and the question of his curability, with the exception of that of attaining the age of 15 years. If the patient, at the age of 15 years, is in the way of cure, special arrangements may be made for his further stay so as to complete it.

6. *Following up cases.*—An essential feature in the ultimate success of climatic and conservative treatment is the *following up* of patients by officers appointed for the purpose after the patients leave the hospital. The object of following up is to ascertain if the patients' surroundings are suitable and if there are signs of relapse; herein is one of the many values of thorough and complete registration of all cases.

7. *Education of children whilst under observation.*—The education of the children shall continue to be under the direction of the Board of Education or of the Education Committee of County Councils, and will probably follow the plan now in work at the Royal National Orthopaedic Hospital in London.

8. *Teaching trades to tuberculous cripples.*—As the ultimate objects of the scheme are to convert diseased into healthy individuals, and dependent or partially dependent into independent self-sustaining men and women, who will become useful members of society, it is necessary that each should, if possible, be taught a trade. Special teachers and methods are required for those who, being crippled, cannot be restored to perfect physical conditions, and instruction in particular trades must be provided if they are to be enabled to earn a satisfactory livelihood. The State of Nebraska has recognised these facts, and, since 1905, 450 children have been treated for their diseases, educated, and trained. Among the trades may be mentioned carpentering, leather-work, trunk-making, basket-weaving, printing, photography, metal-work, sewing, and typewriting.

9. *Special provision for incurable cases.*—Here we approach a difficult side of the subject. Some parents will, no doubt, welcome kind and considerate care for their afflicted children provided that they have free access to them, others may object. For the former class of children, a few hospitals for incurables should be provided; for the latter, some of the most pressing indications may be met by arranging for visitors to look after their welfare, to see that their surroundings are as healthy as possible, that they have necessary comforts and medical aid, and to ensure that they are not a source of transmission of infection to others.

Number of beds required.—From the experience gained here and in America it is clear that, when hospitals for tuberculosis are generally provided, the number of cases suitable for admission will be found to be out of all proportion to that which could possibly have been anticipated. Assuming that there are 7,500,000 children under the age of 15 years in this country, provision should at first be made for one bed in 5000. This means there should be 2500 beds. I venture to think, however, that the number of children under the age of 15 years is nearer 10,000,000 than 7,500,000. If we, however, accept 7,500,000 as the number of children under 15 years of age in this country, I believe the number of 2500 beds will be found too small, and I am inclined to think that 4000 beds may be required when the scheme is in full work. Since, however, under efficient treatment the number of children affected with tuberculosis in this country will decrease, this number of 4000 beds will be lessened ultimately.

Prime cost of beds.—From the statistics given in the reports of various institutions in this country and America we find that the highest average prime cost of hospitals is £150 per head, so that to provide for 2500 beds £375,000 may be required, or if 4000 beds are in working order the prime cost may be £600,000. The average prime cost ought not to exceed £100 per bed, and therefore these estimates may be reduced by one-third.

Cost of maintenance.—It is found that the cost of maintenance of an invalid in such an institution averages £65 to £75 per bed per annum, so that the average cost of maintenance of 2500 beds will be £175,000 a year, and of 4000 beds £280,000. I am of opinion, however, that with efficient management the cost of maintenance should not exceed £50 per bed per annum.

Research.

There are at least four problems of immediate urgency. They are: (1) The development of tuberculosis in cattle and other animals, and the means whereby it can be eradicated; (2) methods of entrance of bovine bacilli into human beings,

and of infection of human beings by the tubercle bacillus of man, and how prevention can be obtained; (3) the values and uses of the many forms of tuberculin; and (4) the diagnostic uses and therapeutic application of Roentgen rays. These problems can be attacked by a well-organised Central Research Department consisting of (a) a clinical laboratory, (b) a bacteriological laboratory, (c) a veterinary department including an experimental farm, and (d) a Roentgen ray department.

(a) and (b) may be combined under a superintendent or chief research officer, who should have clinical experience and be a bacteriologist with wide experience and sympathies. He should devote his whole time to the work, and a salary of £600 to £800 a year will be found effectual in securing a first-class man. Under him there will be a bacteriologist of the laboratory who will carry out the more scientific bacteriological investigations, whose salary might be placed at £400 a year; and these officers will require the services of three or four assistants at salaries of £200 to £300 per annum. The veterinary department should be under the superintendence of the chief research officer, and he should have under him a skilled veterinary surgeon. The laboratory should be centrally situated and in the immediate neighbourhood of a tuberculosis hospital; probably the best situation will be near London, in a healthy open site. At the laboratory opportunity should be provided for the surgical officers of the local tuberculosis hospitals or clinics to learn details of clinical examination, of pathological research and of bacteriological methods; and these officers will be required to make investigations in the local tuberculosis hospitals, and work under and receive guidance from the chief superintendent of the central research laboratory. The expenses of such a central laboratory for attacking the problem of tuberculosis, in children only, may be estimated at about £7000 to £8000 a year.

The question of scholarships or research students will arise. I venture to think the present time is not ripe to entertain this question, but eventually provision of £1000 to £2000 a year might be made for this purpose, and scholarships offered when the above scheme is in full working order.

Administration of the Scheme.

Presuming that it is the intention of the National Insurance Act to place the administration of the whole question of the treatment of tuberculous children in the hands of a body of experts nominated for that purpose by the authorities, and not in the hands of an existing Government Department, then the suggestions I beg to offer are as follows. The central direction and control of the scheme shall be in the hands of an Advisory Committee, and on the Advisory Committee the following elements shall be represented: (a) Registration and statistics; (b) finance; (c) building and accommodation; (d) expert surgical; (e) research; and (f) educational.

Harley-street, W.

AN ANALYSIS OF 35 CONSECUTIVE CASES OF BRADYCARDIA.

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It has become evident, through the increasing facilities for analysing the cardiac rhythm afforded by polygraphic and electrocardiographic methods of examination, that under the term "bradycardia" (by which is meant a pulse frequency of 60 beats per minute or under) are embraced pathological conditions owning various causes, producing divergent symptoms, and responding in different ways to treatment.

One of the first attempts at scientifically classifying such bradycardias was that of Mackenzie.⁸ He divided them into four classes as follows. 1. Those where all the chambers of the heart participate in the slow action (true bradycardia). 2. Where the slow rate is due to a missed beat, the ventricle having contracted, the resulting wave being too feeble to reach the wrist. 3. Certain cases of nodal rhythm where the auricle has ceased to beat, or does so synchronously with the ventricle. 4. Where the stimulus is blocked between the auricle and ventricle so that the

auricle beats at its normal rhythm, and the ventricle does not respond to the auricle, but pursues an independent and slow rhythm.

Such a division denotes well the types commonly met with. Two qualifying statements, in the light of more recent work however, must be noted. (a) With regard to Class 3. These cases are due, as admitted now by Mackenzie, not to a rhythm initiated at the nodal area of the heart, but to auricular fibrillation, in which there is associated a high degree of a.-v. block, so that few auricular impulses impinge upon and activate ventricular response. (b) With regard to Class 4. Though complete block at the a.-v. bundle is in most cases associated with the Stokes-Adams syndrome and a slow, regular, intrinsic ventricular rhythm of frequency 40 or thereabouts (bradycardia), cases have been reported^{7 10} in which complete block was certainly present, but the intrinsic ventricular rhythm has lain at 66 or even 70. So that not all cases of heart-block are associated with bradycardia. Despite the latter reservation, however, the above classification still furnishes the most suitable one for the analysis of cases of bradycardia, and will therefore be adopted here.

General observations.—The analysis has been based upon 35 consecutive cases, with the idea in view that thereby the relative type frequencies may represent, to some extent,

Class 2.—The dominant type of arrhythmia which was found here was that of coupled beats or bigeminy. The second beat of the couple was not conducted to the wrist, hence the apparent bradycardia. This rhythm was noted in six of the nine cases. In two (Cases 5 and 7) the extrasystoles (responsible for the weaker beats) arose, not regularly but irregularly. One case deserves especial note (Case 4). This

FIG. 2.

Example of bradycardia (Class 2) in which the slow radial pulse, seen in the lower tracing, is due to the fact that there arises in each cycle a ventricular extrasystole (marked c) which occurs synchronously with the next normally recurring auricular beat. This combined beating of auricle and ventricle produces a large wave (x) in the jugular tracing, but is not perceptibly felt at the wrist. (Case 1.)

was an example of pulsus alternans, in which each alternate ventricular beat was so weak that it failed to reach the wrist. Such phases of alternation were in this case only of short duration. The auricular rhythm in all the cases lay

TABLE I.—True Bradycardia.

No. of case.	Sex and age.	Disease.	Auricular and ventricular rate.	Rhythm.	Symptoms.	Remarks.
1	M., 30	Mitral stenosis.	50	Regular.	Dyspnœa on exertion. Patient comfortable at time of tracing.	1 V.e.S. noted.
2	M., 23	Convalescent. Rheumatic fever.	60	„	Patient has dyspnœa on exertion. Condition improved, and this was associated with acceleration of pulse (80) 13 days later.	—
3	M., 20	Convalescent. Lobar pneumonia.	54	„	Patient comfortable. No symptoms.	Acceleration of pulse associated with improvement.
4	M., 50	Chronic nephritis.	54	Slight respiratory variation.	Patient comfortable. No symptoms.	—
5	M., 15	Convalescent. Acute gastritis.	58	Regular.	Patient comfortable. No symptoms.	—
6	M., 13	Convalescent. Asthma.	52	Very marked phasic variation. (See Fig. 1)	Patient comfortable. No symptoms.	Acceleration of pulse associated with improvement.
7	M., 25	Convalescent after "fit."	60	Regular.	Patient comfortable. No symptoms.	Character of fit unknown. Admitted as "urgency." Acceleration of pulse with improvement.

V.e.S. = Ventricular extrasystole.

their probable frequency of incidence in ordinary practice. The cases have been observed exclusively in the larger teaching hospitals and infirmaries. The period of observations was two years. In all cases polygraphic records were gained.

Relative Incidence.

	Cases.	
True bradycardia	7 = 20	per cent.
Missed beat	9 = 25.7	„
Auricular fibrillation	16 = 45.7	„
Heart-block. Auricle active	3 = 8.5	„

Total number of cases 35

It will be seen that auricular fibrillation is responsible for over one-third of the cases.

Class 1.—The general statement with regard to these cases may be made that none gave rise *per se* to subjective symptoms. In all but two of the cases this slow pulse occurred in the convalescent period following an acute infection. The liability of disturbed sinial rhythm under such conditions has been recorded before.¹¹ The majority of the cases were young adults and adolescents. In four (Cases 2, 3, 6, and 7) improvement was associated with an increasing

FIG. 1.

Example of true bradycardia. (Case 6, Class 1.) Ventricle responds to every auricular beat (A wave in tracing). Rhythm irregular, so-called sinial arrhythmia.

pulse frequency up to about 80 per minute. In only one case was there any demonstrable cardiac lesion found. (See Table I.)

within normal limits—66 to 96. In all the cases but one (Case 3) there was suspected cardiac lesion. In none were there any signs of severe loss of cardiac compensation. The periods over which in any given case the bradycardia arose were, as a rule, variable and markedly subject to extrinsic causes, such as exertion, change of posture, or mental excitement. The symptoms associated with the disturbed rhythm were not definite, but some limitation of the cardiac response to effort was usually present. In none of the cases did drugs seem to inhibit the abnormal rhythm, though in two instances (Cases 3 and 6) there was evidence that the exhibition of digitalis tended to give rise to or prolong the abnormal condition. In one of these (Case 3) the patient during labour presented alarming symptoms associated with marked cardiac irregularity, but no tracings were taken which could determine its nature. (See Table II.)

Class 3.—Particular interest attaches to this class, not less on account of its frequency than upon the associated symptoms and their close relationship to and dependence upon treatment and prognosis. In all cases auricular fibrillation was present. This was readily demonstrated by the absence in the jugular pulse of the A wave, caused by the normal auricular beat, and also by the associated ventricular arrhythmia. There was in all cases clear evidence of organic cardiac disease, mitral stenosis with varying degrees of incompetence of this valve in ten cases, and cardio- or arterio-sclerosis was present in the remaining six cases. All the cases were in the middle decades of life; sexes about equally affected.

To appreciate fully the clinical significance of this group of cases it is necessary, perhaps, briefly to note the more pertinent facts at present known regarding the

influences affecting ventricular activity during auricular fibrillation. The fibrillary movement of the auricle conveys to the ventricle, *viâ* the *a.-v.* bundle and its two branches to right and left ventricles respectively, irregular and numerous impulses which excite this chamber to irregular and rapid contractions, usually in man at a rate of 100 or upwards. The ventricular frequency is proportional to the capacity of the *a.-v.* conducting channels to conduct to the ventricle the auricular impulses. If, now, the *a.-v.* bundle is partially

FIG. 3.

(Case 9, Class 3). Auricular fibrillation (note the absence of any A wave in the jugular tracing), together with irregular ventricular rhythm of slow frequency due to a high degree of *a.-v.* block.

blocked, the result is that a lessened number of auricular impulses reach the ventricle, and this chamber consequently

above series it will be noted that there were four instances of this, the proof resting in the fact that the ventricular rhythm is regular and at about 40. Similar examples of the association of auricular fibrillation and complete heart-block have been reported—Lewis and Mack,⁵ Falconer (A. W.) and Dean (G.),³ Lewis (Th.) (experimental production of),⁶ and Lea (C. E.).⁴

Since in all the above cases but two the bradycardia was of gradual onset and associated with the exhibition of digitalis or its allies, it is suggested that this drug exerted an especial blocking effect upon the *a.-v.* conducting tissues. Such an inference has been supported by a large body of clinical and experimental evidence.

To come now to the cases themselves, the symptoms associated with the bradycardia were variable. In all the cases in which digitalis had been given the general condition of the patient was better than before. In three cases, however, despite the slowing, there were unfavourable signs (Cases 1, 6, and 7.). In Case 1 there were præcordial distress and a sense of constriction about the chest. In the other two cases the patients died during the bradycardia, both with considerable signs of loss of compensation, oedema, and so forth. The rest of the cases presented tolerable

TABLE II.—“ Missed Beat ” Bradycardia.

No. of case.	Sex and age.	Disease.	Auricular rate.	Ventricular extrasystole.		Treatment.	Remarks.
				Time.	Frequency.		
1	F., 51	Mitral stenosis.	1. 120 2. 80 Radial = 40	Synchronous with auricular beat.	None. Each cycle.	—	Bigeminy with slower auricular rhythm; not with rapid. Occasional phases when V.e.S. arise irregularly, giving an irregular radial pulse.
2	M., 72	Cardio-sclerosis.	68 Radial = 34	”	”	—	Bigeminy induced by holding breath. Occasional phases where V.e.S. absent, or irregular in incidence.
3	F., 30	Functional?	78 Radial = 39	”	”	Digitalis (small doses).	Bigeminy more marked after digitalis.
4	M., 59	Chronic nephritis. Cardiac dilatation.	85 Radial = 43	Pulsus alternans.		—	The smaller beats not conducted to radial, giving half frequency. Such phases only occasional. Patient died.
5	M., ?	Arterio-sclerosis.	72 Radial = 54	V.e.S. just precedes auricular beat.	Irregular, but frequent.	—	—
6	M., 35	”	80 Radial = 40	Synchronous with auricular beat.	Each cycle.	Digitalis, 1/5 t.d.s.	Occasional phases when V.e.S. not present. Pulse then regular at about 78.
7	M., 59	Arterio-sclerosis. Paralysis agitans.	66 Radial = 56	V.e.S. irregularly placed.	Irregular, but frequent.	—	Digitalis seemed to have no effect in altering rhythm. After a swallow, ventricle slowed for three succeeding beats to a regular 36 per minute.
8	M., 39	Arterio-sclerosis.	96 Radial = 48	Synchronous with auricular beat.	Each cycle.	—	Incidence of bigeminy variable. Sometimes, V.e.S. only single and infrequent; at others, frequent and occurring irregularly.
9	M., 23	Mitral stenosis.	80 Radial = 40	”	”	Digitalis had no marked effect.	Bigeminy usually came on with changed posture. No single V.e.S. noted. Arrhythmia, when present, always of bigeminal type.

beats at a slower frequency.⁶ With progressive increase in this blocking this slowing can be induced to a point much lower than the normal ventricular frequency of 70 or thereabouts. Such cases, then, may become bradycardial, and it is in fact these cases which form the majority of the above list. In such cases, therefore, we may conclude that there exists, not only auricular fibrillation, but also a high degree of *a.-v.* block. It is especially to be noted that though slowing of ventricular rate results, the irregularity remains. Pushing this blocking process to its logical conclusion, however, we should expect to reach a point at which the block

FIG. 4.

Auricular fibrillation associated with complete *a.-v.* block. Note the absence of the A wave in the jugular tracing and the regular ventricular rhythm at frequency 37.

was complete and no auricular impulses could reach the ventricle. What happens, then, in that case, just as in ordinary heart-block, is that the ventricle assumes its own independent rhythm, regular in character, of 40. In the

comfort. This was especially noticeable in those cases where there was complete heart-block (Cases 5, 10, 11, and 16). In three of these cases the condition was compatible with a considerable degree of exertion. In the three serious cases the ventricular frequency was low; 36 in two, and in the other case (7) the full ventricular beats were 36, but there was a bigeminy due to extrasystoles. (See Table III.)

Class 4.—These cases merit brief notice here. Many cases of true heart-block continue to be published, a fact which

FIG. 5.

Typical heart-block. (Case 1, Class 4.) Auricular frequency 90, ventricular 26 per minute. Complete dissociation of the two chambers. Note a ventricular pause of 5.2 seconds' duration.

demonstrates their relative frequency of occurrence. The main clinical features present much similarity. The three cases of this series present no feature calling for comment. (See Table IV.)

The clinical features of bradycardia are mainly dependent upon the character of ventricular response to auricular

activity. Of the four classes noted the easiest to understand, perhaps, are the cases of true bradycardia, due to slow auricular rate and apparently unaffected by changes in the *a.-v.* conductivity. Such cases present no marked clinical features, and no treatment is necessary. The remaining three classes depend upon the interrelationship between auricular activity and *a.-v.* conductivity. With regard to the latter factor it must be noted that changes in the power of conductivity may affect not only the main bundle of His, but also one or other or both of the branches (right and left) as they pass into the right or left ventricular musculature respectively. The lowest form of block which we could consider, then, would be one which involves one only of the two conducting branches, the main bundle being intact. The observed effect of such a single branch lesion is that the ventricle to which the conducting channels are normal contracts before the one to which the conducting channels are

excitability must play an important part, and it is probably the varying relationships between these two factors that explain the variable characters. It is suggested, however, that with regard to the cases in Class 2, where extrasystoles arose in many instances in regular manner, and in all with considerable frequency, it may be reasonably assumed that there is altered relationship between the conducting channels and the ventricular musculature, and that this alteration is in the direction of an enhanced ventricular irritability or an associated alteration of conductivity. Regarded in this sense, the cases of Class 2 may be taken to represent the combination of a normal auricular activity (the auricular frequency was in all cases within normal limits) and an altered *a.-v.* conductivity. The clinically observed fact that in these cases the inception of the abnormal rhythm, due to the extrasystoles, was usually dependent upon altered extrinsic conditions, such as exertion, mental excite-

TABLE III.—Cases of Auricular Fibrillation.

No of case.	Sex and age.	Disease.	Auricle.	Ventricle.				<i>a.-v.</i> conductivity.	Treatment.	Remarks.
				Normal + V.e.S.	V.e.S.	Incidence of V.e.S.	Ventricular rhythm.			
1	F., 17	Mitral stenosis.	Fibrillating.	72	36	Each cycle.	Irregular.	Low.	Tr. digitalis, m 5 t.d.s., 37 days.	Pulse before treatment at 80. Patient has occasionally feeling of præcordial distress.
2	M., 30	Arterio-sclerosis.	"	1. 60 2. 40 3. 72	— — 36	— — Each cycle.	" " "	Moderate. Low. "	— Pill diuret. t.d.s. 18 days. " " " 23 "	Patient dyspnoëic. " comfortable. " "
3	M., 35	"	"	55	—	—	"	"	—	Patient had periods when rhythm regular and faster. Exertion led to irregularity.
4	M., 69	"	"	1. 50 2. 60	— —	— —	"	"	—	Patient in good general condition.
5	F., ?	Mitral stenosis.	"	1. 60 2. 40	30 40	Each cycle. —	Regular. "	" Ht. block.	—	Stages of block and inception of V.e.S. vary from period to period. General condition of patient good.
6	F., 73	"	"	1. 72 2. 65	36 65	Each cycle. —	Irregular. "	Low. "	Digitalis.	Patient in considerable distress. Died day after tracing taken.
7	F., 42	"	"	36	—	—	"	"	Nativelle granule daily for 43 days.	Much cyanosis and œdema. Patient died.
8	M., 24	"	"	72	24	Irregularly placed.	"	"	?	Patient has much dyspnoëa on exertion.
9	F., 58	"	"	55	—	—	"	"	No digitalis.	Marked right side heart dilatation. Patient fairly comfortable.
10	M., 58	Arterio-sclerosis and nephritis.	"	1. 42 2. 61	— 13	— Irregularly placed.	Regular.	Ht. block. Low.	Strophanthus, m 15 t.d.s., 7 days.	When block present, patient comfortable. Patient died later, after block had passed off.
11	M., 44	Mitral stenosis.	"	38	—	—	"	Ht. block.	Digalen, m 10 t.d.s., 33 days.	Patient comfortable. No symptoms.
12	F., 42	"	"	45	—	—	Irregular.	Low.	Tr. digitalis, m 10 t.d.s., 15 days; m 5 t.d.s., 23 days.	Patient comfortable. Phases of slow and more rapid beats, varying from 30 to 65 per minute, such phases only four seconds long.
13	M., 27	"	"	60	—	—	"	Moderate.	Tr. digitalis, m 5 t.d.s.	—
14	M., 42	"	"	48	—	—	"	"	?	—
15	M., 35	Arterio-sclerosis.	"	60	—	—	"	"	?	—
16	M., 42	"	"	30	—	—	Regular.	Ht. block.	No digitalis.	Patient fairly comfortable.

defective. The character of the ventricular beat is abnormal in form.¹ It has been found, also, that the type of beat thus produced is identical with the usual forms of extrasystoles clinically and experimentally observed. Again, digitalis is a drug which is said to exert distinct influences upon the conducting tissues in the direction of lowering the power of conductivity. Such action has been noted mainly upon the main bundle of His, but it has been shown that with toxic doses of this drug, in animals, the ventricle beats in abnormal fashion identical again with that of an extrasystole.⁹ It is tempting from these observations to suggest that in the latter instance the abnormal beats are due to defective conductivity in one or other of the *a.-v.* branches. Such a conclusion, however, is not fully warranted, and the exact genesis of the extrasystole as clinically seen is still undetermined. In dealing with conductivity within the ventricular musculature, as represented by the branches, the associated conditions of the ventricular

ment, or even posture—conditions as a rule, associated with alterations in auricular frequency—presents a suggestive analogy to certain cases of incomplete heart-block (main bundle). For in these cases, unlike those in which the block is complete, the ventricle is still under auricular influences, and it is in just these cases that with exertion attacks of syncope are prone to arise.⁶ Such fits are due to the increasing degree of block consequent upon an accelerated auricular frequency, and the analogy of such fits may be made to the less acute, but nevertheless present symptoms occasionally induced by the inception of regularly recurring extrasystoles. In both cases there appears to be an altered relationship between auricular activity and *a.-v.* conductivity.

Coming now to those conditions where there is demonstrable blocking in the main bundle of His, these are well exemplified in Classes 3 and 4. In Class 3 the state of the auricle is the same in all—namely, fibrillating. The variant effects in individual cases from time to time and in different

cases are mainly attributable to changes in conductivity. Such conductivity changes are in all cases in the direction of depression, and in nearly all the cases, but not all, the cause of this was digitalis. The action of the drug is exerted in the main upon the bundle of His. This fact is evidenced because the slowing in many cases was not associated with extrasystoles, and also because in three instances complete block was obtained. Not all cases, however, presented this feature. Just as in Class 2, and with even more reason, there is evidence that the alteration might not be wholly confined to the main bundle, but might

presence of these extrasystoles prevents or fails to influence the inception of the independent ventricular rhythm, so typical of complete block, there does not appear to be sufficient evidence to say.

Conclusion.—From a consideration of the above cases it seems reasonable to conclude that in most cases the cause of bradycardia (excluding Class 1) may be attributable to altered *a.-v.* conductivity, that such a cause is responsible not only for Classes 3 and 4, but also possibly for Class 2; and that in most cases of auricular fibrillation, but not all, the cause is digitalis.

TABLE IV.—*Complete Heart-block; Auricles Active.*

No. of case.	Sex and age.	Disease.	Auricle.	Ventricle.		<i>a.-v.</i> conductivity.	Remarks.
				Frequency.	Rhythm.		
1	M., 66	Cardio-sclerosis.	90	30	Regular.	Block complete.	Patient died. Digitalis tended to increase frequency of syncopal attacks.
2	M., 38	Acute myocarditis.	126	34	„	„	Patient died. Suppurative myocarditis involving especially the interventricular septum.
3	M., 32	?	60	36	„	„	Patient subject to syncopal attacks.

influence also one or other of the branches. Such evidence seems to be afforded by the frequent appearance of extrasystoles. These arose in some cases regularly, as in Cases 1, 2, 5, and 6; in others less regularly. In all the cases where the *a.-v.* block was complete their presence was noted.² In Case 10 the continued administration of strophanthus after the inception of complete block resulted in occasional paroxysms of tachycardia, due to rapidly successive nodal or ventricular extrasystoles. To what extent the

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Clinical Notes :

MEDICAL, SURGICAL, OBSTETRICAL, AND THERAPEUTICAL.

NOTE ON A CASE OF RUPTURE OF A NORMAL SPLEEN.

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A MAN, aged 32 years, was admitted into the Campbell Hospital at 10 A.M. suffering from abdominal pain and tenderness. He stated that this from the first was due to a blow he had received three hours previously. His general appearance was anxious; the pulse was 76 and of fair volume, the respirations were not hurried, and there was no abdominal distension, but some pain on pressure which was not definitely localised. The shifting dullness on abdominal percussion was the most marked symptom of abdominal mischief.

The patient was immediately prepared for operation and by the time this was effected his condition had undergone a complete change: the pulse-rate had increase to 100 and the volume was markedly smaller, the respirations were hurried, and the dullness on percussion was very considerable, especially over the pubic region. A median incision was made, and when the abdominal cavity was opened a large quantity of fluid blood escaped and masses of blood-clot had to be removed. The abdominal incision was continued up towards the ensiform process when it was seen that the hæmorrhage proceeded from the lower margin of the spleen. A transverse incision four inches long was then made, the vessels were ligatured, and the spleen was removed. The patient's condition at this time was critical. An intravenous saline injection of four pints was given, and after all the blood had been removed the abdominal cavity was filled with hot saline and the wound was stitched up by through-and-through sutures. Recovery was practically uneventful, but brachycardia was a marked symptom for some time.

The interest in this case lies in the facts that the patient was a healthy well-developed man, the spleen

apparently normal in every respect, and the blow received not severe. The rupture was an inch in length, situated along the lower margin. The blood-count six weeks after operation was as follows: Red blood corpuscles, 4,200,000; white blood corpuscles, 17,600; polymorphonuclear, 28 per cent.; transitional, 10 per cent.; large mononuclears, 12 per cent.; lymphocytes, 50 per cent.; and eosinophiles, *nil*. After six months: Hæmoglobin, 74 per cent.; red blood corpuscles, 4,000,000; white blood corpuscles, 14,000; polymorphonuclear, 72 per cent.; large mononuclears, 8 per cent.; lymphocytes, 20 per cent.; and eosinophiles, *nil*. After one year: Hæmoglobin, 93 per cent.; red blood corpuscles, 5,100,000; white blood corpuscles, 8,000; polymorphonuclear, 40 per cent.; large mononuclears, 20 per cent.; lymphocytes, 28 per cent.; and eosinophiles, 12 per cent. These figures tend to confirm the observations of Y. Noguchi which he reported last year in the *Berliner Klinische Wochenschrift*, of which an interesting *résumé* is given in the January number of the *Medical Review*. Calcutta.

A CASE OF LARGE DERMOID CYST SITUATED OVER THE STERNUM.

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THE patient, a girl aged 17, was sent to me by Dr. W. Allan, of Govan, and was admitted to the Elder Hospital on March 21st. The history was to the effect that a small red mark existed from the time of birth in the middle line a short distance below the episternal notch. Little difference was noticed in the condition until about the age of 12, when it began to increase in size, appearing at first as a thickening of the skin under the mark, which, as it grew, became more tumour-like. Shortly thereafter, when the swelling was of about the size of a hen's egg, but flatter, it was first shown to a medical man, who did not advise surgical interference. Four years ago, when the patient was 13 years of age, the tumour increased rapidly in size, became much softer, and caused a sensation of breathlessness, which ultimately induced her to see Dr. Allan.