

general average. It was found that about 2 per cent. of the population were actually neuropathic, 30 per cent. were normal, but carried the neuropathic taint in their blood, and the remaining 68 per cent. were normal and without the neuropathic taint. Assuming for the moment that these various elements in the population will intermarry freely without the interference of selective influences or of any other disturbing factor, then it may be found by calculation that in the next generation the percentage of neuropathic subjects would rise to 2.89, that of those who are normal, but carry the taint, would fall to 28.2, and that of those who are normal and without the taint would rise to 68.89. In other words, insanity would increase, but at the same time a process of purification would take place through the segregation of normal traits and of neuropathic traits in separate elements of the population.

The influence of selective forces is difficult to determine. On the one hand, the higher death-rate among neuropathic subjects and some amount of elimination through sexual selection must tend to reduce chances of propagation. On the other hand, the lack of moral inhibition among them not infrequently leads to early marriages, rearing of large families, or illegitimate propagation. One thing would seem certain, namely, that those modern conditions which have the effect of increasing the admission rates and the permanent populations of hospitals for the insane must be regarded as forces which aid in the elimination of defective germ-plasm and which are, therefore, salutary.

Without doubt this process of elimination could be hastened by a well-organized eugenics movement, but it would seem that matters have come to such a pass that we may have the burden, not of spreading a propaganda, but of holding back enthusiasts from premature and ill-considered action. Laws providing for the sterilization of degenerates, defectives, lunatics, etc., have already been passed in Indiana, California, Washington, Connecticut, New Jersey, Iowa and Nevada. They have everywhere remained practically a dead letter and we are already having to deal with the reaction of alarmed conservatism. In other words, the net result of such legislation has been so far no good and much harm.

Even if it were possible not only to enact laws for the sterilization of neuropathic subjects, but also to enforce them, nobody to-day would be in a position to tell whether or not it would be desirable or on the whole profitable for the human race to do so.

It is now many years since Lombroso with his far-seeing vision was led to observe the kinship between the neuropathic constitution and genius. Whether we agree with him fully or not, the fact is that in dozens of cases the very highest types of human activity have been associated with neuropathic traits, and in many more they have been the products of subjects of neuropathic descent. Among those who have been frankly insane may be mentioned, in the sphere of literature, Swift, Cowper, Shelley, Lamb, Burns, Keats, Byron; in the sphere of musical composition, Schumann, Wagner, Glinka; and in the sphere of science and natural philosophy, Sir Isaac Newton and Auguste Comte. If it is true that genius, which, as Lombroso says, is "the one human power before which we may bend our knee without shame," is a neuropathic manifestation, then it must be obvious to every right-thinking person that wholesale sterilization would be hardly a measure of wisdom; on the contrary, genius must, at any cost, be allowed to thrive and is no matter for mediocrity to meddle with. But it may be that only certain types of the neuropathic

constitution are related to genius, or that any existing relationship is not essential, but incidental. Who knows? The point is merely made that the time has not yet come for radical action. The immediate need is for further investigation.

Mainly through the efforts of Dr. C. B. Davenport the State Board of Charities has created a bureau for the investigation of pauperism, feeble-mindedness and epilepsy. At the present time, Dr. Gertrude Hall is at the head of the bureau. But steps have been taken to seek a legislative appropriation to provide for ten field workers to be employed in the work of tracing all pauperism, feeble-mindedness and epilepsy to their sources throughout the state, county by county. The State Board of Charities has nothing to do with insanity, yet it would add but comparatively little labor, in going over the field, to record the equally necessary data concerning insanity, while at the same time the project would gain energy from a union of the interests of the State Commission in Lunacy with those of the State Board of Charities.

MYOCARDIAL DEGENERATION

E. FLETCHER INGALS, M.D.
CHICAGO

Various terms, such as fatty degeneration, fibroid degeneration, myocarditis, weak heart, chronic cardiac insufficiency and senile heart, are sometimes applied to fairly distinct conditions, as for example, senile heart; but the symptoms supposed to indicate different forms of the disease may be caused by the same pathologic conditions. Again, various pathologic conditions may cause the same symptoms, and therefore an exact classification becomes impossible.

These affections are found more often in men than in women. Fatty degeneration is, as a rule, a disease of old age or at least of people past middle life; and fibroid degeneration also occurs much the most frequently in those past their prime, but it is commonly observed five or ten years earlier than fatty degeneration.

Fatty and fibroid degenerations of the heart-muscle are also classified clinically as myocarditis, which may be either acute or chronic. I wish, however, especially to call attention to conditions, commonly chronic in character, although the symptoms may be very acute—so acute indeed that not infrequently no warning is given before the person is seized with a sharp precordial pain, with a feeling that pulsation of the heart has ceased, or with faintness and dizziness, and he sinks back in his chair or falls to the floor and expires before any one can render assistance. Symptoms indicative of cardiac degeneration occur several years before the fatal termination in a few, but in the majority the symptoms extend over a period of only one to two years.

These degenerations seldom occur until after middle life, and they are commonly found either in the aged or in those prematurely senile, and are, therefore, sometimes considered under the head of senile heart. By many physicians they are all grouped under the head of myocarditis; but this name is so suggestive of a more active process that I think myocardial degeneration the better term.

Although there is pathologically a sharp line of demarcation between acute inflammation, fibrosis and fatty degeneration of the heart-muscle, in the majority of cases there is no way by which these various conditions

can be distinguished from each other clinically. On this account it appears best to consider them together, for not only the symptomatology, but also the prognosis and the treatment, with few exceptions, are essentially the same. These exceptions, whenever well marked, will be indicated.

Fatty degeneration of the heart includes two conditions, one in which the action of the organ, as a whole, is impaired by superimposed fat which does not necessarily interfere directly in any way with the muscular fibers; but the fatty deposit may penetrate between the muscular fibers so as to impede their action mechanically, to impair nutrition and ultimately to cause destruction of the fibers themselves by fatty degeneration. This occurs in general obesity and has been termed "fat heart." In well-marked cases it may be recognized clinically with a fair degree of accuracy.

In the other condition, owing to some obstruction or inflammation of the coronary arteries, nutrition is interfered with and the muscular fibers become more or less replaced by fat. This constitutes true fatty degeneration.

In fibroid degeneration the muscular fibers, owing to inflammatory action, are more or less completely supplanted by connective tissue. This usually occurs in limited areas, which are found most frequently near the apex of the left ventricle, in the posterior part near the auricle, in the interventricular septum, or in the papillary muscles.

Not infrequently the heart-muscle becomes hypertrophied in the early stages of any of these conditions in an attempt to overcome obstruction in the peripheral blood-vessels; but later, owing to disease of the coronary arteries with resulting deficient blood-supply to the heart-muscle, or to inflammation, with proliferation of connective tissue, which, contracting, diminishes the nourishment of the muscular fibers; these fibers then degenerate, the heart-wall becomes weakened and dilated, and incompetence follows. After death from myocardial degeneration, the microscope may reveal in the muscular fibers either fatty or fibroid degeneration or both combined in the same case.

ETIOLOGY

Fatty degeneration of the heart is due in most cases to the same causes as atheroma of the aorta, with extension to the coronary arteries. It is one of the natural results of advanced age, and is also attributed to gout, alcoholism, the toxic effects of tobacco, coffee, etc. Chronic diseases of the kidneys that increase the resistance in the arterioles throw increased work on the heart and lead to general arteriosclerosis, coronary sclerosis and myocardial degeneration. This degeneration may be caused also by protracted wasting diseases, exhausting discharges, or repeated loss of blood, anemia, etc.

Acute fatty degeneration may be caused by phosphorus poisoning, by the toxins of diphtheria, and by other acute infectious processes.

Fibroid degeneration which results from inflammation of the heart-muscle, when acute, is commonly of septic origin as in pyemia or as in diphtheria, typhoid and other infectious diseases. The chronic variety is often merely a continuance of the acute affection; but in other cases it is caused by rheumatic endocarditis with arteriosclerosis, or by obstruction of the coronary arteries by thrombosis or embolism which cuts off the blood-supply to certain portions of the heart-muscle. Thus it may have the same origin as fatty degeneration. Fibroid degeneration may result from excessive or protracted physical effort or even protracted mental strain and

worry. In some cases it is undoubtedly one of the late effects of syphilis, and in many others it apparently results from the excessive use of tobacco, alcohol or coffee. It may also be due to chronic venous congestion of the heart as found in protracted emphysema, fibroid phthisis or mitral lesions, with consequent overgrowth of the connective tissue which causes pressure-atrophy of the muscle fibers.

SYMPTOMATOLOGY

The most important symptoms and signs of degeneration of the myocardium are: irritability of temper; melancholia; some loss of memory or hesitating speech; pain over the precordia or over the upper part of the sternum following exertion or mental excitement; palpitation of the heart; dyspnea on exertion and even without exertion (the so-called cardiac asthma); diminished endurance, physical and mental; alterations of the pulse, which may be either faster or slower and is often intermittent; and slight edema of the ankles. These are attended by more or less change in the physical signs over the heart due at first to some hypertrophy and increased force of the muscular action, but later to weakness of the contractions. There may or may not be appreciable enlargement of the organ, but often the signs are not at all distinctive until late in the disease. If the pulse varies from normal, being either strong or weak, slow or fast, and regular or intermittent according to the strength of the myocardium, a similar condition is found in the cardiac pulsations excepting that feeble cardiac pulsations do not always communicate an impulse to the radial artery, so that not infrequently there is intermission of the radial pulse when the heart is beating regularly, although some of its contractions are feeble.

When the symptoms are first noticed, the heart is usually of normal size, or slightly hypertrophied; but with degeneration, its impulse becomes enfeebled to a greater or less degree. In uncomplicated cases, on auscultation, no valvular murmur will be heard until late in the disease when the feeble walls have dilated so as to cause relative insufficiency. But when the degeneration has been caused by aortitis and disease of the coronary arteries, a more or less distinct systolic murmur may be heard over the roughened aorta comparatively early. The most important signs at this time are feebleness of the heart-sounds and diminution of the force of the impulse against the chest-wall with lessening of the muscular element in the first sound of the heart. The muscular element of the first sound of the heart is the same as the sound produced by other contracting muscles, which may be readily recognized by listening with a stethoscope over the base of the thumb while its muscles are contracting. I call special attention to these symptoms and signs because often physicians hearing no endocardial murmurs and perhaps finding the action of the heart regular and of nearly normal frequency are led to think that there is no disease of the heart.

Not infrequently the degeneration progresses without symptoms, and no signs are discovered until an attack of dyspnea or fainting or a paroxysm of angina pectoris proves immediately fatal; but in most cases some of these prominent symptoms or signs precede the fatal termination several months or two or three years; yet any or nearly all of them may be absent. As a result of feeble circulation and passive congestion, or of emboli formed by vegetations or clots carried from the heart or aorta, many other symptoms and signs may appear in individual cases, most of which can readily be traced to their true source. Another significant symptom of fatty

degeneration that sometimes occurs is pseudo-apoplexy, an attack in which the patient suddenly becomes unconscious and falls; this may be attended by paralysis, but the symptoms pass off within a few minutes or hours or at most a few days. The well-known Cheyne-Stokes respiration is also an occasional early symptom. Other symptoms frequently noticed are: comparatively rapid loss of weight after a person has been fleshy, pallor and a swollen appearance of the surface with congestion of the ears and lips, weight or pain in the head and disturbance of the stomach and bowels.

There are no symptoms or signs by which we can surely distinguish between the various forms of degeneration; but certain combinations may justify a fairly positive diagnosis in a considerable number of cases. For example, in a fleshy subject the occurrence of unusual dyspnea with irregular action of the heart or an abnormally slow, full and regular pulse, a weak impulse of the apex, feeble intensity of the heart-sounds and absence of most of the other symptoms and signs are presumptive evidence of fatty deposit on the heart which mechanically interferes with its dilatation and contraction. These symptoms are illustrated by the following history (65,196):

CASE 1.—A man, aged 68, consulted me on account of irregular action of the heart and some shortness of breath, which he attributed to excessive smoking. He was not sick but had noticed the symptoms first three years previously and they had been gradually increasing. He weighed 248 pounds and had been at one time up to 270 pounds. He had some dyspnea and a little edema of the ankles; but his chief symptoms were irregularity of the heart's action and palpitation at times. I found the pulse irregular and only 44 per minute; he complained of frequent eructations of gas from the stomach and moderate dyspnea, but there were no other symptoms. Physical examination of the lungs yielded only negative results. The heart was slightly enlarged, its impulse almost imperceptible, action slow but galloping, sounds only about one-fifth as intense as usual in healthy men, and no endocardial murmurs. These symptoms and signs seemed to indicate that the action of the heart was interfered with mainly by deposit of fat. The patient had already given up smoking but he drank three cups of coffee daily. This was interdicted and he was given strychnin arseniate and stomachic tonics with digestive agents.

Pain over the aorta following exertion, relieved by rest, and dyspnea with muscular weakness and more or less alteration of the frequency and rhythm of the heart, with feeble impulse and heart-sounds, and sometimes absence of the first sound of the heart with absence of signs of valvular disease speak strongly for fatty degeneration of the muscular fibers due to disease of the coronary arteries, following or associated with atheroma of the aorta. These are illustrated in the following history (47,919):

CASE 2.—A woman, 65 years old, came to me complaining chiefly of pain in the precordia, rapid action of the heart, and dyspnea. Her symptoms began about six months previously and her physician told me that she had asthma about that time, which appeared to be of cardiac origin. She complained of frequent attacks (two to four daily) of great weakness, faintness and nausea. Some of her pain was in the epigastrium and the dyspnea was present even without exertion. She had some rheumatic pains in both arms, but had not suffered from a frank attack of rheumatism. She had had years previously, both malarial and typhoid fever. She suffered from headaches and was quite nervous. She weighed 168 pounds, but had lost 12 pounds within a few weeks. There were varicose veins in the legs and some edema of the feet. Temperature normal, urine normal, appetite and digestion poor. The arteries were stiff, the pulse weak and irregular, varying

from 92 to 156 during the examination. There was no endocardial murmur, but the dulness extended half an inch to the left of normal. Pulmonary signs were negative.

Usually also well-marked attacks of angina pectoris without many other symptoms speak for the same condition; later in the disease dilatation of the heart is commonly shown by the physical signs.

A certain group of symptoms occurring in persons near 70 years of age, or in those prematurely old, have been considered by Balfour under the name of senile heart. This class is illustrated by the following history (83,115):

CASE 3.—In 1907 I saw in a neighboring state a man whose life had been prolonged by good care for over four years, when I last heard of him through his family physician. At the time I was called to see him he was 69 years old and had been suffering for two months with weakness, much dyspnea, a sensation of tightness in the chest and dizziness if he moved quickly. There was nothing in heredity or previous disease to account for the trouble; but he dated his symptoms from a fall that had occurred two months previously. He had used tobacco moderately until two weeks before I saw him and was still using tea and coffee moderately. He had not used alcoholics. He had a little pain over the sternum and precordia; weighed 135 pounds; slight edema of ankles; two degrees subnormal temperature; digestion fair; urine normal; pulse full and soft, but only 37 per minute. Physical signs over lungs, liver and spleen were negative. Heart was normal size, pulsations 37 per minute, regular except one imperfect contraction about once a minute. There were no valvular murmurs, but a ventricular murmur not heard at base of heart and not transmitted beyond ventricles. The subnormal temperature and the slow pulse have continued for four years, but the patient has improved somewhat in other respects.

A strong probability of fibroid degeneration of the heart-muscle is established when the patient suffers from dyspnea and pain over the heart on exertion, and the signs indicate that the organ is enlarged by hypertrophy and dilatation or simple dilatation, especially if the history points to a remote cause of myocarditis in such affections as malarial or typhoid fever, scarlatina or diphtheria, syphilis, gout or alcoholism. This class of cases is illustrated by the following history (50,577):

CASE 4.—A man, 53 years old, complained of pain on exertion over the base of heart and aorta which had troubled him for a week. A year previously, after lifting a heavy weight, he had considerable pain over the aorta. This soon passed off, but returned while he was walking a couple of hours afterward, so that he had to stop and rest until it disappeared. Then it returned off and on for a week or ten days on exercise, but subsequently it did not trouble him until a few days before he saw me. I found that he had suffered a severe attack of scarlatina followed by nephritis when a boy, and that all his life afterward he had been subject to irregular action of the heart, and he had noticed some gouty nodules nine years before he first experienced aortic pain. I learned that at times he tired very easily. His temperature was normal, arteries stiff and the pulse, regular and full, ranged from 82 when quiet to 90 or 100 on exertion. There was little dyspnea on exertion. The signs over the lungs and abdominal organs were negative, and the heart normal in size and action, but there was a slight increase in the area of dulness over the aorta with a feeble systolic murmur and some accentuation of the second sound of the heart. The heart-sounds were not so loud as normal and the force of the impulse was diminished, but there were no endocardial murmurs. All coffee and stimulants were given up and under the influence of arsenic, strychnin and moderate doses of potassium iodid with care about exercise, he improved, although occasionally there would be some pain and shortness of breath. This continued for four months, when he suffered a mild attack of angina pectoris. At this time no aortic murmur was present, but other signs

continued the same. A few days later a sharp attack of angina proved fatal in about twenty minutes. Necropsy revealed atheroma of the aorta with slight dilatation, and marked sclerosis of coronaries with thickening of heart walls and extensive fibrosis. There were no valvular lesions.

In most cases the different forms of degeneration cannot be distinguished clinically, and in fact the fibroid and fatty degeneration are often combined; therefore, it is hardly worth while to try to draw a sharp line of demarcation between them. Usually the symptoms and signs merely point to weakness of the myocardium and many of them result from venous congestion due to setting back of blood from the right ventricle. Edema of the skin, particularly about the ankles, and some cyanosis are among the first manifestations of this condition. Obstruction to the flow of blood from the renal veins causes scanty, dark-red urine of high specific gravity, containing an excess of urates, small amounts of albumin and hyaline tube casts. Congestion of the hepatic veins causes enlargement of the liver, which is apt to be sensitive on palpation or which may cause the patient to complain at other times of a sense of weight, tension, or actual pain in that organ. Extension of venous stasis to the portal veins causes disturbance of the digestive organs manifested by eructations of gas, flatulence of stomach and bowels, loss of appetite, nausea, vomiting and irregular action of the bowels, or by the development of hemorrhoids. The spleen also becomes enlarged and hard and perhaps painful, and ascites may occur. Stasis in the intrathoracic veins causes obstinate bronchitis and hypostatic pleurisy, or pneumonia, and may be attended by hemoptysis. The jugular veins may be enlarged and tortuous, and hypostatic catarrh of the upper air-passages and throat is not uncommon.

Congestion of the cerebral veins and poor arterial circulation in the brain, both of which result from the weakened condition of the myocardium, give rise to various cerebral symptoms such as headache, dizziness, faintness, insomnia, mental hebetude, slow speech and an irritability of temper that often calls for explanations by the physician in order that friends may be patient and charitable with the sufferer. In some cases it is very interesting to note the prompt effect of heart tonics in improving the mental condition.

Severe paroxysmal cardiac pain termed angina pectoris is generally associated with atheroma or sclerosis of the aorta and coronary arteries and resulting fatty degeneration. The paroxysm itself is supposed to result frequently from an embolus. Cutting pains sometimes felt in the heart appear to be of rheumatic or gouty origin.

DIAGNOSIS

As already stated, the differential diagnosis of the various forms of cardiac degeneration is most difficult. There may be no alteration whatever in the size or force of the heart, and commonly there are no endocardial murmurs; therefore the diagnostician must rely largely on the history and personal peculiarities of the patient and the presence of a few of the numerous symptoms that may attend such cases, together with the exclusion of other affections. Fatty and fibroid degenerations of the heart are liable to be mistaken for functional affections, especially when occurring in those who have not yet reached middle life. Symptoms of heart weakness developing in a young person are likely to be functional; but in a person past 50 years of age they usually result from some organic change.

The most important differential feature is shown by the effect of exercise, which has but little immediate influence on functional affections, but which increases the pain, dyspnea and cardiac disturbance when the myocardium is degenerated. The age of the patient, the precordial pains, the condition of the arteries, the blood-pressure, the position and force of the apex-beat and the heart's rhythm are the most important factors in establishing the diagnosis; but the symptoms referable to the brain, kidneys, liver and other vital organs must be carefully weighed, and other diseases should be systematically excluded.

PROGNOSIS

The prognosis will depend largely on heredity, the age and strength of the patient, his ability and willingness to take proper care of himself and his response to judicious treatment. Other things being equal, the patient whose ancestors were long-lived has the best chance to improve. The younger the patient, the better his outlook. If his general strength is good it indicates a condition of the myocardium susceptible of improvement. If he is able and willing to follow proper instructions it is greatly in his favor. So long as the myocardium responds to heart tonics, betterment may be expected; but when degeneration has progressed to such a degree that digitalis and nux vomica have but little effect, no reasonable hope can be entertained that the patient will live long, and a few months, or at the most a year or two will generally finish the history.

Fatty deposit and infiltration, while *per se* much less serious than fatty or fibroid degeneration, may produce either or both of these conditions by mechanical pressure unless efficient measures be taken to check them; however, restriction of diet and suitable exercise may nearly or quite remove the difficulty. Yet these subjects are very liable to succumb to pneumonia, bronchitis, or any acute exhausting disease, and they occasionally die by syncope.

Often in fatty degeneration death comes suddenly from syncope, or a little more slowly from angina sine dolore, or from agonizing attacks of angina pectoris. In the latter, death may follow the first symptoms in from half an hour to two or three hours during the first attack; or it may be delayed until the second or third seizure, which is likely to occur within a few months or at most a couple of years. With care, however, appropriate management and good luck the patient may possibly hold out for several years. In degeneration due to permanent interference with the blood-supply repair is impossible, although life may be prolonged by proper care; but in the acute affection resulting from general blood conditions it is possible for complete recovery to take place.

Fibroid degeneration may terminate in the same way as fatty degeneration, but usually the symptoms of cardiac failure are more prolonged and the patient is liable to suffer for a year or two or even longer with the pronounced symptoms of the affection, such as pain, dyspnea, palpitation, dizziness, digestive disturbances, edema and physical and mental weakness. Finally, the disease commonly terminates in sudden death, or by a paroxysm of angina pectoris of several minutes' or a few hours' duration. Myocarditis which only causes arrhythmia is considered more favorably than other types. In myocarditis attended by sclerosis of the coronaries (which may be suspected from atheroma of the palpable arteries or of the aorta, with angina pectoris) sudden death may be expected at any time. Myocardial degeneration associated with diabetes or

chronic nephritis has a very bad prognosis. Intercurrent bronchitis or influenza is always a grave complication in this disease, and pneumonia is almost surely fatal.

TREATMENT

Fatty deposits on and in the heart call for restricted diet and regular exercise, that will vary much with the persistence and tractability of the patient and the judgment and force of the physician. Fat-producing diet should be diminished and at the same time care must be taken that nitrogenous foods are used only in proper amount and that the ingestion of fluids is not excessive, especially at meal time. I am firmly convinced that obesity depends less on the quality than the quantity of food and drink. Most fleshy people claim to be small eaters and we may admit that such is sometimes the case; but so far as my own observation goes, nearly all fleshy people are great eaters. For such patients the most important factor in getting rid of their excess of fat is reduction of the quantity of their food. At the same time a reasonable amount of exercise should be demanded; but it is useless to require exercise to "work off the flesh" while the patient is eating all he wishes, for the exercise increases the desire for food and for liquids so that more flesh is apt to be gained than is taken off, except with the very few people who will faithfully follow instructions in limiting the amount of food ingested.

The treatment of fatty and fibroid degeneration and of chronic myocarditis is essentially the same; therefore in this respect we are not hampered by the difficulties of diagnosis. If the heart-muscle is weak from either of these conditions the causes of such weakness must, if possible, be removed; the work demanded of the organ must be diminished and persistent and protracted efforts must be made to increase the strength of the myocardium.

The general treatment is essentially the same as that for valvular disease with broken compensation, consisting of cardiac and general tonics and the elimination of all injurious factors.

Patients should be cautioned to do nothing that induces dyspnea, and to rest immediately whenever shortness of breath appears. In severe cases the patient should be kept in bed until the heart has rested and recuperated. Excessive efforts of all kinds, mental and physical, must cease. If the affection is the outcome of some infectious disease, of pneumonia, or of protracted fever or of syphilis, treatment should be directed first to the causative disease. If it has resulted from excesses of any kind these should at once be abandoned. Alcoholics, tobacco and coffee should be interdicted in practically all cases. Contraction of the arterioles should be relieved by iodids or nitrites and high blood-pressure may be further reduced by proper diet and the proper use of saline laxatives and diuretics. The skin must be kept active by baths, friction and occasionally diaphoretics. Mental and physical exercise must be regulated according to the patient's strength and in severe cases absolute rest may be required. The digestive and excretory organs should receive the physician's careful and constant attention. The myocardium must be strengthened by appropriate resistance-exercise, massage, or moderate walking; and also by heart tonics, chief among which are digitalis and nux vomica. These in combination will often give much better results than either by itself; and either or both often have to be given in much larger doses than are commonly prescribed. At

first, they should be given in moderate doses, but the quantity may be steadily increased, while the effects are carefully watched, until the desired results are obtained, or until the beginning of toxic symptoms shows that a maximum dose has been reached. One need not fear the cumulative effects of digitalis when only three doses are being given daily so long as the stomach is not disturbed and the kidneys are acting freely; but nausea and vomiting or diminution in the amount of urine indicate that the dose must be decreased or the remedy discontinued. Similarly there is no danger from gradually increasing doses of nux vomica, but the occurrence of spasmodic contractions of the muscles or of insomnia call for suspension of the drug, or reduction of the dose. Iodids, especially those of potassium and sodium, in moderate doses and usually long continued are most beneficial in relieving pain and in dilating the arterioles. Nitroglycerin, amyl nitrite or sodium nitrite may be employed in similar cases for quick action. Arsenic is often found most beneficial in relieving pain and at the same time it may strengthen the heart-muscle. Other drugs commonly recommended for strengthening the heart-muscle are generally most disappointing, although they occasionally answer the purpose and therefore should be tried when for any reason the more effective medicines cannot be used. Caffein citrate has properties similar to those of digitalis, although it is much less reliable. Theobromin, in doses two or three times as large as those of caffein, acts similarly but has an advantage in not causing contraction of the arterioles and in not causing so much insomnia. Theobromin is especially useful for its diuretic action. Spartiene sulphate in doses of from half a grain to 2 grains appears to have considerable influence in regulating the rhythm of the heart and increasing the flow of urine. Strophanthus is thought to act in the same way as digitalis, but from prolonged observation it appears to me useful only in controlling the action of the heart when nervous symptoms predominate. The other remedies in common use for strengthening the heart's action, such as adonis vernalis, convallaria majalis, cannabis, etc., have appeared to me utterly unreliable. Severe pain must sometimes be relieved by morphin and atropin or chloroform, and distressing dyspnea or general discomfort and nervousness may require the same remedies; but opiates should not be used, if they can be avoided, until it becomes clear that nothing else will give sufficient relief, and until our main efforts are directed to promoting euthanasia. Chloroform may be inhaled with perfect safety and with great relief, provided it is given properly. The best way to administer it in such cases is to place about a dram on a sponge large enough to about fill one-third of a two- or three-ounce wide-mouthed bottle. This should be held by the patient, who should inhale deeply and freely from the mouth of the bottle until relieved. Before an excess of chloroform can be obtained in this way, the bottle will be dropped and roll away.

15 East Washington Street.

The Nature of Fear.—We may say then that fear is a phylogenetic fight or flight. On this hypothesis we recognize no reverberation through the body as suggested by James, but all of the organs and parts of the entire animal are integrated, connected up or correlated, for self-preservation by activity of its motor mechanism. We fear not in our hearts alone, not in our brain alone, not in our viscera alone, but we fear in every organ and tissue of our body—each organ or tissue is stimulated or inhibited according to its help or hindrance in the physical struggle for existence.—Crile in *Med. Herald*.