

well watched, carefully treated and apparently cured patients showed. Gonococci were found as follows: By slide alone, 63, or 5%; by culture and slide, 44 positive, or 3½%; by culture alone, 26 positive, or 2%. In other words, from two to five men in every hundred who were clinically well harbored active and dangerous gonococci. It is sad to think of what the effect of marriage upon innocent wives and future children would have been. No patient who has had gonorrhea even in the distant past should neglect the precaution of these careful examinations to protect his health and that of those who will be near and dear to him in future. None of these cases had less than three examinations and we should insist on that number of cultural examinations at least, and more if the slide contains much pus. Some of our positive results were obtained on the first examination, while in others they did not appear till the second or third one.

It is needless to say that every one showing positive results was again subjected to treatment which was continued until we obtained three negative results, and up to the present not one of these men who have been married have had any return of their discharge nor have their wives been infected.

Many interesting results have been obtained from the bacteriological study of these cases as to the other pathogenic organisms which follow the gonococcus and serve to keep up a urethral discharge in some cases, but the limits of this paper do not permit a description of them. With new culture media the more accurate will be our results and the greater our assurance that physicians may do a beneficent work in the community by educating their patients to have these tests made.

10. *The Complement-Fixation Test.* This new and apparently valuable addition to our methods of determining the presence of gonococci or their toxins was first brought into notice by Schwarz and McNeil in an article published in the *Journal of the Medical Sciences* for May, 1911. Prior to that work along this line had been done by Mueller and Oppenheim, but it was not sufficiently conclusive to attract the attention of the scientific world.

This is similar to the Wassermann test for syphilis and follows essentially the same technique. It has been found necessary to use a polyvalent antigen, that is, one made from several strains (usually twelve) of gonococci. By this we determine the presence in the blood of an antibody produced by the gonorrheal organisms in the blood current or in the tissues of some organ, like the prostate, vesicles, or the joints. In an acute case it is not found before four weeks, and apparently remains long after the disease has clinically disappeared. It has been found after all microscopical and cultural tests have proved negative. These facts are most startling and point to the possibility that

gonorrhea is not so local a disease as we have supposed it to be.

Not enough evidence has yet been produced for us to say that a positive result shows the presence of living gonococci somewhere in the tissues of the body, nor have we any way of knowing how long the antibodies may persist after cure. This is a most important fact to find out as otherwise we cannot wisely advise those patients whose test has proved positive. The test is exceedingly delicate and can only be done in a well equipped laboratory, and even there strange variations in the results are obtained. A clinically clear case of gonorrhea may show negative results, while one which is well by other and better tests may show positive results. The time has not yet arrived when we can depend upon this test alone and we must therefore place our faith in the tests which are of proven value and which will assure safety to our patients.

These tests which have been described are those which the physician should recommend to his patient, and by so doing he may lessen the peril of latent gonorrhea. He will do more than that for he will awaken in the public mind a realization of the fact that an apparently cured patient is not surely well, but that the consequences of his folly and misfortune may follow him all his life unless he receives competent and skillful treatment from his physician until he is cured, clinically and bacteriologically.

With the treatment of gonorrhea thus placed upon a plane as high as other diseases of far less importance we will hear less silly talk of the physician prolonging a case for financial reasons, we shall see fewer and fewer patients applying to druggists for nostrums promising a quick cure, and we will soon find that men having gonorrhea will aid their physician in their conscientious efforts to rid them of this dangerous malady.

SOME HYGIENIC TESTS APPLIED TO ORTHOPEDIC CONDITIONS.

By H. W. MARSHALL, M.D., BOSTON,

AND

H. L. LANGNECKER, M.D., BOSTON.

It is rather interesting in view of the great dependence placed upon personal hygienic measures in treatment of so many diseases, that so few precise hygienic methods have come into general use, ones that can be employed in recording conditions and changes in normal healthy functions from time to time with exact quantitative degrees of accuracy.

If a mechanic attempts to regulate a complicated piece of machinery, he must know all normal actions of the machine, and the degrees that these actions are influenced by different defects which happen to exist in each instance; and if he does not possess means of measuring

such normal conditions, nor the changes in them in response to his manipulations, probabilities then are strongly in favor of bungling readjustments. And the question has been asked properly why the same probabilities for poor results do not exist when varying degrees of normal human functions are inadequately recognized, and when therapeutic procedures are crudely estimated, or are wholly unmeasured in the treatment of human maladjustments.

The writers have attempted to approach the problem of more accurate hygienic regulations for joint troubles in the following way: The individual heart has a certain functional capacity that depends upon its size, the strength of its muscular walls, the integrity of its valves, and upon other considerations. And by measuring the degrees and variations of blood pressure some quantitative idea can be obtained of the organ's efficiency as it is functioning normally under the special conditions which exist within it. Blood pressures accordingly may be used as rough indicators of normal cardiac functions.

In the lungs the total air capacity may be taken similarly as an approximate gauge of normal pulmonary function regardless of pleural adhesions, diseased areas in the lungs, and so on.

Volumes and specific gravities of urines suggest quantitative amounts of normal work that kidneys are doing at the times the quantities and specific gravities are measured, irrespective of whether casts, albumin, or other evidences of renal disease exist.

Varying degrees of muscular strength are measures of the varying normal functional activity of muscular tissue; and amounts of food, eaten as dictated by the natural appetite, can be taken as very rough quantitative indicators of normal digestive functions if twenty-four-hour quantities of food are weighed before being consumed.

The percentage of haemoglobin in the blood furnishes an idea of the efficiency of the blood with respect to its normal oxygen carrying functions; and also it is possible to judge whether a nervous system is very vigorous or very weak by the hours of sleep taken, when allowances are made for unusual amounts of exercise, worry, *et cetera*.

An individual's weight is a measure of the fluctuating balances which have existed in the past between activities of different organs; while weight fluctuations, from time to time, measure changes continually taking place in the complex physiologic balances among the related organs of every individual.

If all normal functions of all important organs could be measured simply and accurately by clinical methods, we should, have a precise way of stating personal idiosyncrasies and peculiarities that now are designated under vague terms of plethoric tendencies gouty diatheses, nervous temperaments, debilitated

and auto-intoxicated states, and others. We would then have definite formulae showing ratios between normal activities of different organs in each individual, as well as absolute degrees of physiologic activity of each organ.

But if one examines a physician's report one usually finds particular emphasis laid upon existing abnormalities and defects without any stated estimation of their probable influence upon healthy relations and functions; although there may be perhaps some vague observations that the individual's general condition seems to be "fairly good" or "rather poor." A lung may be tubercular, however, or a heart may have leaky valves, or a kidney show evidences of nephritis, or a digestive tract exhibit various peculiarities, and the person as a whole may still be active and able to perform his ordinary daily work for a considerable period of time. It should be recognized that these abnormalities are of moment only as they influence present or future normal physiological functions; and the writers wish to emphasize this fact, yet at the same time it is not intended to minimize the other side of the situation, namely, the great importance of knowledge of pathological anatomical peculiarities.

Medical literature of the past shows scanty hygienic data applied to orthopedic cases. Practically none of the older records can be considered complete or adequate in showing quantitative variations which occur from time to time. An attempt has been made therefore in this paper to tabulate in more available form some of the more easily measured normal functions and conditions, arranging them in a way that they can be understood at a glance, and showing variable proportions among different combinations, as well as absolute degrees each measurement exhibits. The relation of each observed condition to the average figures for the same condition among collected large series also is roughly indicated.

Data has been obtained from various sources. From tables of physical measurements made in gymnasias it was found that five feet seven inches and one hundred pounds can be taken as fairly representative figures, respectively, for average heights and weights. Eight hours is commonly considered a fair average for the number of hours of sleep required. Text books have yielded other approximate normal averages as follows:

Average vital lung capacity for an adult, 3700 cc., W. H. Howell, Text-book of Physiology. Average brachial blood pressure in adults (systolic), 110 mm. of mercury, Joseph Erlanger, quoted by W. H. Howell, text-book of Physiology. Average specific gravity of urine, 1.017-1.020. Olaf Hammarsten, text-book of Physiological Chemistry. Average volume of urine in patients treated in United States—1200 cc. for males and 1000 cc. females—C. E. Simon, Manual of Clinical Diagnosis.

Average amount of animal food—10 oz. Av-

erage amount of water—50-60 oz. Average amount of vegetable food—30-40 oz.—W. Gilman Thompson, Practical Dietetics. Other average amounts have been assumed less accurately for exercise, muscular strength, nervous reflexes, *et cetera*.

All these have been set down arbitrarily in a table at points marked off upon a straight line. Variations from these averages have been indicated in a convenient way upon perpendicular lines drawn through the straight line of averages, one for each average figure. Each perpendicular has been divided then into a scale to show degrees of variation possible for each separate condition.

Having selected this method of recording results, patients have been weighed, measured, tested with spirometers, blood pressure apparatus, dynamometers, etc.; and from results obtained a curve has been plotted for each individual. Using the table as the pattern for all records, sheets of thin paper have been placed over the table and straight lines drawn upon the blank sheets to coincide exactly with the straight line of averages of the table. Then various numbers obtained from each patient are marked off upon the individual sheets by looking through them to the right places upon the proper perpendiculars of the table. Points thus located then have been joined together into a continuous irregular line as is indicated in the diagrams below.

These irregular curves show easily the variable combinations, the deviations of each variable from the average, and the changes that occur from time to time.

There are many limitations to this graphic method, but before these are discussed a few cases will be cited to illustrate the advantages.

The first chart is that of a woman of thirty years. She was delicate as a girl, and appears now thin, flat-chested, and with poor muscular development. She is engaged at an indoor occupation, sits at her task of proof-reading, and gets outdoor exercise mainly from walking to and from her work.

Several physical examinations in the past have revealed no serious pathological lesions of her organs, and she has been cared for by a number of competent physicians. Fearing that she might become helplessly crippled she sought further advice, and came for treatment before she was seriously incapacitated.

She represents an under-developed woman who has been pushing herself to the limit of her vitality constantly in her daily pursuits. Her main complaints now are chronic dyspepsia, rheumatism, and muscular weakness. A routine physical examination shows no marked abnormality, apart from the poor general development, except obvious atrophy of the small muscles of the hands together with periarticular swellings of finger joints, and gastric symptoms of discomfort, sourness and belching after meals. There has been no history nor evidence

of recent infections. Teeth, throat, tonsils, ears, nose, and genito urinary tract are apparently normal. No examination of gastric contents made at the time the hygienic data was tabulated.

The series of hygienic tests and measurements show a curve given in the first chart. This line runs generally below the average and sinks especially low at the points of lung capacity and amounts of fluids taken daily. There is a corresponding small volume of urine of rather high specific gravity. The patient was interested in seeing the graphic record, and could appreciate more readily from it the necessity for increasing if possible her lung capacity, also the desirability of getting more fresh air, and of taking more water. She has been given a few breathing exercises, and she rests an hour in bed in a room with open windows, after work, just before the heavy evening meal. A few tonic medicines and milk of magnesia have helped to relieve gastric symptoms, and by these various therapeutic measures the joint pains have diminished, her appetite improved and her strength has increased. It is not to be expected that a complete cure of such a case can be accomplished quickly after the condition has slowly come on in such a life-long delicate constitution, but the graphic method makes it possible to show to patient and physician clearly in a general way what needs to be done and what is being accomplished. In the past, in this particular instance, lack of such a method has been responsible apparently for the overlooking of the quantitative physiological defects which have been producing the anatomical abnormalities in the joints.

The second chart is of a healthy woman who is a sister of the first patient. The curve is different particularly because of the higher levels for body weight and amounts of fluids taken; but it shows a lung capacity of rather low degree like the patient.

The third record is one of a patient suffering with chronic gonorrheal arthritis. A general physical examination showed nothing very remarkable except the urethral infection. In the past the patient derived much temporary benefit from a course of baths at Hot Springs, Arkansas. After returning home, however, he was unable to take care of himself and the joint symptoms came back again. Then a trial of gonorrheal vaccines was made.

Vaccines, which were continued for a long period, produced slight relief at first, but later they wore the patient out so that he was worse than when he began this treatment. He also tried various rheumatic remedies.

When first seen by the writers he presented the condition so often seen in chronic patients, namely, the effects of too much and too varied therapeutic measures. After seven or eight months' rest from all stimulating or depleting procedures, and with observance of a few hygienic regulations, joint swellings and pains have

subsided greatly, muscular strength has partially returned, seven or eight pounds have been gained in weight and a secondary anemia has disappeared.

The curve which is shown was taken at this later period, and it does not demonstrate such striking deviations as that of the first patient. This single record, by itself, is of value mainly in revealing the absence of striking abnormalities. But if a record had been taken eight months ago, it would differ sufficiently from the present one to point out tendencies of the change taking place in favorable directions. Here again the value of greater precision and greater clearness of graphic representation of clinical data is obvious.

The fourth record is one of a healthy man who does little muscular work, and who leads an ordinary sedentary life. The curve in this case runs more frequently above the base line, and its general level is higher. The fifth chart is that of his wife, who has well-defined rational ideas about personal hygiene, and who is frequently engaged in showing others how to take care of themselves. In spite of all precautions, she slowly succumbed to a very obscure metabolic type of joint disease. Physical examinations have revealed nothing definitely abnormal, and now it is considered that she represents a type of disturbance analogous to gout. There may be in her case a backing up in circulation of some unrecognized substance, perhaps creatinin in too large amounts, and this normal product of metabolism may be producing pathological changes in the joints because of excessive amounts in the blood, similarly as excessive amounts of circulating urates produce pathological anatomical changes in gouty patients.

The sixth chart shows another infectious arthritic case originally of gonorrheal origin. Specific blood tests now are negative in reaction, and apparently the patient simply is in a run-down state. He has lost greatly in weight, and arthritic involvements are extending to new parts.

He has a history of having lived very well, has eaten heartily, worked hard, and has used some alcoholic stimulants. He exhausted himself finally and then tried unsuccessfully to restore his depleted vitality with bath and tonic treatments. At the time the hygienic data were taken he could barely walk with crutches, and ankle and knee joints were swollen and sore.

The curve is valuable in showing an individual generally below the average and without any marked abnormalities. The line rises above the base line only at two related points. He has been drinking water freely so that the amount of daily fluids taken and the volume of urine are above the line of averages. The urine represents the clear pale type of low specific gravity in latent chronic interstitial nephritis.

Such a chart helps to explain why there is so little chance of any single remedy, new or old, being found that will fit all different needs of the

situation. It is difficult to conceive of any single drug or therapeutic measure being discovered, that will produce readjustments in all deviating factors correctly and in exactly right degrees in each to restore the most healthy complex proportions among them all. The only imaginable way that success can be attained in such a generally depleted condition is by means of a number of therapeutic procedures, each prescribed in individual ways with definite observations upon their separate effects. A graphic chart permits these combinations and slight variations to be estimated in the best manner.

DISCUSSION OF SOME OF THE ADVANTAGES AND LIMITATIONS OF THE METHOD.

The six illustrations that have been given hint at some advantages of the method, *e.g.* that patients' interests are aroused and sustained better; that greater precision and more completeness in estimation of patients' conditions become possible, and that therefore greater success in treatment results.

Many persons will see the defects of the scheme and some possibly will condemn the whole of it because there are many faults. For the latter an explanation is necessary,—that defects, although great, are less than those which are associated with total absence of hygienic data, as quite commonly is the case now with orthopedic patients. The method has not the accuracy of comprehensive physiologic experiments conducted in institutions, for example, like the Carnegie Nutrition Laboratory in Boston; and it is intended to be intermediate only between such careful scientific labors and the neglect, due to lack of time, shown frequently now among busy practitioners.

Criticisms can be advanced that the list of measurements is very incomplete, and that it does not include many important physiological functions. This is true, and if the number of individual tests was extended the curves would possess much more significance. As previously suggested, it would be advantageous to have all normal functions represented; but the element of case has to be reckoned with, and the writers have selected only a few representative tests, that take but a few minutes of a physician's time. It may seem advisable perhaps in the future to add others, such as blood cell counts, ages, etc.; yet as now presented the records harmonize well in the degrees of reliability, which individual tests have shown and the significance which they possess in combination.

An objection may be raised that amounts of food vary greatly from day to day with varying appetites. However, experimentally it has been found that, rough as these measurements are, they are more precise than statements of patients. One individual may claim to have an unusually good appetite and to eat a large amount, and upon weighing the food it has been discovered occasionally that the reverse condi-

tion of affairs exists. Again another person says the appetite is poor and yet not infrequently the consumption of food actually is found to be excessive. These results of food weighings should be interpreted only to point out gross tendencies, and further weighings should be made to determine the lesser degrees and changes.

It is to be noted that work of weighing the food is relegated to patients themselves. Each is provided with a pair of scales with directions for weighing and eating each kind of food separately, and practically it has been found that the task arouses patients' interests, while simultaneously relieving the physician.

Regarding the accuracy of averages, it should be explained that only great deviations are to be considered significant in interpretation of results, so that these average figures do not have to be accurate to be useful. They depend upon so many elements that they can be only very roughly approximate; for example, body weights depend upon age, sex, occupation, etc., and vary within wide limits.

These figures, nevertheless, serve as a convenient *fixed base line* for comparisons. The two tests for muscular strength, *e.g.* the strengths of the forearm muscles and of pectoral muscles, are very incomplete, yet are better than descriptions of "poor," "ordinary," and "good," as these adjectives are used often in reference to muscular development. Moreover, patients find it interesting to watch the changes from time to time in degrees of muscular weaknesses of which they complain.

Averages do not have much significance for these particular tests unless many corrections are applied, and they are of use mainly as fixed points upon the base line of the table. This fact is made more clear by a statement of D. A. Sargent, director of the Hemenway Gymnasium at Harvard University, who has very kindly informed the writers that he has found that the average strength of forearm for the male is 55 kilos and for the female 25 kilos, while the average strength of chest for the male is 65 kilos and for the female 30 kilos.

No records are given in the article with repeated observations upon the same patient over extended periods. Single charts, however, differ greatly from each other and help to show the peculiarities which each patient exhibits. This fact justifies an early paper explaining the method.

It does not seem appropriate to discuss further the significance of hygienic measures in their relation to orthopedics, because everyone understands that personal hygienic regulations mean vascular regulations, and that the latter are matters of extremely great importance in restoration of health of all tissues including bones and joints.

Orthopedics, as it is understood at present, deals at times with surgery, mechanical supports, corrective apparatus and internal medical measures in treatment of joint diseases, deformities and various anatomical weaknesses.

In progress it is recognized by every one that orthopedists must continually study their problems carefully in order not to lay too much or too little emphasis upon any one of the related, important phases of their specialty. Care has to be taken not to stretch surgical methods to limits beyond which they are more harmful than useful, nor to use them too exclusively. There has to be avoidance of the error of ascribing all benefits observed to them, or to mechanical supports when the latter are matters of greatest interest; for there always are existent less easily recognizable, and perhaps even more important, vascular peculiarities; vascular states can be regulated properly only through attention to personal hygiene.

It can be said with truth, that surgery and mechanical therapeutic devices are simply aids, that are needed only occasionally to help personal hygienic regulations restore the health. The facts are, that sometimes surgery is indispensable, and at other times artificial supports are absolutely necessary, while vascular and hygienic conditions must always be compatible with health or otherwise the other measure will fail.

CHART I

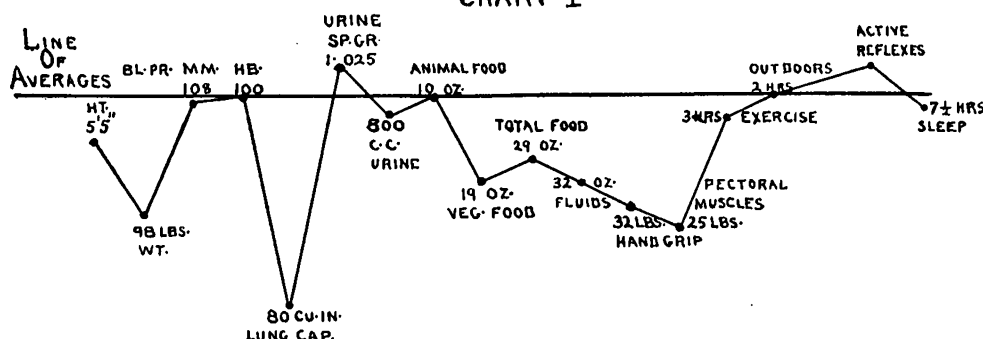


CHART 2

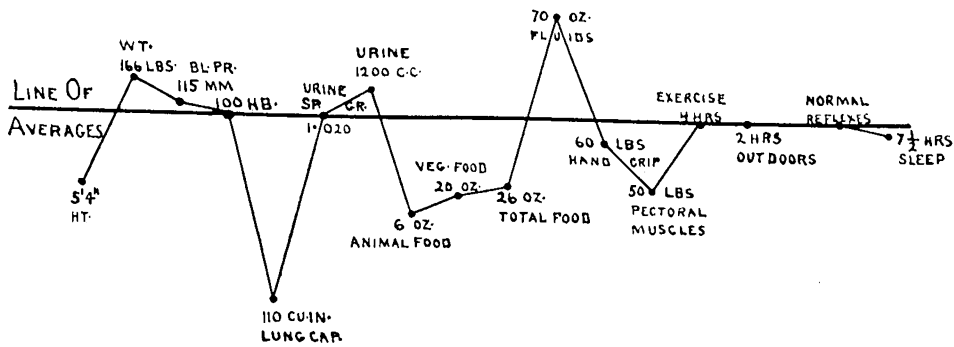


CHART 3

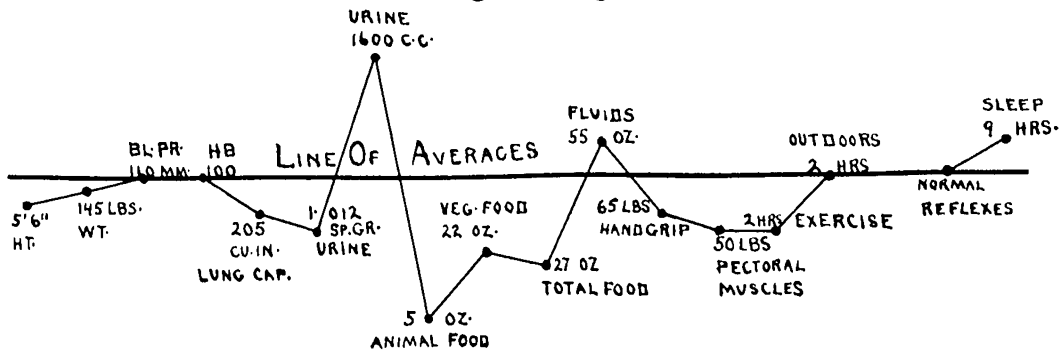


CHART 4

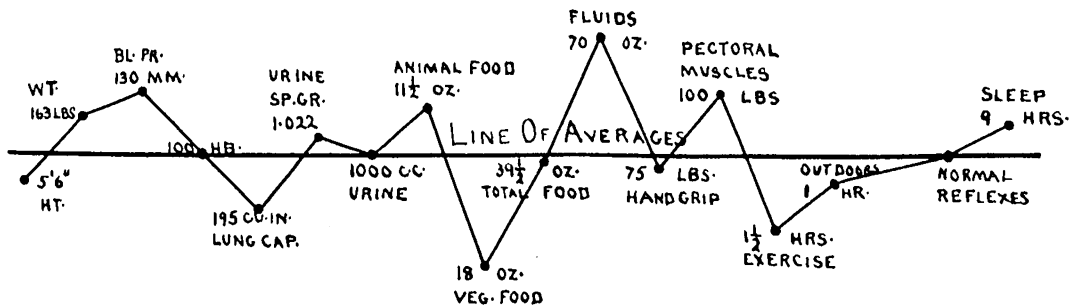


CHART 5

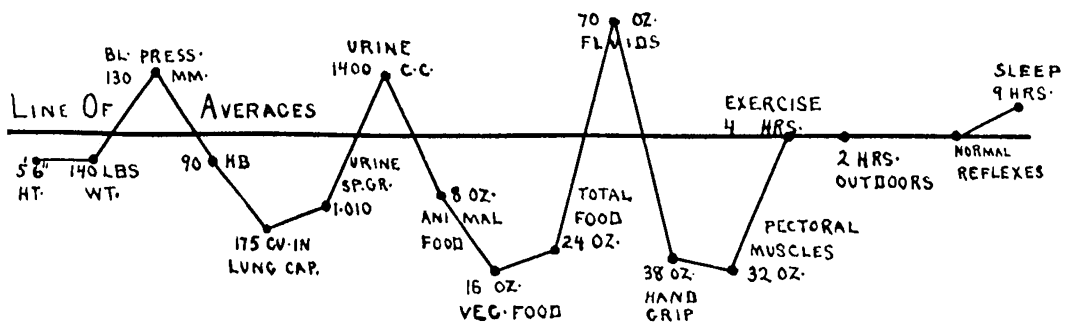
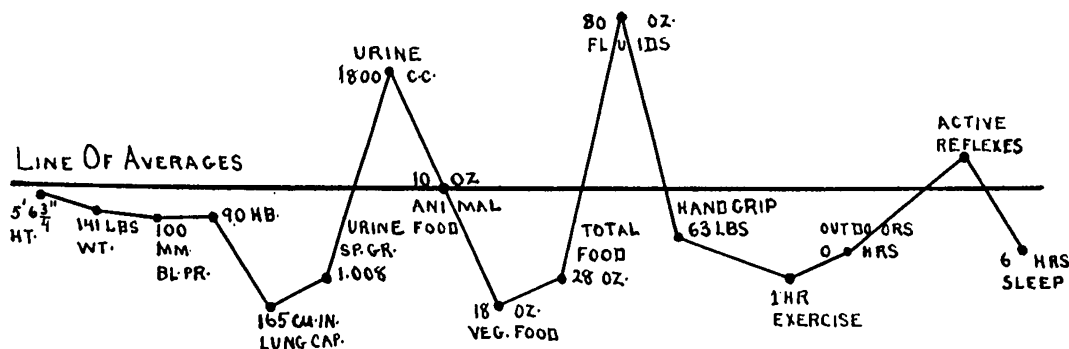


CHART 6



FEET INCHES	POUNDS	M.M. Hg	MAX. CUBIC INCHES	SP. GR.	C.C.	OUNCES	OUNCES	OUNCES	OUNCES	POUNDS	POUNDS	MAX.	HOURS	DEGREES OF ACTIVITY	HOURS
6-6	290	250	435		3800					220	220		17		
5	80	40	20		5600					210	210		16		
4	70	30	405		3400					200	200		15		
3	60	20	90		3200					190	190		14		
2	50	10	75		3000	20	60	80	100	180	180		13		
1	40	200	60		2800	19	57	76	95	170	170		12		
6-0	30	90	45		2600	18	54	72	90	160	160		11		
5	20	80	30	1048	2400	17	51	68	85	150	150		10		
4	10	70	15	44	2200	16	48	64	80	140	140		9		
3	200	60	300	40	2000	15	45	60	75	130	130		8		
2	90	50	85	36	1800	14	42	56	70	120	120		7		
1	80	40	70	32	1600	13	39	52	65	110	110		6		
6-0	70	30	55	28	1400	12	36	48	60	100	100		5		
5	60	20	40	24	1200	11	33	44	55	90	90		4		
AVERAGES 5-7	150	110	100	225	1020	10	30	40	50	80	80		3		
6	140	100	90	210	16	800	9	27	36	45	70	3	1	SLUGGISH	7
5	30	90	80	195	12	600	8	24	32	40	60	2	0	VERY SLUGGISH	6
4	20	80	70	80	08	400	7	21	28	35	50	1			5
3	10	70	60	65	04	200	6	18	24	30	40				4
2	100	60	50	50	1000	0	5	15	20	25	30				3
1	90	50	40	35			4	12	16	20	20				2
5-0	80	40	30	20			3	9	12	15	10				1
4	70	30	105	90			2	6	8	10	0				0
3	60		90				1	4	5	5	0				0
2	50		75				0	3	4	5	0				0
1	40		60				0	2	3	4	0				0
HEIGHT															
WEIGHT															
BLOOD PRESSURE															
HAEMOGLOBIN															
LUNG CAPACITY															
SPECIFIC GRAVITY URINE															
VOLUME URINE															
ANIMAL FOOD															
VEGETABLE FOOD															
TOTAL FOOD															
LIQUIDS															
STRENGTH OF FORE ARM MUSCLES															
STRENGTH OF PECTORAL MUSCLES															
AMOUNT OF DAILY EXERCISE															
HOURS SPENT OUT OF DOORS															
NERVE REFLEXES															
HOURS OF SLEEP															

TABLE I

Medical Progress.

REPORT ON OBSTETRICS.

By ROBERT L. DENORMANDIE, M.D., BOSTON,

AND

JOHN B. SWIFT, JR., M.D., BOSTON.

(Concluded from page 729.)

PHARMACOLOGIC ACTION OF ECBOLIC DRUGS.

Feeling that the general practitioner has not been able to keep in touch with the recent ad-

vancement in the chemistry and pharmacology of the ecbolic drugs, Lieb⁷ has reviewed briefly the more important papers, and gives the results of his own experiments on the use of oxytocics in the circulation and on the isolated uterus, and indicates their therapeutic employment.

Dogs anesthetized with morphine and chloretone were used for the blood pressure experiments and the isolated uterus of the guinea-pig was used for the experiments on the effects of oxytocics on the uterus.

A careful description of the method used accompanied the article, including some excellent