels were seen, which might give rise to considerable haemorrhage. The specimen looked like a necrobiosis. That formation of degeneration frequently occurred during pregnancy and the puerperium.

The President asked if the specimen was as dark at the time of removal. He had never seen such severe symptoms in axial rotation. He mentioned a case in which he had removed during pregnancy a twisted subperitoneal fibroid showing necrobiotic changes.

Professor Kynoch said he appreciated the resemblance to red degeneration of a fibroid, but the specimen was almost black on removal, the cut surface was uniformly dark, and blood oozed from it.

Ectopic Gestation: Difficulty of Diagnosis.

Dr. F. W. N. Haughton read notes on two cases of ectopic gestation in which the diagnosis was difficult. In the first the patient, 25 years of age, had had one child five years previously. In the second pregnancy her doctor had diagnosed a septrated retroverted uterus. The fetal head was felt at the top of the tumour, 2 in. above the umbilicus. No symptoms had occurred except severe pains on two separate days, and then fotal movements stopped. As her pulse-rate and temperature were high, two gastrastic bungs were introduced to induce labour. They went in for a distance of 8 in., and could be felt near the apex of the swelling. Labour pains started four days later, but the uterus was required to be extracted and the opening of the sac was found closely adherent to the intestine; inside it was a fetus 3 lb. 9 oz. in weight. The uterus was pulled high up by the sac, the increase in length to 7 in. being mainly due to the lower uterine segment. In this case the patient was married in October, 1910, and two months later, after one week's amenorrhoea,

