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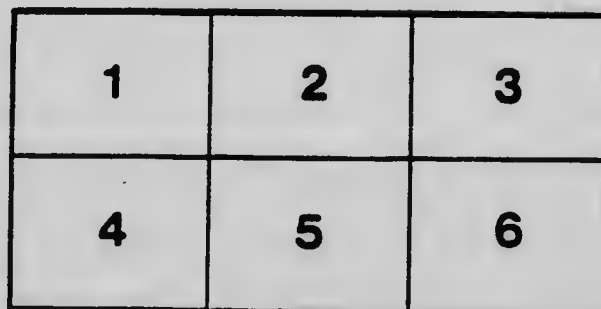
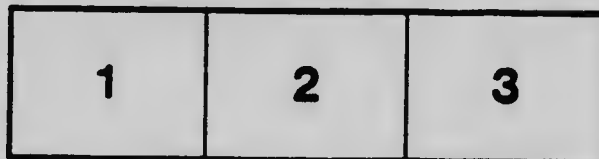
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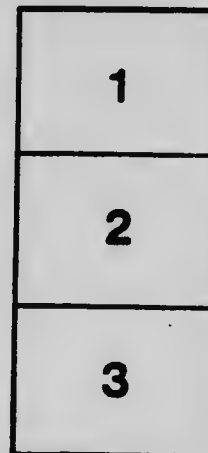
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THE IRRITABLE HEART.

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## THE IRRITABLE HEART.

BY

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In the pathology of the heart structural changes have not received too much attention in the past, but disturbances of function have been too often disregarded. We know now with reasonable certainty that the heart muscle possesses the various properties of stimulus production, excitability, conductivity, contractility and tonicity. The diagnosis of a cardiac disorder is scarcely complete until we have considered whether or not each of these properties is normal.

A recognition of structural alteration is of value in proportion as it enables us to estimate the ability of the heart to perform its functions. A valvular lesion is important because it may lead through fatigue to loss of tonicity and ultimately to failure of contractility.

A degeneration of the myocardium is to be considered in its effects on these and other properties of the heart muscle.

Of the properties which characterize heart muscle stimulus production and excitability are so related to each other that they cannot always be separated. If the heart is beating too frequently we cannot always say whether the excitability or the stimulus production is the property which is increased above the normal. In speaking of the irritable heart therefore, we must for the present include not only cases in which the excitability of the heart is too great, but also those in which the heart is being too powerfully stimulated.

The signs and symptoms which are more or less characteristic of the irritable heart, are palpitation, consciousness of the heart's action, frequency or increased amplitude of the heart beat, diffuse apex beat, epigastric pulsation and dilatation the result of fatigue.

In cases where several of the above mentioned symptoms and signs are present, the possible causes should be enquired into. They may all, I think, be included under three heads:

1. Causes acting mechanically to increase the work of the heart, such as, distended stomach, lifting heavy weights, athletic overstrain.
2. Causes which impair the nutrition of the heart, such as, anæmia, too rapid growth, the debility following exhausting fevers.
3. Causes which affect the heart through the nerve paths controlling its rhythm and excitability, or, to use modern phraseology, the chronotropic and bathmotropic nerves. Such causes are, powerful emotions, tobacco poisoning, and abnormalities of the thyroid glands.

The generalizations I propose to make in this paper will be based on a consideration of about forty cases, of which I have in my possession

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Read before the Canadian Medical Association, September, 1907.

written notes, and as many more which I have seen and examined but have not recorded on paper. Only a few cases, however, can be reported individually on account of space.

During the winter of 1900-1901 I examined candidates for the gymnasium of the city Young Men's Christian Association. The first evening ten candidates presented themselves, of which three showed disorders or abnormalities of the heart, illustrating some of the causes referred to above.

*Case I.*—A young man who had played hockey for six winters. Apex beat very pronounced; heart dulness to beyond nipple line. Pulse 60. No cause could be discovered for the enlargement of the heart except the excitement and strain attending the game of hockey.

*Case II.*—Had an attack of typhoid fever the preceding summer; did some hard bicycle riding soon after. The heart lifted a large area of the chest with each beat; dulness was increased, from 1 in. to right of mid-sternal line to nipple line; pulmonary second accentuated. Pulse 85 sitting, 110 standing. The typhoid fever and the hard bicycle riding probably both contributed to the production of his enlarged heart and frequent pulse.

*Case III.*—Aged 20; height 6 ft. 2 in.; pulse 72. Heart enlarged to nipple line. No cause could be elicited unless it was due to the weakness resulting from too rapid growth.

The following case from private practice seems to have resulted from over-exertion:

*Case IV.*—Married man, aged 30. Had not felt well since nine months before when he rode seventy miles in one day on a bicycle. He was not in proper training, as he had not ridden at all for a year previously. The fact that he smoked rather much may have had some bearing on the case also. His pulse on two examinations was found to be 100 and 120 per minute. Apex beat diffuse; heart dulness slightly enlarged. In two weeks his pulse came down to 72 and his apex beat and heart dulness became normal. The only treatment was abstinence from tobacco and a mixture containing ammonium bromide and digitalis.

The next case represents a more advanced stage of the so-called athletic heart.

*Case V.*—Man of 45, unmarried; first seen October 21st, 1900, in the evening. He was sitting up in bed with marked dyspnoea and complained of pain in the epigastrium; he had had similar attacks before but not so severe. He ascribed the present one to fatigue from walking too far during the day. He had been a heavy smoker till a month before when he had given it up; he had felt worse since. He had had rheumatic pains at times, but no definite attack of rheumatic fever. He



had been one of the best known local athletes in his youth, his greatest forte being snowshoe racing. His pulse was fluttering, irregular and uncountable. The heart beat could be distinctly seen through the night shirt; apex beat visible and palpable over a large area. Heart estimated to be beating considerably over 150 per minute, but the beat was too frequent to count. Slight edema of the lower extremities. The more alarming symptoms passed off with a night's rest and the hypodermic injection of 1-50th gr. of atropine.

The next day the following notes were taken: "Feels fairly easy. Arteries sclerosed. Pulse 108, very irregular. Heart dulness vertical from the middle of the 4th rib, transverse six inches from  $\frac{1}{2}$  inch outside right sternal border to 1 inch beyond nipple line. Heart sounds sharp in quality; an occasional rough murmur heard."

In a few days he improved sufficiently to get about. Seven months later the transverse dulness was  $5\frac{1}{2}$  inches; heart rhythm irregular, rate 108 per minute. Only 65 or 70 beats could be felt at the wrist, the others being too weak to be felt. A year later his heart dulness was sometimes about normal but varied in a very remarkable way from  $2\frac{1}{2}$  to  $4\frac{1}{2}$  inches, according to the state of fatigue. Heart beat forcible and extensive; no murmurs. Pulse when quiet 75, irregular. He was kept on moderate doses of digitalis, about half an ounce of the infusion a day, for a long time, and required medical attention less and less. His urine was examined at various times and found normal. One note of his urine read: "Clear, acid, 1016, no albumin, no sugar." I have not seen him lately, but hear that he is getting along very well and attending to business. If his heart gets troublesome he takes digitalis or suprarenal extract. It is now about seven years since I first saw him.

I fancy we have here to do with a heart injured by athletic and, perhaps, other excesses. One of his sisters has sclerosed arteries and a moderate degree of cardiac hypertrophy. He probably had similar tendencies which made his heart unable to stand the strain put upon it by his numerous hardly contested races.

Among the most interesting examples of irritable heart are those that declare themselves under the influence of abnormalities of nervous control. The case which made the most lasting impression on my mind as an example of the emotional heart, and which first directed my thoughts to the questions discussed in this paper, is unfortunately one of which I have only a page or two of imperfect notes, although I had her under observation for some years.

*Case VI.*—Unmarried woman, about 33 years of age, first seen in October, 1905. Complained of swelling of feet and palpitation of heart. Heart first became troublesome after death of mother a couple of years

before. Patient grieved deeply and long for her mother and was also much troubled over other family matters. She seemed to possess an unusual capacity for mental anguish. Pulse 80, of small volume. Apex beat exaggerated and a little outside nipple line. No murmurs. Moderate oedema of feet. During the few years succeeding my first visit she continued to worry and grieve over her mother and also over her estrangement from her only brother. She frequently had a feeling of a lump in her throat and suffered with palpitation of the heart. In the summer she was troubled with burning of the feet. Her condition changed very little and her symptoms did not improve. About six years after I first saw her I was summoned to her house one day and found her unconscious, pulse scarcely palpable, heart sounds very feeble. She did not respond to stimulation and died in a few hours without regaining consciousness. There was no post mortem, so the exact cause of death must remain a mystery. Whatever other causes were at work, however, I felt convinced that the emotional strain had played a prominent part.

*Case VII.*—A young woman came complaining of numbness in the feet and legs lasting about a year. Symptoms corresponded in time with a period of great mental distress. Patient said she had a trembling feeling in the chest and noticed her heart thumping, especially when lying on left side. Frequent micturition; pulse 108; heart enlarged outwards about two inches; beat weak and rapid.

*Case VIII.*—Widow, aged 72, complains of dyspnoea in early morning. Has always been emotional; heart easily excited. Has been much upset lately by marriage of daughter and family disagreements. Pulse 144. Heart greatly enlarged; transverse dulness 7 inches. Right ventricle enlarged, as shown by retraction of large area with each systole. Apex beat can be felt, not at lower border of heart, but considerably higher up. No abnormal sounds. Under rest in bed, digitalis and adrenalin, the pulse came down to 70 and the heart dulness nearly to normal in a few weeks.

*Case IX.*—Medical student, aged 21; family and financial worry for several years. Moderate smoker. No history of over-exertion. Suffers with palpitation, especially in evening; feels heart beating rapidly at night. Digestion good. Pulse regular, low pressure, 105 per min. Patient says he feels his heart drop a beat sometimes. Apex beat diffuse. Heart slightly enlarged; transverse dulness left of sternum to  $\frac{1}{2}$  inch inside nipple. Sounds sharp and distinct; pulmonary second exaggerated. Ordered ammonium bromide and digitalis. In two weeks pulse was down to 70 and symptoms were relieved.

In the next case tobacco poisoning seemed the essential cause of the disorder, and in the two succeeding ones it probably played a part.

*Case X.*—Cabman, aged 30; complained of indigestion; feeling of distension; weak and smothering feelings; palpitation of heart; constipation; frequent micturition. Indigestion had been present for two years. Patient admitted heavy smoking and chewing. Pulse 109, full and hard. Apex beat not pronounced, but epigastric pulsation very marked. Heart dulness mid-sternum to nipple line; sounds sharp; no murmurs. No dilatation of stomach detected on palpation or percussion. Urine 1005, no albumin or sugar. Ordered 15 grms of laudanum three times daily. A week later the pulse was 75 and the heart dulness was diminished nearly to normal. Very little tobacco had been consumed in the interval. Laudanum discontinued and ammonium bromide and digitalis ordered. Two months later the pulse was 80 and the heart normal in size.

*Case XI.*—Unmarried man of 28; clerk in china store. Nervous; uneasy feeling about heart since a mental shock ten days before. Has always been muscular and has at times done heavy lifting in connexion with work. Anæmic, costive, a heavy smoker at times. Appetite usually good, but has suffered lately with indigestion. Teeth good; no history of rheumatism. Has had scarlatina. Pulse 85. Apex beat diffuse; dulness to nipple line sounds normal. Ammonium bromide and digitalis. Three weeks later the pulse was 72 and the heart normal. Five months later smoking to excess. Pulse 76, apex beat exaggerated as before, but heart dulness normal. Ordered Fowler's solution, potassium iodide and digitalis. A month later pulse 85; apex beat not visible; dulness normal.

*Case XII.*—Young man of 19; complains of heavy feeling about heart for about nine months, worse lately. No history of rheumatism or mental distress. Has done some hard bicycling. Smokes a good deal; began smoking cigarettes when 12 or 13, now smokes a pipe, averages 4 or 5 pipefuls of Old Chum daily. Complains of shortness of breath and has the gasping respirations characteristic of tobacco poisoning. Feels as if there was an obstruction to his breathing. Pulse 84 per minute and full in quality. Apex beat not visible but well marked on palpation in nipple line showing some cardiac enlargement; vertical dulness from upper border of sixth rib, transverse from  $\frac{1}{2}$  inch to right of sternal border to nipple line. Sounds sharp; no murmurs. Blood pressure 118 to 125 on different estimations. Ordered ammonium bromide and digitalis. In two weeks he was seen for the second and last time and his condition was about the same, there was certainly no definite improvement.

The next few cases illustrate the association of irritable heart with enlarged thyroid.

*Case XIII.*—Young woman of 24, unmarried; complains of a swelling in neck which has been noticed for about a year. Thyroid found moderately enlarged, especially the right lobe. No tremors or exophthalmos; no history of fright. Heart often palpitates, especially for past six months. Menstrual flow has diminished recently from four days to two days. The thyroid enlargement is thought to be more noticeable at these times. Hands and feet are sometimes felt to be swollen at time of periods; finger nails sometimes turn blue and extremities get cold. Patient complains of feeling nervous; mother and sister have both had enlarged thyroids. Patient noticed nervousness and palpitation of heart before swelling in neck. Heart beat is so pronounced that it may be distinctly seen and felt through underflannel. Heart not noticeably enlarged; no murmurs; pulmonary second exaggerated.

Two years later; patient married and pregnant about six months. Apex beat exaggerated; heart dulness increased outwards about two inches; no murmurs; pulmonary second exaggerated. She was confined in due time in a country town and I was told she made an excellent recovery from her puerperium.

*Case XIV.*—Young man of 24; has had several weeks of severe financial worry; feeling weak and short of breath for about three weeks; occasional headaches; bowels costive. Pulse 96; heart slightly enlarged. Heart beat visible and shows systolic retraction of precordium one inch outside outer limit of dulness. Heart sounds clear; pulmonary second exaggerated; no murmurs. Vessels of neck show undue throbbing. Both lobes of thyroid moderately enlarged.

*Case XV.*—Young woman of 21, unmarried; complains of burning pains in feet, palpitation of heart, swelling of neck. History of worry about love affair, commencing a little before symptoms complained of and continuing up to present. Feels nervous; pulse 132; no tremor, exophthalmos, or von Grafe. Apex beat exaggerated, heart dulness normal; no epigastric pulsation; thyroid gland moderately enlarged. Prescribed medicine which patient did not take, but shortly afterwards a reconciliation took place between her and her lover and the symptoms soon began to subside. Two months later, however, the thyroid was still a little enlarged and her pulse was 96, but the subjective symptoms were gone.

A critical review recently published by Cheinisse<sup>1</sup> in *La Semaine Médicale*, deals with some of the problems under discussion. He draws attention to the fact that there has recently been a three-fold increase

in the number of candidates for the Swiss Army rejected on account of heart affections. This fact has been ascribed to the wave of athleticism which has spread over Continental countries in recent years. He quotes a number of authors who have pointed out the deleterious effects on the heart of injudicious indulgence in athletics during the period of growth. He considers it well established that excessive muscular work can produce chronic affections of the heart, but believes that the possibility of acute dilatation of the heart being produced in this way is open to question. He quotes authorities for and against. Those who have used the old methods of inspection and percussion as criteria, believe that acute dilatation may be brought about by physical strain, but the majority of those who have made use of X-Rays to determine the size of the heart will not admit that this is the case. The author of the review seems to favour the conclusions of the latter group, but to the present writer their subjects seem to have been poorly chosen, being trained athletes in whom the heart would naturally be able to adapt itself to sudden strain. Moreover, the use of the X-Rays itself may not be as free from practical fallacies as it is sound theoretically.

In any case the reviewer tells us that there is no reasonable doubt as to emotional causes being able to bring about acute dilatation. One case is given of a young man in whom acute heart symptoms with dilatation were caused on several separate occasions when he attempted to fight a student's duel. Two cases are given of acute dilatation of the heart among those who had to witness the horrors of the recent massacres of Jews at Odessa. In all these cases the dilatation was of short duration, lasting only a few hours.

A valuable storehouse of suggestion on the subject of emotional disturbances of the heart is to be found in one of our great English classics, Burton's "Anatomy of Melancholy." He describes the symptoms, for instance, of "Maids', Nuns' and Widows' Melancholy," as follows: "The most ordinary symptoms be these, *pulsatio juxta dorsum*, a beating about the hack which is almost perpetual, the skin is many times rough, squalid, especially as Aretaeus observes, about the arms, knees and knuckles. The midriff and heartstrings do burn and beat fearfully and when this vapour or fume is stirred flieth upward, the heart itself beats, is sore grieved and faints. . . . They complain, many times, says Merceatus, of a great pain in their heads, about their hearts and hypochondries, and so likewise in their hreasts, which are often sore." Among the cures of this complaint Burton recommends: "Sparing diet, plebotomy and physic, but the best and surest remedy of all is to see them well placed and married to good husbands in due time."<sup>2</sup>

I can recall at least one case in my own practice where enforced continence in a married woman seemed to be the chief cause of severe palpitation, and I heard later that the continence and the palpitation came to an end about the same time.

A recognition of the cause of an irritable heart may usually be attained after a careful consideration of the history, the habits, the physical signs and the symptoms. The athletic proclivities of the individual must be carefully enquired into. Cardiac pain and flatulence should excite suspicion of tobacco poisoning, although the cause will frequently be found to be unsound teeth. The presence of sighing or gasping respiration in a man is almost pathognomonic of tobacco poisoning, as pointed out by the writer elsewhere.<sup>3</sup> This is especially true if there be a subjective complaint that the air cannot be drawn into the chest. A history of emotional shock and enlargement of the thyroid gland are frequently found together. It is sometimes difficult to decide which is the primary cause and which secondary. An interesting point I have noticed in cases of enlarged thyroid is that in the jugular pulse the systolic wave is usually higher than normal, rising above the auricular wave. I fancy this is to be explained by the arterial pulse being transmitted through the dilated capillaries of the gland to the veins.

With regard to treatment it is of first importance to remove the cause whatever it may be, if it can be determined. Rest to the heart is desirable, and to attain this we may have to order physical rest, or we may have to devise some plan for promoting mental and emotional rest, which is not so easy. Of direct medication I have had excellent results in the athletic heart from ammonium bromide and digitalis. In the tobacco heart I have been led by theoretical considerations to employ preparations of opium, and I think I have seen decided benefit result. I have used both laudanum and codeine for this purpose, but for obvious reasons these drugs must only be used after due consideration and must not be continued too long, especially the former. In the emotional and thyroid hearts I have had the best results in relieving symptoms from thyroid gland tablets. The administration of iodothyryn is said by Cyon<sup>4</sup> to slow the heart and lower the blood pressure. Numerous authors claim to have seen benefit from it in certain forms of goitre, although in other forms it seems to do harm. The best way is to try it carefully and observe the effect. I have been much impressed by the testimony of patients that it has a marvellous effect in calming their nervous feelings. In some cases I have seen the heart

improve during its administration, and in some cases I have been disappointed.

To slow the heart and improve its tone in these cases I have used both digitalis and suprarenal tablets. I have seen some excellent results from suprarenals and also some failures. My personal conviction is that we have not yet learned the proper dose of suprarenal by the mouth. I fancy an effective dose will be found to be twelve or fifteen two-grain tablets a day or a couple of drams of the 1.1000 solution of the active principle. If the administration be hypodermic 10 minims of the 1.1000 solution every two hours is probably about the maximum dosage.

These cases of irritable heart offer many interesting questions for consideration and in some cases for experiment. Can we have a diffuse apex beat without dilatation of the heart? How are we to explain its presence when the heart dulness is not increased? What is the meaning of epigastric pulsation? Can we always distinguish that due to the right ventricle from that due to the abdominal aorta by systolic retraction in the former case? Why do we sometimes get systolic retraction of the precordium without epigastric pulsation? What is the meaning of marked throbbing in the neck without corresponding fulness of the radial pulse? Does it indicate dilatation of special vascular areas in the neck, perhaps the vessels of the thyroid gland? Is not the pulsation observed in the neck venous more frequently than is usually supposed? Where the neck has been throbbing violently and I have taken a tracing I have sometimes obtained the tracing characteristic of the venous pulse when I expected it to be arterial.

Many of these questions I must leave unanswered from lack of a sufficiency of observations to settle them to my satisfaction. I shall be grateful for any light that may be thrown upon them and on some future occasion I may return to some of them again.

#### REFERENCES.

- L. CHEINISSE.—*La Semaine Médicale*, Paris, February 27th, 1907.  
 ROBERT BURTON.—*The Anatomy of Melancholy*, Part I, Sect. III, Mem. II, Subs. iv.  
 W. S. MORROW.—"A Respiratory Symptom of Tobacco Poisoning." *British Medical Journal*, June 5th, 1897.  
 CYON.—*Manual of Physiology*, by G. N. Stewart, Fifth Edition, page 490.

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