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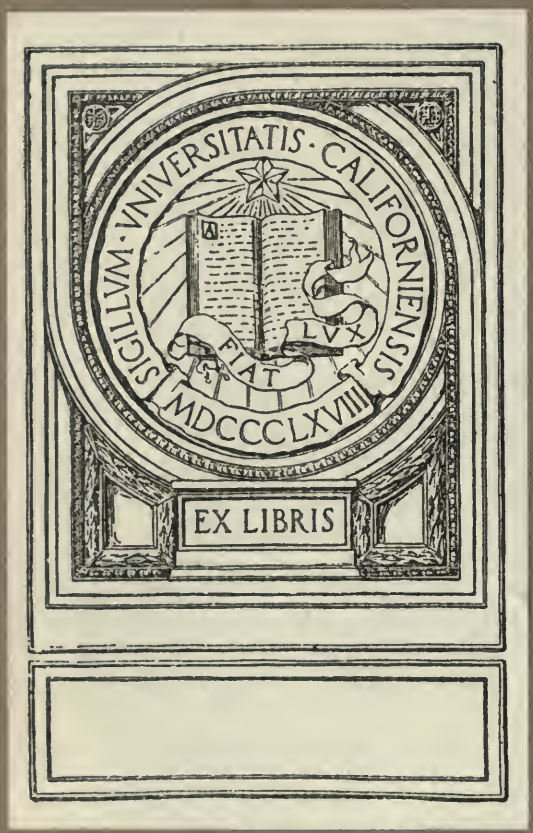
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them. The former viewpoint, therefore, is indefensible and false. And yet, this, practically, seems to be the manner in which some Freudians contemplate the situation. Their explanation of the exaggerated ego in paranoia (as being based on sexuality) tells the tale.

Do love and life mean only sexual love and sexual life? Is all unconscious thinking sexual? Are all unconscious processes sexual in nature? Is all intrapsychic struggles sexual? Is sexuality the underlying impulse in physiological tropisms, in physicochemical reactions, in all attraction and repulsion, physical or psychic, in the organic or inorganic world?

The Freudians have assumed a purely psychologic viewpoint. They have confined their psychology to sexology.

The biological viewpoint is the basic method of approach to a study of the mind of man. Biological relations cannot be explained from a purely psychological conception of the universe. And psychological relations can be explained not from the psychological aspect alone, nor even from the biological standpoint alone, but only on a psychological basis.

Man can be understood only if we agree that he is composed of a bundle of instinctive tendencies. Man does not breathe and eat and digest and sleep and dream and exercise his physical and psychical faculties because he is constantly demanding and seeking gratification of his complex sexual impulse, no matter how broadly this term be construed, but because he instinctively, innately, and frequently blindly, must strive and tend toward self expression all his livelong life.

In conclusion I wish to state that these questions have not been propounded with a feeling of fixed antagonism and blind hostility, but with a sincere desire to know "the truth, the whole truth, and nothing but the truth."

If certain Freudian teachings regarding the rôle of sexuality are not according to facts as we know them to be, then they should be quickly and surely bombarded and shattered. And the sooner this is done, the better will it be for science and for psychotherapy.

1517 SOUTH KEDZIE AVENUE.

BLOOD PTOSIS.

*A Test of Vasomotor Efficiency.**

BY C. WARD CRAMPTON, M. D.,
New York,
Director of Physical Training, Department of Education.

We have few if any accurate scientific tests of health. On this account school hygiene shares with other branches of medicine a difficulty in quickly and certainly testing the failure or success of its methods. We labor to improve the health of school children and to increase their prospects of life by physical training, athletics, instruction in hygiene, school lunches, open air classes, changes in ventilation and the like and invariably experience difficulty in clearly and honestly stating what gain has been made by our work. It is true that such records of rates of increase and decrease of hemoglobin have their value, and certain strength and endurance tests have some merit, but they are all subject to error, and are incomplete or difficult to control.

During the course of an exhaustive study on blood pressure[1] I presented a preliminary report on a test which fulfils the latter requirements.[2]

It is a statement of the efficiency of the vasomotor system in responding to the necessity of raising the blood pressure upon rising from the recumbent to the standing position.

In the perfectly normal vigorous male the blood pressure will rise from eight to ten millimetres of mercury upon assuming the standing position. In one damaged by disease, overwork or unhygienic living or weakened by inactivity, the blood pressure will fail to rise and may fall as much as ten millimetres of mercury. The heart rate acts in exactly the opposite fashion, rising in proportion to weakness as much as forty-five beats a minute, but only in exceptional cases falling. These two adjustments are interdependent, one often masking the failure of the other, and both must be considered and balanced. If blood pressure were alone considered many cases showing a high heart rate would be given a good rating when it should be poor, and *vice versa*. This test has been put into regular routine practice by R. Tait Mackenzie, M. D., of the University of Pennsylvania; George H. Meylan, M. D., of Columbia University; Doctor Raycroft, of Princeton; Doctor Storey, of the College of the City of New York; Doctor Marks, of Pittsburgh; Doctor McCurdy, of Springfield, and others in examination of athletes for "permission to compete" and for other purposes. It is based upon the following facts:

If the blood were contained in flaccid tubes without support it would, upon standing, drop to the lowest possible point and remain there. There would be none to reach the heart and none would be pumped to the head. A complete blood ptosis would occur and death would result at once. This does not occur because there is some mechanical support and the blood vessels are not flaccid but held to a narrow lumen by circular muscles, in turn controlled by the sympathetic nervous system. The most capacious system of blood vessels in the body are the splanchnic veins; these can hold all the blood volume if released from the vasoconstrictor efforts of the nervous system.

In the perfectly normal there occurs upon rising from the recumbent position a vasoconstriction effort which squeezes these veins and raises blood pressure which more than overcomes the added hydrostatic load. In the subnormal this vasoconstriction effort is relatively weak and ineffective and does not raise the blood pressure in the upper body, but allows it to fall under hydrostatic pressure. There is a blood ptosis due to the relative failure of vasomotor tone. This may be mild, merely a failure to raise the pressure or a fall of the systolic pressure five or ten millimetres, in which case we

*Abstract of address at the Fourth International Congress on School Hygiene, Buffalo, August 25-30, 1913.

[1] Olympic Congress Lectures, Gold Medal Thesis, St. Louis Exposition, 1904. *Blood Pressure in Its Relations to Physical Training Procedure.*

[2] *Physical Education Review*, 1905-1906; *Medical News*, September 16, 1905.

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may still call our patient fairly normal. It may be a more complete failure, allowing the systolic pressure to drop to forty or fifty, at which point the patient faints from cerebral anemia. This is the familiar picture seen when a convalescent patient with vasotone damaged rises prematurely from a sick bed, and, robbing the splanchnic veins of mechanical support by emptying the bladder, falls to the floor.

The most severe grade of vasotone paralysis occurs as a terminal phenomenon in poisoning from disease in which case the patient literally bleeds into his abdominal veins and dies. Vasotone is then a function essential to life; a delicate measurement of its efficiency such as is indicated in the foregoing is worthy of consideration as an important indication of the condition and vitality of the whole body, which depends upon vasotone for its proper functioning.

It would then seem to be necessary merely to observe the amount of rise or fall of the systolic pressure at a convenient point in the upper body to determine the efficiency of the vasomotor system and its reverse, the amount of blood ptosis.

Another fact presents itself in the increase in heart rate which accompanies vasotone failure. Hill states that the heart, as it were, comes to the rescue of the falling pressure by beating faster in a successful endeavor to reestablish it, its rate increasing in proportion to the necessity. In this case we would discover weakened vasotone by either increased heart rate, or fall in blood pressure, or both, but only by taking both into consideration, we may arrive at a correct estimation of the weakness. Another explanation maintains that the increased heart rate does not raise the pressure but merely reveals it, for the heart furnished with a lessened charge of blood is able to send it into the arteries more quickly.

From my own observation it is clear that a single patient will show in successive readings a variation of blood pressure and heart rate which compensate each other, while the consideration of both will reveal no change in vasotone efficiency.

The balancing of these two is a matter of some importance. The usual range of the systolic pressure is from +10 to —10 of the heart rate increase from 0 to 44, as observed from records of a large number of cases. Upon a statistical balancing of these two series of frequencies, and assigning equal percentages to equal ranges, the following scale is constructed.

PERCENTAGE SCALE.

Vasomotor Tone.

Blood Pressure.

Heart rate increase.	Increase +10	+8	+6	+4	+2	0	Decrease —2	—4	—6	—8	—10
0 to 4	100	95	90	85	80	75	70	65	60	55	50
5 to 8	95	90	85	80	75	70	65	60	55	50	45
9 to 12	90	85	80	75	70	65	60	55	50	45	40
13 to 16	85	80	75	70	65	60	55	50	45	40	35
17 to 20	80	75	70	65	60	55	50	45	40	35	30
21 to 24	75	70	65	60	55	50	45	40	35	30	25
25 to 28	70	65	60	55	50	45	40	35	30	25	20
29 to 32	65	60	55	50	45	40	35	30	25	20	15
33 to 36	60	55	50	45	40	35	30	25	20	15	10
37 to 40	55	50	45	40	35	30	25	20	15	10	5
41 to 44	50	45	40	35	30	25	20	15	10	5	0

Note.—In case of increase in pressure higher than +10 add 5 per cent. to the +10 column for each 2 millimetres in excess of 10.

This scale provides a convenient and intelligible method of recording and reporting cases and permits a numerical statement of the function in question. Its 100 mark indicates a perfectly efficient working of the vasomotor system under test, the zero is approximately the point where the average person is unable to maintain the erect posture.

The technic of the test is as follows:

The sphygmomanometer is adjusted over the brachial artery and the patient is placed on a comfortable couch with a low pillow. The heart state is counted by quarter minutes and a gradually decreasing rate is usually observed. Counting should continue until two successive quarter minutes are the same, this is multiplied by four and recorded. The systolic pressure is then taken preferably by auscultation. The patient stands, the heart rate is counted as before until it reaches the "standing normal," when it is recorded, and the blood pressure is then taken. The differences are calculated and reference is made to the scale.

For example—Case XX: L. V., age seventeen years, asserts to be in good condition at 11:20 a. m.

	Pulse rate.	Blood pressure.
Horizontal	68	100
Vertical	104	94
Difference	+36	—6
Percentage record 20		

This is a very poor record taken from an apparently normal strong young football player of exceptional ability who had previously given records above 80.

I was at a loss to account for this, for questioning failed to bring out any history of loss of sleep, dissipation, or illness. He looked quite as "fit" as usual. He was absent next day, and remained home for a week with a "cold and fever." It is evident that the test revealed a weakened vasotone, the beginning of actual illness before any other symptom could be noted. Others who have used this test have noted similar cases.

This test has been used to follow athletes through a course of training and as the basis for choice for the entry of one of several athletes of equal ability in an important race where only one might compete. It has been used to guide the daily exercise of athletes to guard against overwork and approaching staleness. It has been found useful in guiding treatment of the neurasthenic and overworked.

It has been used in school hygiene to determine the amount of physical cost of school procedures of various kinds. The following is a typical record.

Time.	Increase pulse rate.	Increase blood pressure.	Percentage.	Remarks.
9:45 a. m.	0	+10	100	Slept well, no exercise.
10:45 a. m.	0	+4	95	After lesson in physics standing.
11:50 a. m.	+8	+10	95	After lesson in algebra.
12:24 a. m.	+5	+6	85	After lesson in French.
1:10 p. m.	+6	+8	90	After lunch and rest.
2:00 p. m.	+14	+8	80	After history lesson.
2:35 p. m.	+16	+4	70	After slow one mile run.

This shows that one period of work in the physics laboratory (which required continued standing) was more expensive than a slow mile run. It also showed that this was partially regained in the next period, lost again during the

French period, and partially regained by rest at the lunch period. This record also shows the importance of considering both heart rate and blood pressure.

This test opens a wide field of investigation hitherto unworked. The effect of various modes of ventilation, of feeding, exercise, and other hygienic procedure may be tested and recorded in terms which may be statistically stated and easily compared with a control series of records.

It has been used to test the amount of relaxation of vasotone resulting from various forms of physical exercise, and shows clearly that exercise is expensive of nervous energy and should be followed by rest and recuperation.

This test will not reveal more than it assumes to test, i. e., the efficiency of the vasomotor system. It will not show the presence of a mitral lesion any more than it will a decayed tooth. Nor will it test other factors of efficiency such as will power, inhibition, or skill; it does provide a means of making a definite record of an all important bodily function. Those who work to mould schoolroom and other living conditions for the purpose of improving health and efficiency may be able by this means to measure the benefit resulting from their labors.

431 Riverside Drive.

THE REFLEX OR PROTECTIVE PHENOMENA OF ANGINA PECTORIS.

By W. J. Pulley, M. D.,
New York.

It is not my purpose to-night to discuss angina pectoris in detail, but to confine my remarks to a discussion of what James Mackenzie calls the reflex or protective phenomena of it. I have chosen this part of the clinical picture of angina pectoris to talk about because it seems to me to be more or less definite and explainable, while the causative pathology, symptomatology, etc., are more or less indefinite and variable, and furthermore, there are two additional points about it which I consider important and which I have not seen sufficiently emphasized in the literature of the subject. For fear of becoming too didactic I will state simply that the heart, according to Engelmann and his followers, has five functions more or less well defined, viz.:

1. Stimulus production or rhythmicity. The heart takes a certain length of time to produce enough stimulus to cause a normal contraction, and the length is the same between all of the beats.

2. Excitability, or the power of being able to receive stimulus.

3. Conductivity, or the power of conveying stimulus from fibre to fibre.

4. Contractility, or the power of contracting when stimulated.

5. Tonicity, or the power to retain a certain amount of contractility between the active movements.

There are some who deny that these heart functions can be isolated and definitely demonstrated, and the principle reasons they point out as against it is that, taking the assumption as a basis, many of the cardiac irregularities cannot be explained. However, since Mackenzie has perfected the polygraph and Eithoven the electrocardiagraph, a derangement of any of the known functions of the heart can be demonstrated. Exactness of results acquired from the use of these instruments was made possible by aninal experimentation.

James Mackenzie says: "I have a great many tracings from patients who have suffered from angina pectoris—during the attacks and when free from pain—and an analysis of these tracings enables me to say with confidence that angina pectoris can occur when the excitability, the conductivity, and the power to produce rhythmical stimuli are unimpaired. There only remains now the function of tonicity and contractility. The evidence of failure of the function of tonicity is mainly shown in dilatation of the heart, and typical attacks of angina pectoris frequently occur in hearts perfectly normal in size. Therefore angina pectoris may occur without any evidence of the impairment of the function of tonicity. Seeing that angina pectoris can occur in patients when four out of five functions of the heart muscle are demonstrably intact, we are led to inquire whether angina pectoris may not be due to an impairment of the remaining function, that is contractility."

Carrying out this line of reasoning, he states that it is his opinion that angina pectoris is an evidence of an exhaustion of the function of contractility. To my mind this looks to a great extent reasonable, at least it gives us a very attractive way of explaining some of the symptoms of angina pectoris satisfactorily, especially the reflex ones, only two of which we will deal with in this paper. Pain and reflex muscular contraction are the symptoms here referred to, both of which are reflexly produced and protective in their action. That these reflex phenomena are due solely to an impairment of the contractile function of the heart does not, I believe, explain the entire situation, for there must of necessity be present with it a great distress of the function of tonicity, if not a beginning impairment. Mackenzie uses the words exhausted and impaired here, evidently leading one to infer that the power of the heart muscle to contract is partly, at least, lost. I think the real condition of affairs would be more correctly stated by saying that the heart muscle is embarrassed and fatigued by contracting against an abnormal obstruction modified by certain conditions, for the heart muscle must be to a great degree intact in order to send out the stimuli so constantly and strongly as to produce irritation in the reflex nerve centres.

In a heart muscle in which the function of tonicity is impaired these symptoms of angina pectoris do not usually occur, even if the function of contractility is embarrassed. In order then to have these reflex phenomena occur, clearly, there must be an overstimulation of the function of tonicity as well as of the function of contractility. As a proof of this I will cite you a case taken from my files, in which repeated attacks of angina pectoris occurred, until the function of tonicity became impaired, after which they became greatly modified and finally ceased altogether. The impairment of the function of tonicity was easily recognized by the development of a systolic murmur at the apex, evidently a relative mitral insufficiency and a slight

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