BODILY BUILD

PHYSIOLOGICAL AND PSYCHOLOGICAL FUNCTIONS

BY

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The term personality is employed in such divergent meanings that it is necessary, before discussing it, accurately to state what one intends by its use. Every person is judged by his behaviour and by his appearance. He is as he shows himself to us in bearing, shape, expression, and movement, as he conducts himself, acts, and reacts to the external world, and as he deals with and inwardly experiences psychical contents. Personality thus defined displays itself in two directions. It is characterized, that is, by external phenomena which are objectively cognizable, and by inward experiences which are subjective; in other words, we distinguish between a person's outward and inward aspect, both of which are accessible to close investigation. In order to comprehend the subjective experiences, the inward aspect, that is, of patients and healthy persons, we endeavour to call up in ourselves the feelings aroused in them by dealing with the psychical contents. If this is to be done it is essential that the investigator should be able to put himself into the state of mind of the subject of the investigation. This inward-feeling is achieved by imitating the expressive movements e.g. of depression, fear, anger, distrust etc., and then seeing what emotions are aroused, or by following in oneself the line of thought of the person to be examined, and observing what thoughts, emotions, arise in consequence. For the success of this method it is necessary that the psychic states to be investigated shall not be strange to the investigator, that he shall have experienced them himself, be it only in a rudimentary form, so that at all events traces of them are present in his consciousness. A second condition is that he shall have a close acquaintance with the expressive phenomena of the inward experiences. Subjective psychology therefore requires the aid of objective, but on the other hand it must not be forgotten that the cognizable expressive phenomena of which the investigator makes use are nothing but the objective signs by means of which the inward experiences make themselves known. In order to sum up the personality it is therefore necessary to employ both the objective and the subjective methods of investigation. Either method alone is insufficient. The objective method is inadequate owing to its giving no insight into the inward experiences; the subjective method is impossible if a knowledge of the cognizable expressive phenomena is lacking. The objective and the subjective symptoms both give us an aspect of the same reality, of which the former show us the outward side and the latter the inner side. Both groups of phenomena are subject to the same laws.

The exterior of the personality, which is objectively cognizable, is characterized by somatic and psychic phenomena. The somatic ones are related to physiological operations and to the anatomical structure, to the

shape of the body as a whole and in all its parts. These forms owe their origin to centrifugal growth-impulses. They are thus the result of physiological operations. The psychological phenomena of the interior are related to observations, memory, orientation, practice, fatigue, associations, line of thought, judgment, affections, volitions, etc. Like the somatic operations, they are accurately measurable. There is so intimate a correlation between the somatic and the objectively cognizable psychical processes, that form and function imply in the domain of somatology a definite psychical constellation and that psychical processes make themselves evident through accompanying physical phenomena. Every psychical operation is immediately reflected in a measurable modification of the plethysmogram, in the respiration curve, in the secretion of perspiration, in the resistance of the skin to electric currents, etc. The strength, but not the nature, of the psychical symptoms can thereby be measured. This investigation is moreover of great importance owing to the fact that the rapidity with which and the extent to which the functions are developed by practice give a reliable insight into the disposition in various spheres. The strength and the direction of the disposition, which differ for each individual, can be accurately measured. For the investigation of the internal aspect of the personality, of the subjective experiences, that is, an accurate knowledge of the objective phenomena is also necessary.

The connection between somatic and psychic phenomena may be determined in various ways. Experimental investigation enables us to determine the correlations between the psychological and the physical phenomena in the anatomical and in the physiological sphere. The biographical method is also very useful for this purpose. Where reliable biographies are not available, we can make these ourselves. A third method is that of the somato-psychological inquiry [1]), by which the desired anatomical, physiological, and psychological data are furnished, so that it is possible to see, in the case of the same individual, the anatomical, the physiological, and the psychological person, between which the connection may be sought. But the differences which exist between the somatic and psychological qualities of the individuals also enable us to distinguish between the races and the types of constitution. The races may be distinguished from one another somatically by means of height, shape of skull, and pigmentation, psychologically by means of difference in psychical after-effect. The types of constitution likewise differ from one another in physical, physiological, and psychological characteristics. In medical science the term constitution is used in connection with an increased or decreased susceptibility and resistance to diseases. This view is one-sided, for the individual difference in the degree of reaction to innocuous stimuli is also due to the constitution. These differences may be either of a somatic or of a psychological nature.

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[1]) E. D. WIERSMA. Lectures on psychiatry, 1932, p. 78.

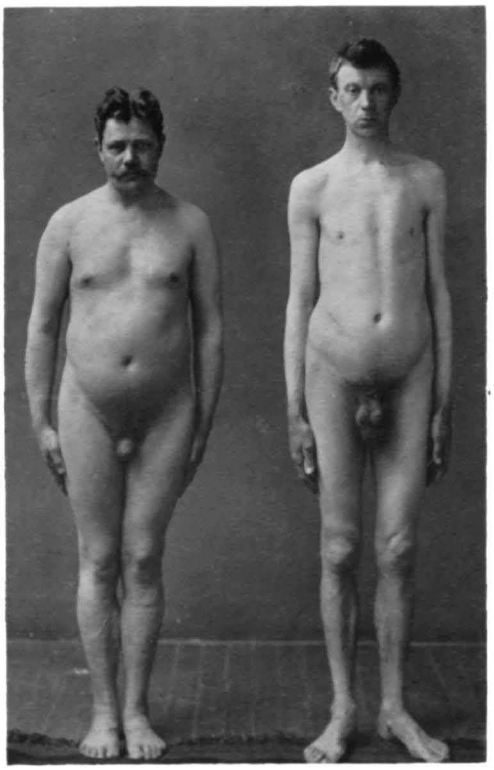


Fig. 1.

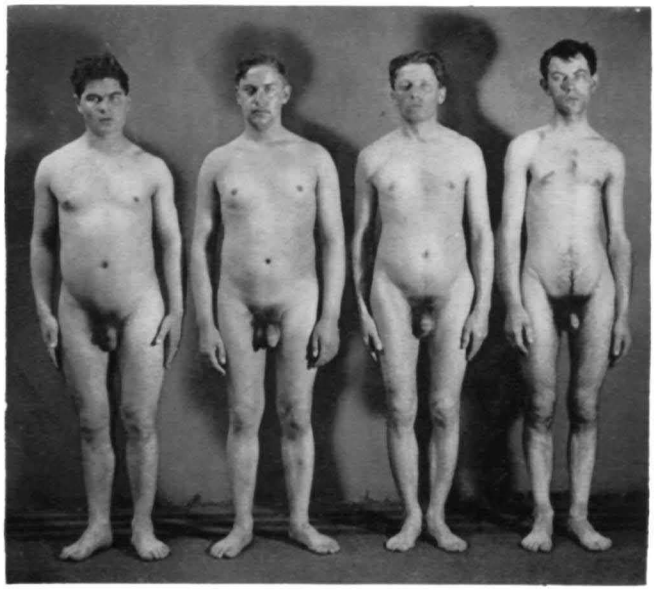


Fig. 2.

Bodily Build.

HIPPOCRATES, BENEKE, STILLER, and others have tried to find a connection between physical build and susceptibility to particular diseases. They speak of an innate predisposition, whereas the French school, SIGAUD and his disciples, ascribe a great influence to the action of the environment. KRETSCHMER was the first to seek a connection between physique and mental condition. The marked inclination which exists constantly to find new names for the same conceptions, is due to the desire to indicate the principle from which one has started. There is on the one hand a close resemblance between the phthisical habit of HIPPOCRATES, the scrofulous-phthisical constitution of BENEKE, the asthenic type of STILLER, the habitus microsplanchnicus of VIOLA, the type respiratoire of SIGAUD and others, the leptosomic type of KRETSCHMER, the linear type of STOCKARD, and the slender type of the somato-psychological inquiry; and on the other hand between the habitus apoplecticus of HIPPOCRATES, the carcinomatous constitution of BENEKE, the apoplectic type of STILLER, the habitus macrosplanchnicus of VIOLA, the type digestif of SIGAUD and others, the pycnic type of KRETSCHMER, the lateral type of STOCKARD, the thick-set of the somato-psychological inquiry, eurysomia of WEIDENREICH. All these divisions are based on the length and breadth of the persons, for which reason WEIDENREICH suggests distinguishing only between eurysomics and leptosomics. It is to my mind advisable to speak only of broader and narrower individuals when these measurements are regarded not as absolute values, but in relation to the length. This is also implied by the above terms, for eurysomic means broad, leptosomic narrow or slender of build. Eurysomia may occur both in tall and short persons, leptosomia in both short and tall ones.

The classification of human beings according to the relative breadth of the body and its parts is evidently not difficult, for so great is the harmony between the build of the parts of the body that the shape of the face suffices to indicate eurysomia or leptosomia of the entire body. This was pointed out by KRETSCHMER, and WEIDENREICH [1]) gives a number of instances. This is also evident from fig. 1, taken in the Groningen clinic.

There may, however, be objections, for there is not invariably entire agreement between the shapes of the parts of the body. There are sometimes discrepancies, whilst there are also gradual transitions between the broad and the narrow type, such as those mentioned above, and which are not infrequently met with in the case of the coarse and robust. Accurate measurements, however, usually enable us to determine in which category the individual is to be placed. In the following fig. 2 the gradual transition

[1]) F. WEIDENREICH. Rasse und Körperbau. 1927.

from eurysomia to leptosomia is plainly visible. From left to right the figures gain in slenderness and narrowness.

A second objection is to be found in the asymmetrical construction of the body, which is especially noticeable in the face. The two right-hand halves of the face, joined together to form one whole, often give quite a different picture from the real portrait and form the two left-hand halves joined together. I have made photographs of this kind of many persons. When doing so it is necessary to fix the head in such a position that the photographs are as truly full-face as possible. The difference between the two halves of the face is often that the juxtaposed right-hand halves show the eurysomic physique, the two juxtaposed left-hand halves the leptosomic (fig. 3).

Not only is asymmetry in build shown by this investigation, but there is also often a great difference in emotional expression, so that the right-hand halves express an entirely different state of mind from the left-hand ones (figs. 4 and 5).

It is further known that considerable alterations may take place in build during the life of the person. Children who are eurysomic in the first few years of their life not infrequently become leptosomic later on. In the case of adults, also, changes in the bodily build may occur at the various periods of life.

Connection between build and function.

The somato-psychological inquiry, which puts us in possession of 415 biograms, which furnish us with information as the anatomical build, the physiological operations, and the psychological constitution, enables us to trace the physiological and psychological characters by which eurysomia is distinguished from leptosomia.

The eurysomics or thick-set are characterized by a relatively smaller length and greater breadth of body, face, nose, neck, and thorax, by relatively short, rounded arms and legs, by small, broad hands and feet, by relatively short, thick fingers and toes, and by an obtuse angulus epigastricus. The leptosomics are slender; their face, nose, neck, thorax, and shoulders are narrow. The arms are relatively long, thin, and slender, the hands, feet, fingers, and toes are long and thin. The face is oval, the chest is flat, the angulus epigastricus is acute. Still another type may be isolated from the material furnished by the somato-psychological inquiry, viz., the coarsely-built and robust, identical with the muscular type of SIGAUD and the athletic type of KRETSCHMER. They are characterized by greater length, a coarsely-built skeleton, and pronounced muscular development. The relative breadth of the body and its parts may be slight, in which case they approach the leptosomics; they may also be greater, forming a transition to the eurysomics. According to their bodily build the coarse and robust sometimes, therefore, belong to the leptosomics and sometimes to the euryso-

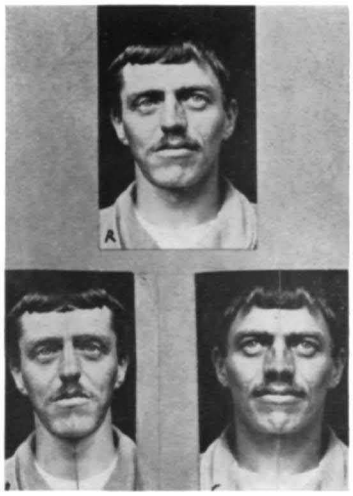


Fig. 3.

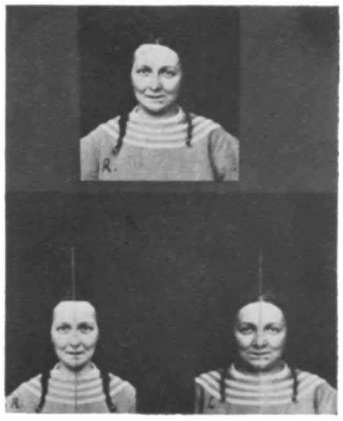


Fig. 4.

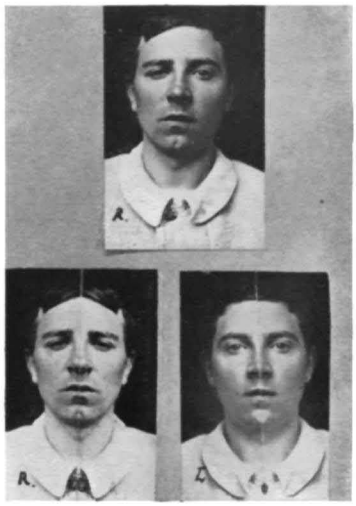


Fig. 5.

mics. Although of the same height, they may sometimes be leptosomics and sometimes eurysomics. An independent type of physique is not discoverable in the muscular, the athletic, the coarse and robust.

The somato-psychological inquiry further shows us that euryblastia is accompanied by the development of particular psychological and physiological phenomena.

The thick-set, the stocky, who are characterized physically by lateral growth, display at the same time a particular state of mind and special physiological properties. Psychologically they evince a more than average activity (73—67). [Of the figures between brackets the first refers to the percentage in which the quality mentioned is found in the type under discussion, the second to the percentage in which this quality is found in all the persons covered by the inquiry.], a secondary function stronger than the average (53—46), and a less than average emotionality (57—65), so that they conform to the phlegmatic type of temperament. They make a calm (28—20), levelheaded, and thoughtful impression (62—49). Physiologically they belong to the rapid, sure, and quiet type. They give the impression of reacting quickly, efficiently, quietly, and without undue haste: movements rapid (55—51), walking quick (71—58); they make straight for their goal (83—79), speak loudly (48—39) and articulate well (64—58); their movements are quiet (69—62). With respect to the autonomous functions the thick-set belong to the hypo-autonomous type: pulse slow (50—33), respiration slow (41—38), temperature low (33—28).

The slender, belonging, so far as their physique is concerned, to the slight and narrow-built, are distinguished psychologically by a greater emotionality (69—65), increased irritability (39—35), and further by a greater interest in new impressions (19—17), in languages (20—18), in drawing (12—10), in the stage (8—7), in imitating others (12—10), but less in mathematics. (13—17). Physiologically the narrower and slenderer belong to the quick and more or less uncertain and restless tempotype. They give the impression of carrying out the movements of walking, writing, and speaking quickly, but with some haste, agitation, and uncertainty: movements rapid (59—51), walking quick (63—58), speech rapid (51—42); movements of the hands restless (16—13); writing irregular (31—25), changeable (26—25). With respect to the autonomous functions the slender and narrow must be placed in the hyperautonomous type: pulse rapid (29—25), respiration rapid (10—8), temperature high (9—7).

Physiological and psychological functions separately and in connection with one another.

There is, as is seen from the above, a great degree of harmony in the build of the parts of the body, so that from the shape of the face the build of the other parts of the body may be deduced, not, it is true, with absolute certainty, but with a great degree of probability. Moreover the types of

build, of which we have distinguished the eurysomics and the leptosomics, are characterized by certain physiological and psychological qualities. The question now arises whether as strong a correlation can be shown to exist between the phenomena of the various physiological types, and also between the various psychological types as between the build of the parts of the body, and furthermore which correlation can be marked between the physiological and the psychological types and between these and the types of physique.

Interconnection of the separate physiological functions.

Of the physiological operations two groups may be distinguished, viz., the automatic and the autonomic. The former evolve from voluntary movements. They (e.g. walking, speaking, cycling, in short all acts of daily routine) are gradually learned by practice, and are finally performed without or with only very little intervention of the consciousness. They have then become automatic. The operations of the second group (e.g. the action of the heart, the respiration, the secretion of perspiration, the movements of the stomach and intestines, etc.) are not under the direct influence of the will. They obey laws of their own, they are autonomic.

Just as between the shape of the parts of the body, so also is there a harmony between the automatic operations. Of these functions the rapidity of reaction of the movements is the most striking, since it displays a marked correlation more especially with the rapidity, but also with the sureness and calmness, with which all actions are performed. According to the somato-psychological inquiry the rapid tempotype is characterized by the great rapidity of the movements, of walking, of speaking (66—50) by the greater energy, decision, and sureness of the actions, of writing, of speaking, of the facial expressions (64—55) and by greater restlessness of the movements and of the face (39—30). With the slow tempotype all these actions are performed in greater number less-rapidly (42—17), less-energetically, less-decidedly, and less-surely (24—16) and more calmly (65—53).

This inquiry also shows that there is a correlation between the autonomic operations. The hyperautonomic type, which is most easily recognizable by the more rapid action of the heart (100—25), also shows a more superficial (37—23) and quicker (24—8) respiration, a higher body-temperature (23—8), and a restless and short sleep (23—17). The hypo-autonomic type, with a slow heart-action (100—33), is also characterized by a deep (51—30), slow (68—38) respiration, a low body-temperature (57—28), a calm, long sleep (71—61), which quickly begins (74—66).

Correlation between automatic and autonomic operations.

Correlation also exists between these two groups of physiological phenomena, between the automatic and the autonomic operations. The rapid tem-

potype is distinguished from the average with respect to the autonomic phenomena by a higher temperature (11—8), a quicker pulse (31—25), a more rapid and superficial respiration (20—15), a reduced secretion of perspiration: dry hands (84—82). — The slow tempotype is characterized with respect to the autonomic phenomena by a lower temperature (34—28), by a slower pulse (45—33), by a deeper and slower respiration (42—34), by an increased secretion of perspiration: hands damp (30—10). — The hyper-autonomic type is marked with respect to the automatic operations by a greater rapidity of the movements of the body, of walking, of speaking, and of writing (56—50), by uncertainty and irregularity (19—17) and restlessness of these movements (30—23). The hypo-autonomic type, on the other hand, displays a greater slowness of the bodily movements, of walking and speech (26—17), a greater regularity in gait and writing (69—61), less decision and energy in the movements and in the writing (49—54), and more calmness in movements and mimicry. (62—54).

Correlation between the physiological types, the psychological (temperamental) types, and the types of physique.

The relations of interdependence of the psychical phenomena (temperament, intellect, tendencies, volitions) have already been discussed in detail.[1]). The somatopsychological inquiry further showed that the automatic operations are influenced to a very great extent by the qualities of temperament. Inactivity reduces the energy of the bearing: slouching carriage, round shoulders (40—25)); increases the slowness of the bodily movements, of walking and of speech (39—25), promotes uncertainty in walking, writing, and speaking (41—25), aggravates the restlessness of the bodily movements, the expression of the face, the movements of the eyes (30—25); whereas activity exercises a contrary influence on all these operations; emotionality increases the rapidity (77—71), the uncertainty (80—71), and the restlessness (86—71); the primary function likewise increases the rapidity (37—31), the uncertainty (36—31), and the restlessness (43—31). The autonomic functions are modified less by the activity and the psychical after-effect than by the emotionality. It is true that with active persons the temperature is somewhat higher, the pulse and the respiration are rather quicker, and with the secondary functioners the secretion of perspiration is somewhat increased, but with emotionality all these functions are strengthened to a very great extent, so that this heightened activity may be regarded as a sign of increased emotionality.

There is therefore an intimate interaction of the physiological and psychical operations, whilst it has also been shown (see p. 7) that types of physique such as the thick-set and the slender and narrow-built also correspond to particular physiological and psychological phenomena. Are,

[1]) G. HEYMANS u. E. D. WIERSMA. Beiträge zur speziellen Psychologie auf Grund einer Massenuntersuchung. Zeitschr. f. Psychol. Band 51, 1909.

then, these physiological types (tempo- and autonomic types) likewise characterized by particular psychological phenomena and connected with particular kinds of physique?

Psychological and anatomical characteristics of the physiological types (tempotypes and autonomic types).

The rapid tempotype (254 persons), which is marked by rapid reaction, displays a strong motoric disposition, so that the attention is especially directed to the act to be performed. This type bears the psychological signs of the choleric temperament-type: the activity (70—67), the emotionality (74—65), the primary function (28—25) are above the average. The enhanced sensitiveness of reaction reveals itself in every psychical sphere. In intellectual matters the persons of this tempotype are seen to be more intelligent (76—69), more positive in their opinions (52—47), wittier (47—40), readier in conversation (71—62), more practical (83—74), more skilful (72—64), better observers (70—60). With regard to their tendencies, they are on the one hand more altruistic: taking an interest in the lot of others (65—60), helpful (81—77), courageous in danger (45—38), always wide awake (55—49), but on the other hand they display increased vital tendencies: fond of good living (47—42), vain (23—17), sensitive to appreciation (73—68), ambitious (29—24), fond amusements (26—16).

Physically leptoblastia is very prominent. The persons of this type are thin (32—14), slim-built (36—33), slender (37—31). The eyes are large (41—35), the neck (29—26), the thorax (20—16), the ribs (8—6), the shoulders (24—21) are narrow, the pelvis is narrow (23—20) and slender (35—30), the arms are long (46—41) and slender (54—47), the legs are long (41—39) and slender (50—44), the hands are narrow (40—37), the fingers thin (54—49), the feet small and thin (51—47), the toes long and thin (39—32). — The susceptibility to infections such as nasal catarrh, affections of the throat and bronchitis (18—16), to exaltation (7—5), to urticaria (13—12), to reactions to cutaneous stimuli (15—13) is enhanced.

Summing up, the quick tempotype is seen to be distinguished physiologically and psychologically by greater mobility, and anatomically by leptoblastia.

The slow tempotype (64 persons), which has not a motoric disposition, is, so far as temperament is concerned, characterized by an enhanced non-activity (37—23), an increased non-emotionality (25—17) and a stronger secondary function (51—43). The persons of this tempotype display, that is, some resemblance to the apathetic temperament-type. In every psychical region there is a slighter mobility. They are quieter (86—51), of a tranquil nature (83—63), less persistent (33—49), more thoughtful (62—49), more irresolute (47—21), cooler (52—32) and less hurried (11—21).

In intellectual matters they are less intelligent (52—69), more superficial (11—7), more unpractical (20—9), less decided (31—44), more cautious (41—28), less witty (27—40), less ready in conversation (41—62), more poor-observers (20—11), more clumsy (29—16). In their vital tendencies they are not exigent: not fond of good living (39—29), sexually continent (72—66), not satisfied with their own performances (52—45), caring little about their appearance (63—41), not ambitious (19—16), inclined to keep in the background (38—27), easily manageable (11—6); on the other hand the egotistical tendencies are increased: they are more avaricious (16—14), less disinterested in money matters (41—48), less kind to their subordinates (75—85), they have less feeling for others (47—60), are more occupied with themselves (23—10), less willing to help (64—77), more egotistical (16—7), not-loved by children (20—12). Furthermore, they are indifferent to politics (44—38) and religion (39—31), more reserved (64—40), timid in danger (47—35), less domesticated (50—59), self-contained (20—9), distrait (41—27), speak less essentially (13—25), laugh little (59—37), display little courage in sickness (22—32).

Physically they are more thick-set than the average (52—47), much more coarsely (27—16) but not more robustly built (27—31), less strong (6—12), but more angular (11—7). The skin is thick (20—13) and rough (9—4). The face is short (31—24), broad (42—31), round (41—29), and fat (9—4), with indistinct nasolabial folds (50—38), the complexion is pale (34—27). The nose is short (34—26) and blunt (36—33), the lips are thicker than the average (34—27), the skull is short (36—27). The neck is short (45—37) and inclined forward (36—20). The shoulders are sloping (29—18) and bent forward (27—14). The arms are short (27—20) and coarsely-formed (39—28), the arm-muscles are weak (16—10), the pelvis is coarsely built (41—28), the legs are short (29—28) and coarsely-built (41—28), the leg-muscles are weak (16—7), the back-muscles (16—13) and the abdominal muscles are weak (25—19). The fingers are short and thick (38—28). The feet are thick (23—17), the toes are short and thick (30—23).

Summing up, the slow tempo-type, which physiologically is characterized by greater calmness but less quickness, decreased energy, decision, and sureness of movement, psychologically, as a result of the slighter activity and emotionality and of the stronger but less varied secondary function, displays a monotonous psychic life, of which the slight perseverance, the indecision, the irresolution, the decreased wittiness, the unpractical sense, the slight interest, the reduced altruism and the increased egotism are the consequence. Physically this type shows a coarse build of body and extremities, a thick skin and thick lips, a short, broad, round, fat, and pale face, the nose being short and blunt. The short growthform reveals itself also in the skull, the neck, the arms, fingers, and toes. Microblastia is thus not always coupled with euryblastia. These persons cannot be classed

with the eurysomics. They are distinguished from these by the weak muscles of the back, abdomen, arms, and legs, by the bearing bent forward and by their sloping shoulders.

The hyper-autonomic type (102 persons), which, as we have seen above, is characterized by a more rapid heart-action, more superficial and more frequent respiration, a higher body-temperature, and in which also the automatic movements have become more rapid, but also more uncertain, is distinguished psychologically with respect to the qualities of temperament only by the increased emotionality of the average individual. The activity (68—67), the secondary function (45—43), and the primary function (26—26) show no deviation worth mentioning. The emotionality, on the other hand, is greatly increased (80—65). In agreement with this is the greater mobility (52—39), the increased impulsivity (51—38), the greater vehemence (59—44), the increased irritability (47—31), the reduced calmness (54—63), the more marked agitation (32—21), the greater fear of (30—22) and impatience during sickness (30—25) and the greater readiness to call in the aid of the doctor (34—29). In intellectual matters the intelligence (75—69), the wittiness (47—40), the loquaxity (68—62), the skill (73—64), the tendency to express a positive opinion on everything (52—44), the aptitude for accomplishments such as mathematics, languages, music, drawing, the stage, imitating people, (16—13) are increased, whilst the common sence (49—55), the breadth of view (74—79) and the independence (64—69) are reduced. The vital and egotistical tendencies are in general stronger than the average, being less inhibited by the higher tendencies: fond of good living (49—42), dissolute in sexual matters (12—9), satisfied with their own performances (32—22), vain (23—17), ambitious (30—24), money-loving (17—14), egotistical (13—7), constrained in deportment (25—17), given to exaggeration and embellishment (21—15), fond of amusement (26—16). There is an increased tendency towards melancholia (6—2), to hysteria (4—3), to neurasthenia (17—13), to hypochondria (3—1) and phobias (8—7).

Physically the persons of this type are lean (17—14), slender (38—33), slightly-built (42—31); the skin is thin (70—63), the face is narrow (36—24), the eyes are large (39—35), the neck is less rounded (40—61), less broad (27—35), the thorax is narrow (20—16), the intercostal spaces are narrow (9—5), the build of the thorax is paralytic (10—5), the shoulders are narrow (26—20), the pelvis is narrow (28—20) and slender (39—30), the arms are long (44—41) and slender (60—47), the legs are slender (54—44), the hands are small (62—51), the fingers are thin (55—49) and tapering (36—32), the feet are small (55—49), the toes are thin (42—39). There is a greater susceptibility to infections such as nasal catarrh, affections of the throat and bronchitis (22—16), to exaltation (9—5), to depression (22—16), to palpitation of the heart (21—12), to urticaria (15—11), to reactions to cutaneous stimuli (21—12).

Summing up, it is therefore seen that the hyper-autonomic type, both

with respect to the psychological and physiological phenomena and to the anatomical structure, bear a great resemblance to the rapid tempo-type, so that the composition of the two types is found very largely in the same persons. The hyper-autonomic type is marked by a greatly increased psychological and physiological activity. Anatomically speaking, leptoblastia of the entire body and of most of the parts is found.

The hypo-autonomic type (136 persons),which is characterized by a slow heartbeat, by a deep and slow respiration, a low temperature, a quiet and long sleep, evinces less rapidity, greater regularity and tranquillity, but less decision and energy, in the bodily movements also. With respect to the qualities of temperament there is a remarkable difference from the hyper-autonomic type. It is true that, as in the case of the hyper-autonomic type, the average values point to an increase in the activity (69—58), but there is a striking difference in the nature of the increase. In the execution of their professional or official duties the persons of the hypo-autonomic type display much more activity (82—78—80). The first figure refers to the hypo-, the second to the hyper-autonomous type, the third to the general average percentage. This also applies to the energetic tackling and finishing of a work once begun (58—50—51), but in their spare time they are more inclined to take it easy and are less occupied (65—78—70). This difference in the direction of their activity is connected with differences in the tendencies which will presently be mentioned. The secondary function is considerably increased (47—42), and this increase is at least partly dependent on greater activity, since it is especially noticeable in those qualities which are benefited thereby, viz. constancy in affections (81—74), attachment to old memories (60—57), the formation of habits (42—36), the fixing of the thoughts on the future (49—40), the agreement between thought and action (75—69). The average primary function, as in the case of the hyper-autonomic type, displays no deviation (26—26). If we compare the individual replies, we find that here, too, the activity has exerted an influence: reconciliation after anger occurs more quickly than with the hyper-autonomic (38—33—38), and the same holds good of susceptibility to new points of view (71—62—66). The emotionality is reduced (59—65). In agreement with this is the greater coolness (46—32), the better temper (68—58), the calm behaviour (71—63), the slighter fear of (18—22) and the greater patience in sickness (43—39), the less readiness to call in medical assistance (26—29). Intellectually the intelligence is smaller (66—69), the common-sense greater (59—54), they possess a broader mind (83—79), greater independence (73—69), a slighter aptitude for wit (35—40). The tendencies are on a higher level. Greater than the average are: the indifference to good living (35—29), the sexual continence (74—66), the dissatisfaction with their own performances (52—45), the indifference to praise (24—16), the desinterestedness in money matters (54—48). Smaller on the other hand are the vanity

(14—17), and the love of power (12—17). Above the average are also the strict veracity (68—64), the absolute reliability in money matters (92—88), the friendship for children (74—71), and animals (57—52), the tendency to discuss business (48—33), the desire to read books (68—56) of which the contents are accurately remembered (54—49), the desire for intellectual games (38—30), the exact performance of agreements (70—69), the slight tendency to laughter (51—37).

Physically the persons of this type are more corpulent (51—47), more coarse and robust (28—24) and more thick-set (15—10). The face is short (26—24), broad (35—30); the neck is short (41—37), rounded (66—61), broad (41—35); the thorax is broad (65—61), the intercostal spaces are broad (11—8), the thorax is barrel-shaped (7—4), the shoulders are broad (68—59); the pelvis is broad (50—42), coarse (35—24); the arms are long (47—41), coarse (41—28), the muscles are strong (37—33); the legs are long (47—39), coarse (41—28), the muscles are strong (46—39); the hands are large (56—44), broad (52—39), the fingers are long (54—47), thick (34—24), blunt (49—40); the feet are large (32—26), thick (22—17); the toes are long (36—26), thick (19—12).

The susceptibility to catarrh of the nose, throat, and bronchia (18—16) is somewhat above the average but much smaller than with the hyper-autonomic type. The predisposition to exaltation (2—5), to depression (15—16), palpitations (10—12), and the susceptibility to cutaneous stimuli (11—13) are somewhat reduced.

Summing up, it may therefore be said that the hypo-autonomic type belongs psychologically to the active, non-emotional, secondary functioning temperament-type, and that accordingly the intelligence is slighter, the common-sense greater. The lower tendencies are on a lower level, the higher ones on a higher. Physiologically speaking, there is, in addition to the hypo-autonomic effect, a reduced rapidity and decision of the automatic operations, which, however, are performed more quietly and regularly. Anatomically speaking this type is especially characterized by euryblastia, although longitudinal growth, especially in the extremities, is sometimes in evidence, just as the external shape of the body is in some cases thick-set, in others coarse and robust. This robustness is also shown by the powerful development of the muscular system.

Amongst the autonomic functions there is also the metabolic process, which, as is well-known, is closely connected with the physique, and the physiological and psychological functions. It is therefore of interest to trace the influence of the increased and decrased metabolism on these functions. With a high metabolism the consumption is greater than with a low one. It is therefore obvious that with a high metabolism the chance of an accumulation of fat is slighter than with a low one. For these reasons it may be taken that amongst lean people there will be found more persons

with a higher metabolism and amongst fatter people more with a lower metabolism. The lean and slender persons and the fat and corpulent ones were therefore picked out from the material of the inquiry and compared with one another with respect to physique and physiological and psychological qualities.

The lean and slender persons (172) are marked by general leanness (33—14), slenderness (78—33), absence of corpulence (0—47), by slight formation of fat over the whole body: face (58—42), neck (38—21), breast and back (76—45), abdomen (64—35), pelvis (48—42), arms (64—53), legs (60—48).

With respect to the physiological operations the carriage of the body and of the back is somewhat limper (24—19). The remaining automatic movements, speaking and walking, are somewhat quicker (54—50), but otherwise they show little deviation in decision and sureness (57—56) and none whatever in quietness. The autonomic operations, on the other hand, are considerably increased: the defecation is more regular [less inclination to constipation] (77—75), the temperature of the body is higher (11—7), the pulse is faster (27—25), the respiration is quicker (9—8) and more superficial (29—23).

Psychologically the lean persons, so far as the temperamental qualities are concerned, are somewhat less active (64—67) and somewhat more inactive (27—25); more emotional (71—65), more irritable (34—31), less cheerful (26—31), gloomier (34—31), more timid in danger (38—35), but on the other hand, in spite of the increased emotionality, less vehement (41—44), more courageous in sickness (50—32), more patient (48—39), and not more inclined to call in medical aid (30—26). The secondary function is hardly any greater (43—42), the primary function somewhat smaller (23—24). The lean persons therefore do not differ to any great extent from the average in activity and psychical after-effect, but they are more emotional. In intellectual matters they are more intelligent (72—69), more sensible (58—55), have broader views (81—79), are somewhat better observers (62—61), more skilful (68—64), but they are less independent (67—69). With regard to the tendencies they do not show any striking differences. They are on the one hand less fond of good living (33—42), which of course is beneficiel to leanness, sexually more continent (71—66), more disinterested in money matters (51—48), less domineering (14—17), kind to subordinates (86—85), fond of animals (56—52), averse to sexual jokes (48—45), but on the other hand more satisfied with their own performances (25—22), vain (22—17), ambitious (26—24), with less interest in the lot of others (51—60), less natural, more constrained (19—17), uncommunicative (44—40), less accurate (66—69), not prone to laughter (44—37).

Physical phenomena: the lean are delicate and slight (55—23), not coarse and robust (15—23); the skin is thin (72—63) and soft (79—75); the face is long (45—43), narrow (37—24) and oval (66—54); the nose is long (51—43), pointed (41—30), prominent (43—37), thin (41—32);

the lips are thin (54—43) ; the cranium is long (41—36) ; the neck is long (67—41), narrow (43—25), not muscular (38—31) ; the thorax is flat (34—21), long (51—32), and narrow (29—16) ; the ribs (11—6) and intercostal spaces (8—6) are narrow ; the angulus epigastricus is acute (35—21), the shape of the thorax is paralytic (9—6); the dorsal muscles are weak (18—13) ; the abdominal muscles are weak (25—22) ; the shoulders are narrow (33—21), sloping (24—18) and bent forward (20—14) ; the arms are longer (30—20), more slender (53—47), the muscles are not so strong (22—34); the legs are long (52—39); slender (48—44), the muscles are not so strong (28—39); the hands are long (48—37), not so broad (22—39); the fingers are long (70—47), thin (65—49), tapering (42—32) ; the feet are thin (58—45) ; the toes are long (40—26) and thin (52—39).

Summing up, there is seen to be, physiologically speaking, in the case of the lean and slender, an increase of the autonomic functions and an acceleration of the automatic operations. Psychologically speaking, with respect to the temperamental qualities the emotionality is somewhat increased (the activity and the psychical aftereffect show but little difference) ; with respect to the intellect it is the intelligence and the common sense which are more especially seen to be somewhat greater. The tendencies are partly on a higher level and partly on a lower one. So far as the bodily build is concerned, the lean belong to the leptosomics. The body and all its parts are long, narrow, and thin. The muscles are weak.

The fat and corpulent persons (205), who are characterized by a greater accumulation of fat (9—5) and corpulence (94—47), with an absence of leanness and slenderness (0—33), show larger deposits of fat on various parts of the body: face, a good deal (60—45), neck (9—5), breast and back (46—26), arms (36—21), legs (37—24).

Of the physiological operations the carriage of the back and body is somewhat more energetic (57—55), the decision and sureness of the automatic movements are rather greater (58—56). The quietness shows no deviation from the average, and resembles that of the lean. The autonomic operations are much less vigorous than those of the lean and also than those of the average: temperature less high (4—8), pulse in greater number slow (36—33), respiration less rapid (5—8).

Psychologically the activity is found to be higher (70—67), the emotionality lower (62—65). In agreement with this is the slighter degree of vehemence (41—44), the reduced irritability (28—31), the greater cheerfulness (36—31), the slighter inclination to gloominess (28—31), the increased lightheartedness (25—20), whilst on the other hand the courage in sickness is smaller (24—32), the impatience greater (27—25), the fear increased (27—22), as a result of which medical aid is more quickly called in (33—29). The secundary function is somewhat smaller (41—42), the primary function somewhat greater (25—24). The fat and corpulent are distinguished intellectually by a lesser degree of intelligence (66—69), and

a somewhat greater superficiality (9—7). They are more decided (49—44) and less inclined to express themselves conditionally (23—28), less good-observers (58—61), and less skilful (60—64). With regard to the tendencies, the vital ones, such as fondness for good living (52—42), by which of course the formation of fat is enhanced, are increased, but they are less vain (14—17), less ambitious (20—24), less disinterested in money matters (46—48), and less egotistical (6—7). They are more demonstrative (42—38) and less reserved (34—40), more accurate (75—69), less ironical (4—11), they are more given to laughter (46—41).

Physically they are coarse and robust (30—24) and thick-set (19—10), round (47—29); the skin is thick (17—13); the face is short (29—24), broad (43—31), round (41—29); the nose is short (30—26), blunt (41—33), thick (30—24); the eyes are small (34—27); the skull is short (29—27); the neck is short (52—37), broad (48—35), muscular (55—47); the thorax is deep (60—48), short (30—20), broad (78—61); angulus epigastricus is obtuse (30—19); the arms are not so long (15—41), coarse (39—28), the muscles strong (42—35); the legs are short (43—28), coarse (38—28); the muscles strong (45—39); the hands are short (48—35), broad (52—39), the fingers are short (46—33), thick (36—24) and blunt (46—40); the feet are small (55—49) and thick (25—17), the toes are short (40—34) and thick (18—12).

Summing up, the fat and corpulent are characterized physiologically by reduced autonomic and retarded automatic functions. Of the qualities of temperament the emotionality is lower, the activity stronger, whilst the psychical after-effects show scarcely any deviation. The intellect is on a somewhat lower level. The vital tendencies are increased, the most egotistical ones are reduced.

If we compare the physiological types, which were classified according to their automatic and autonomic operations, with one another, then a great similarity is found to exist somatically and psychologically between the quickly reacting persons, those with a frequent cardiac action, and the lean. These three types are somatically marked by an increased activity of the automatic and autonomic functions and by leptoblastia; psychologically by increased emotionality. A similar resemblance exists between the slowly reacting persons, those with a retarded cardiac action, and the fat. These are characterized somatically by lowering of the automatic and autonomic functions and by euryblastia; psychologically by reduced emotionality.

The constant concurrence of the increase of the physiological functions with leptoblastia and with increased emotionality, and conversely of the reduction of the physiological functions with euryblastia and with reduced emotionality justify us in supposing that these phenomena are under the influence of a common factor. It is well-known that the emotional are more mobile, that they are more impulsive and react more violently, that their pulse frequence and respiration are quicker, that the secretion of perspira-

tion is increased, and conversely, that the non-emotional are quieter, calmer, and react more slowly, that their pulse frequence and respiration are less frequent, and that the secretion of perspiration is reduced. And if we bear in mind that the leptoblastics are much more emotional than the average, and the euryblastics much less so, then it is obvious that there is a close correlation between the emotionality and the physiological operations and between the emotionality and the bodily build. But the concurrence of the somatic operations mentioned and the thyroid activity is at least equally great. It is wellknown that the autonomic operations, such as the cardiac action, metabolic process, secretion of perspiration, respiration, etc., are increased by thyroid, and that the actions are in consequence executed more rapidly. Thyroid also exerts an important influence on growth. HOLMGREEN's investigation, confirmed by SCHLESINGER, has demonstrated that longitudinal growth is stronger in the case of young persons with a swelling of the thyroid gland, which is accompanied by tachycardia. Conversely we are taught by pathology that the reduced thyroid secretion in cases of cretinism is accompanied by stunted growth.

The thyroid action and the emotionality exert, therefore, a simular influence on the automatic and on the autonomic functions, of which growth is also one.

The unity of the personality is shown not only by the constant concurrence of certain forms with certain functions of a psychological and physiological nature, such as e.g. slender bodily build with quickness, litheness and adroitness of the movements, but also by the reciprocal relation that exists between the predisposition to the development of form and function. The predisposition to the development of a particular form implies the predisposition to the development of the appropriate physiological and psychological operations and vice versa. Which of the two predispositions, the predisposition to the development of the form or that to the development of the function, is primary, it is difficult to say. The force which gives rise to the forms and that which produces the functions are inseparably bound together, for both are dependent on a primitive straining after conditions in which the existence of the individual is as far as possible ensured. This straining dominates the rise both of form and of function. It is impossible to speak of the precedence of either of these functions. They both serve the urge, the primeval impulse, to the evolution and unimpeded subsistence of the individual. The priority of this force may be demonstrated by numerous examples. Wherever, in the organic sphere, impeding influences threaten the existence of the individual, the form and function of the organs adapt themselves to the increased impulse towards an unhindered life. With valvular defects of the heart hypertrophy and increased function are seen to occur, with constriction of the urethra the wall of the bladder becomes thicker and the muscular contraction more powerful, with infectious diseases antidotes are formed which neutralize the noxious effect of the infection.

This endeavour to repair a disturbed equilibrium is so inherent a phenomena that it plays a powerful role in every department of life. In the psychological sphere artificially applied impeding stimuli such as a nose-clamp, the ticking of a metronome or an elastic band, increase the attention so as to compensate for these obstacles [1]; the scientific investigator, the artist, the business-man, are stimulated to greater efforts by difficulties which crop up; the masses are incited by religious, economic, or political oppression to resistance and greater activity. Centrifugal impulses, that is, exist, the object of which is to ensure the most favourable possible course to the vital processes, and for this purpose it is essential that the form and the function of the body and its organs shall be in harmony therewith, and that they shall be governed by these centrifugal impulses. Regarded in this way, therefore, neither the form nor the function is primary, both being dependent on a more central straining after a balanced co-operation of the vital processes. Build and function are two vital phenomena which run parallel, and which in their appearances give us a view of the force and of the direction of the straining after equilibrium, after correctness and usefulness of the vital processes of the individual. This straining may be strengthened when obstacles are placed in the way of the efficient action of the vital operations. This strengthening reveals itself in the hypertrophic build and in the increased activity of the organs affected. If, however, the obstacles are so great that they cannot be compensated for by a greater straining, the energy relaxes, and this relaxation is recognizable by the inferiority in build and function of the organs affected. Furthermore, the straining after equilibrium and correct and efficient functioning may be inherently feeble, in which case this inferiority will be evident in the form and functioning of the organs. The pathological predisposition to physiological and psychological disturbances will therefore show itself not only in a particular functioning, but also in a particular bodily build.

With regard to physical deviations this was pointed out in very early times. HIPPOCRATES speaks of a habitus apoplecticus, BENEKE of the carcinomatous and of the scrofulous-phthisical constitution, STILLER of the typus asthenicus. So far as mental disturbances are concerned, KRETSCHMER has pointed out the connection between physique and character and between physique and psychical disturbances. As stated above, the investigation with the somato-psychological inquiry [2]) enabled me to distinguish the thick-set, who are eurysomics from the slender and narrow, who are leptosomics. It was at the same time found that these two types of physique are characterized by very special psychological and physiological phenomena. The thick-set belong to the active, the non-emotional, and the secondary functioners; the fine and slender are marked by a greater emotionality. In agreement with this the thick-set are calmer, quieter, more level-headed; the leptosomics more mobile, more agitated, more irritable. It was

[1]) E. D. WIERSMA. Lectures on Psychiatry, 1932, p. 193.

[2]) E. D. WIERSMA, Karakter en Psychose. Psychiatrische en Neurol. Bladen 31, 1927.

further possible by means of another investigation on character and psychosis [1]) to confirm the opinion of O. GROSS [2]) that psychopathology makes us acquainted with the psychical phenomena in a highly magnified form. The pathological disturbances are to be regarded as phenomena which differ from healthy ones only in their deviating from the average. Normal psychical phenomena and psychopathological ones obey the same laws. They form one whole; their separation is artificial. The psychologist who studies only the normal psychical phenomena, can enormously widen his outlook by including in his study the abnormal psychical phenomena, since these show him the normal phenomena in a magnified form. The limited deviations of the psychical phenomena from the average which occur within the limits of sanity, assume excessive proportions as soon as the morbid deviations are added. It was shown by the investigation on character and psychosis that the pre-morbid mental state of melancholics is characterized by non-activity, by enhanced emotionality, and by a strong secondary function, so that the melancholics display the charecteristics of the sentimental temperament-type before the occurrence of the disease. The same qualities of temperament are found in a greatly enhanced degree in melancholics, for in their case there is not infrequently an absence of any initiative to action, so that owing to the lack of activity the patients usually sit limp and motionless, and are unable to get on with their thoughts; they are constantly occupied, owing to their enhanced emotionality, by fear, depression, and by delusions of disease and sinfulness, and have, as a result of the strong after-effect of thoughts, impressions, emotions, etc., a very restricted consciousness. Among this type, from which the melancholics are recruited, the thick-set or eurysomics, who on the contrary, as seen above, are active and only slightly emotional, cannot be reckoned. And is it really as certain as is maintained by some that the praecox patients are to a greater extent than the melancholics characterized by a leptosomic physical growth? The narrow-built and slender, or leptosomics, are according to the investigation above mentioned, „Karakter en psychose", more than averagely emotional, irritable, agitated, and mobile, and at the same time they display greater interest in new impressions, languages, drawing, and imitating others. This is also seen in the behaviour of animals, e.g. of slender horses, dogs, and hens, which take notice of all strange objects and are easily frightened by very unusual impressions. The psychological aspect of the praecox patient, with his split thinking, feeling, and acting, with his irritability and his frequently great indifference to his surroundings, is so different from the mental state of the leptosomics that this can hardly be regarded as the pre-morbid psychical condition of the praecox patients. It is therefore of importance to try to determine whether melancholics are really characterized in the majority of cases by the eurysomic physique and the praecox patients more especially by the leptosomic

[1]) Psychiatrische en Neurol. Bladen, 31 1927.

[2]) O. GROSS, Die Cerebrale Secundärfunction, 1902.

bodily build. If this supposition is confirmed, the pre-morbid conditions will of course also display the same physiques; if this conjecture is found to be baseless, the above-mentioned physical characteristics will also be absent in the case of pre-morbid praecox patients. In order to solve this problem the following investigation of the bodily build was instituted.

Physical Proportions.

The following measurements, according to MARTIN's [1]) anthropological prescription, were performed on 111 male and 88 female patients who were treated in the Groningen psychiatrical neurological clinic before 1930 for melancholia or dementia praecox. A few of the melancholics had previously also, although seldom, had a maniacal attack.

Length of body	Girth of abdomen
Breadth of shoulders	Length of legs
Girth of head	Length of arms
Length of head	Girth of pelvis
Breadth of head	Girth of left forearm
Height of face	Girth of hand
Length of nose	Girth of neck
Girth of chest	Weight of body

Length of body. Owing to their psychical disturbances it was not possible to obtain reliable measurements of the length of body of all these patients. The number was restricted to 166. The average height of the men is 170 cM., that of the women 160.9 cM. Of the 166 patients 91 are taller, 75 smaller than the average. Of the 91 taller, 46 = 50.5 % are praecox patients and 45 = 49.5 % melancholics. Of the 75 shorter persons 37 = 49.3 % are praecox patients and 38 = 50.6 % melancholics. There are therefore approximately the same number of melancholics as of praecox patients above and below the average height.

Breadth of shoulders. Reliable measurements were obtained of 179 patients. The average shoulder-breadth of the men was 39.4 cM., of the women 35.6 cM. Of the 179 patients 89 are broader, 90 narrower than the average. Of the 89 broader, 41 = 46.1 % are melancholics, 48 = 53.9 % praecox patients. Of the 90 narrower persons 49 = 54.4 % are melancholics and 41 = 45.6 ... praecox patients. According to these absolute measurements, therefore, the melancholics are narrower than the praecox patients.

Breadth index. Although it would generally speaking be premature to draw conclusions from these absolute breadth measurements as to a greater or lesser degree of lateral growth, since with a greater length the breadth

[1]) R. MARTIN, Anthropometrie 1925.

will also increase, even if not invariably in a proportionate degree, the above measurements do certainly indicate that the melancholics are narrower than the praecox patients, since both the number of persons who exceed the average height and of those below this comprise almost the same number of melancholics and of praecox patients. We are, however, not entitled to express this opinion until we have expressed the breadth-measurements of all the persons in percentages of the height. For this reason the breadth index of all the persons whose height and breadth were known, was calculated. This average index in the case of the men is 23.1, in that of the women 22.1. Of the 166 patients the index of 86 is above the average, of 73 it is below, and of 7 it is the same as the average. Of the 86 broader 47 = 54.6 % are praecox patients and 39 = 45.4 % are melancholics. Of the 73 narrower persons 30 = 41.1 % are praecox patients and 43 = 58.9 % are melancholics. Of the broader persons, therefore, more are praecox patients, of the narrower ones more are melancholics. This investigation, therefore, confirms the opinion that the melancholics in their pre-morbid state do not belong as a general rule to the thick-set nor the praecox patients as a rule to the narrow and slender.

The indices enable us to divide the broad from the narrow. We can then endeavour to determine in the first place whether the greater lateral growth of the body is accompanied by eurysomia of its parts, and whether leptosomia of the body is accompanied by greater longitudinal growth of its parts; and in the second place whether agreement in growth can be found between the melancholics and the eurysomics on the one hand and the praecox patients and the leptosomics on the other. It is of importance to make this comparison between the absolute measurements, but also between the relative measurements, the height of all the persons being reduced to 100. Below is given first a comparison of the breadth-measurements, and then one of the length measurements.

Absolute breadth measurements. In the following table are shown the average measurements of all the persons, men and women, the average measurements of the eurysomics, of the leptosomics, of the melancholics, and of the praecox patients.

The table shows that as a rule the eurysomics are broader built, the leptosomics narrower, and that the difference in the breadth measurements of the melancholics and of the praecox patients is only slight. It is true that the breadth measurements of the melancholics more frequently exceed the average, and those of the praecox patients are more often below it, but some of the measurements of the melancholics are smaller and some of those of the praecox patients are larger than the average. In the case of the men even the shoulder-breadths of the melancholics are below the average, those of the praecox patients above it.

	Men					Women				
	Av.	E.	L.	M.	P.	Av.	E.	L.	M.	P.
Girth of head	57.5	57.5	57.4	57.7	57.4	55.8	56.0	55.5	56.0	55.6
Breadth of head	15.8	15.8	15.8	15.9	15.7	15.2	15.2	15.2	15.3	15.2
Girth of chest	94.8	95.8	93.8	95.7	93.9	87.1	88.1	86.1	89.7	86.5
Girth of abdomen	84.1	84.4	83.3	85.9	82.0	78.5	81.7	75.4	80.9	77.4
Breadth of shoulders	39.4	40.3	38.4	39.1	39.7	35.6	36.1	35.0	35.8	35.4
Breadth of pelvis	32.9	33.1	32.7	33.3	32.5	32.6	33.4	32.4	33.9	31.3
Girth of pelvis	90.9	—	—	9.0	90.7	95.5	—	—	97.2	93.7
Girth of left forearm	25.8	—	—	25.9	25.6	24.0	—	—	24.2	23.8
Girth of left hand	33.0	—	—	32.9	33.1	32.3	—	—	33.0	31.0
Girth of neck	37.3	—	—	37.4	37.1	33.8	—	—	33.9	33.6
Weight	66.6	68.5	64.4	68.5	64.4	59.4	60.7	58.0	61.8	57.0

Breadth measurements in percentages of the height.

	Men					Women				
	Av.	E	L.	M.	P.	Av.	E.	L.	M.	P.
Girth of head	33.8	34.2	33.4	33.8	33.6	34.6	35.3	34.0	34.8	34.4
Breadth of head	9.3	9.4	9.2	9.3	9.3	9.5	9.6	9.3	9.5	9.4
Girth of chest	55.8	56.9	54.5	56.3	55.2	54.1	55.6	52.1	54.6	53.5
Girth of abdomen	49.5	50.2	48.7	50.5	48.2	48.8	51.5	46.5	50.4	47.9
Breadth of shoulders	23.1	24.0	22.3	23.0	23.3	22.1	22.8	21.4	22.3	21.9
Breadth of pelvis	19.2	19.7	19.0	19.4	19.1	20.2	21.1	19.7	21.1	19.4
Girth of pelvis	53.5	—	—	53.5	53.4	59.4	—	—	60.6	58.1
Girth of left forearm	15.2	—	—	15.2	15.2	14.9	—	—	15.1	14.7
Girth of left hand	19.4	—	—	18.8	19.5	20.0	—	—	20.0	19.8
Girth of neck	21.9	—	—	22.0	21.3	21.0	—	—	21.1	20.9
Weight	39.0	40.7	37.4	40.3	37.9	36.9	38.2	35.5	38.5	35.3

If the breadth measurements are reduced to those of a person 100 cM. in height, there is entire agreement between the breadth of the body and

its parts, for in the case of the eurysomics all the measurements exceed the average and in that of the leptosomics they are below it. The melancholics and the praecox patients show so slight a difference in breadth that no value can be attached to it.

Absolute length measurements. In the following table are shown some length measurements, first of all the persons, then of the eurysomics, of the leptosomics, of the melancholics, and of the praecox patients.

	Men					Women				
	Av.	E.	L.	M.	P.	Av.	E.	L.	M.	P.
Length of body	170.0	168.1	172.0	170.0	170.0	160.9	158.6	163.2	160.5	161.4
Length of head	19.2	19.1	19.2	19.2	19.1	18.3	18.3	18.2	18.5	18.2
Height of face	8.5	8.4	8.6	8.6	8.4	8.0	8.0	8.0	8.0	8.0
Length of nose	6.0	6.0	6.0	6.1	5.9	5.6	5.6	5.6	5.7	5.6
Length of legs	88.2	87.3	89.3	87.9	88.5	81.5	80.9	82.5	81.5	81.5
Length of arms	78.2	77.6	78.5	78.6	77.8	72.4	72.0	73.5	72.8	71.9

As a rule the absolute length measurements of the parts of the body are in agreement with the total length of the body. In the case of the eurysomics they are smaller, in that of the leptosomics larger than the average. This does not, however, apply to the measurements of the melancholics and of the praecox patients, for in some cases the measurements of the melancholics and in others those of the praecox patients are above the average.

Length measurements in percentages of the height.

	Men					Women				
	Av.	E.	L.	M.	P.	Av.	E.	L.	M.	P.
Length of head	11.3	11.4	11.2	11.3	11.3	11.4	11.5	11.2	11.5	11.3
Height of face	5.0	5.0	5.0	5.1	4.9	5.0	5.1	4.9	5.1	4.9
Length of nose	3.5	3.5	3.5	3.6	3.5	3.4	3.5	3.4	3.5	3.4
Length of legs	51.9	51.9	51.9	51.7	52.1	50.6	51.0	50.7	50.7	50.4
Length of arms	46.0	46.0	46.0	46.2	45.8	44.9	44.0	45.0	45.3	44.5

The length measurements of the eurysomics and of the leptosomics reduced of those of persons of 100 cM. are practically alike, and this is also the case with the melancholics and the praecox patients.

The result of this inquiry is, therefore, that in the material given eurysomia cannot be called characteristic of melancholia and leptosomia of praecox. We are compelled to assume that the body and its parts may be either narrow or broad in the case of the melancholic and either broad or narrow in that of the praecox patient. For although most of the absolute and relative breadth measurements are greater than the average in the case of melancholics and smaller than the average with praecox patients, it must be borne in mind that there is a great difference in age between these two groups of patients. The average age of the male melancholics is 44.7 years, that of the male praecox patients 29.5, that of the female melancholics 43, and that of the female praecox patients 32. Owing to the greater age of the melancholics the chance of an adipose deposit is greater, with the result that the girth of the chest, abdomen, extremities and neck, and the weight of the body will be considerably greater.

The above shows that there is such a close connection between physical and psychical phenomena, that bodily build, physiological operations and psychological functions are always found to be in fixed proportions, so that they must be regarded as one whole. For the sake of an accurate investigation it is necessary that these functions should be studied separately. It is then found that the fixed relation which exists between the physical and the psychical functions is also to be seen in the parts of the body. There is a harmony between the various bodily forms, between the individual physiological operations and between the different psychological functions of the same individual.

With regard to the bodily build it is found, as has been said above, that with the thick-set the lateral growth of the entire body and of all its parts (shoulders, face, chest, nose, etc.), and with the narrow and slender leptoblastia of the body and all its parts is prominent. The question naturally arises whether these growth-forms are confined to the external bodily build and whether they do not also extend to the internal organs and tissues. So far as the internal organs are concerned, the answer has already been given. For this I need only refer the reader to the investigation of BENEKE, who found that with his carcinomatous constitution, corresponding to the eurysomic type, the osseous and muscular system, the heart, the vascular system, and the liver were powerfully developed, whilst the lungs, in agreement with the short chest, were small, and the intestines, in harmony with the large abdominal cavity, were long. With his scrofulous-phthisic constitution, which corresponds to the leptosomic type, the osseous and muscular system, the heart, the vascular system, and the liver were less powerfully developed, whereas in this case the lungs, in

harmony with the long thorax, were large, and the intestines, in agreement with the small abdominal capacity, were short. With regard to the structure of the tissues in connection with the bodily build I found no data in the literature. I therefore append the results of the investigation into the thickness of the muscular fibres in the case of two thick-set and two narrow-built persons. As I am convinced that this small number does not permit of general conclusions being drawn, I wish these results to be regarded as merely provisional. In the laboratory of my colleague, Prof. DEELMAN, and in concert with him, the m. sartorii were removed several hours after death, measured, and then hardened in formol. This muscle was chosen for the investigation owing to its being of nearly equal thickness over its entire length. After sufficient hardening cross-sections were made of the middle part of the muscle vertically to the longitudinal axis of the fibres. In each muscle-section the average surface of a fibre was determined from the measurements of 100 fibres. The average surface of the fibres of the thick-set type is considerably larger than that of the small, slender type. The difference in dimensions of the fibres is plainly seen in the photographs. Fig. 6 and 7.

Euryblastia and leptoblastia, which are found in every race of mankind as physical characteristics of the types of constitution, are also found with animals as distinguishing characteristics. The races, and also the types of constitution found within each race, are distinguished by these forms of growth. The differences in bodily build in horses and dogs, for instance, are very striking. The Brabantine draught horse, e.g., is massive and heavily-built. The body and all its parts, such as the head, the neck, the breast, the belly, are broad, the legs are thick. The saddle-horse, on the other hand, is slender and elegant. The body and all its parts are narrow. In the same way the massive bull-dog is distinguished by breadth of the body and its parts from the lithe, slenderly-built greyhound, the body and every part of which are characterized by narrowness. These differences are also found amongst birds, e.g. hens. The Barnevelds are heavy and thick-set, the head, the beak, the comb, the wattles, the neck, the wings, and the tail are broad, the legs are thick. Leghorns, on the other hand, are more slenderly-built. The head is narrower, the beak, the comb, and the wattles are longer and thicker, the neck, the wings, and the tail are narrower, the legs are thinner. Euryblastia and leptoblastia are both constant inherent growth-impulses, which, as we have seen, determine, in human beings, not only the external bodily build, but also affect the shape of the internal organs and probably even the form of the component elements of these organs, the cells. May it not therefore be the case with animals also that this difference in growth is not confined to the external build of the body and the parts of the body properly so called, but also extends to parts which are no longer, or only very loosely, connected with the body, for instance, the eggs and feathers of birds?

The breadth-index of 80 eggs from 10 Leghorns and of 159 eggs from

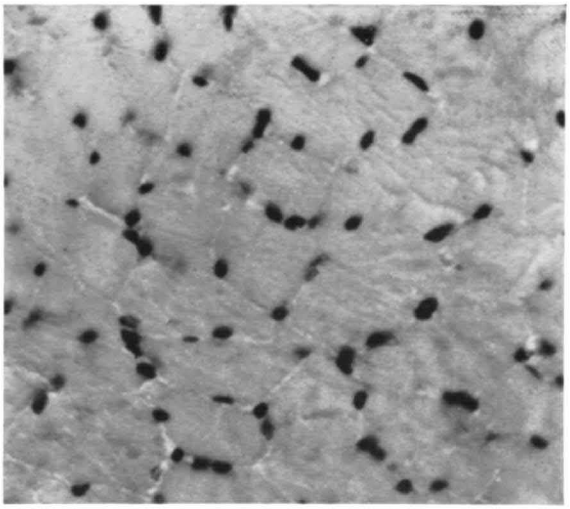


Fig. 6. Muscle-fibres of a leptosomic.

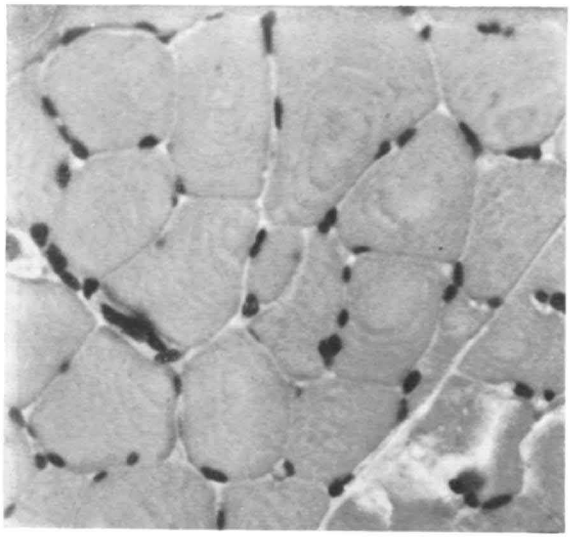
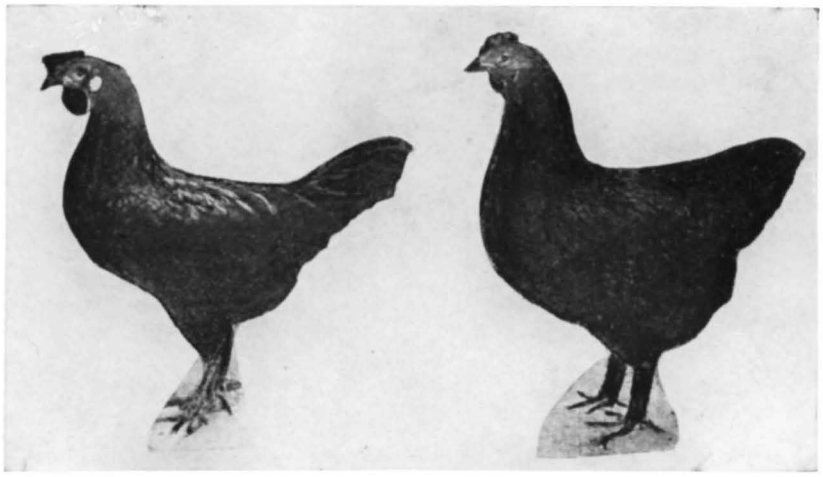


Fig. 7. Muscle-fibres of a eurysomic.



Leghorn Fig. 8. Barneveld

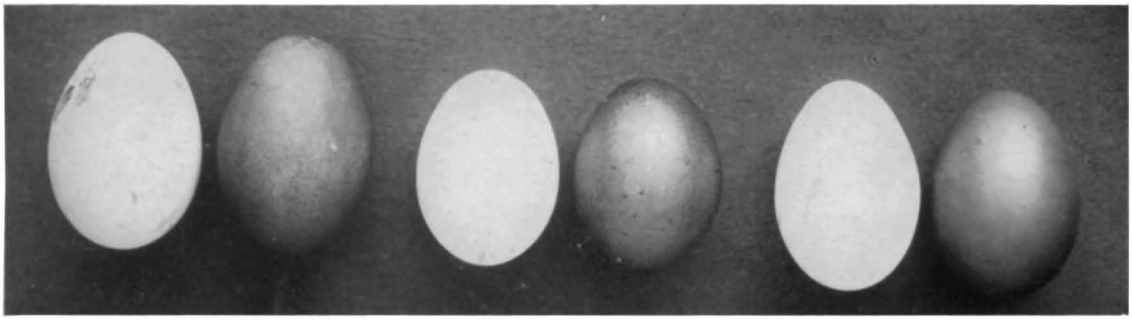


Fig. 9.

15 Barnevelds was determined. The average breadth-index of the Leghorn eggs was 70, that of the Barnevelds was 74.8. The eurysomic hens, that is, lay broader eggs than the leptosomic. This is shown in fig. 9, in which the white eggs are from the Leghorns, the coloured ones from the Barnevelds. There are six eggs, the two in each couple being of approximately equal weight. I was unable to compare the eggs of the broad-built Barnevelds with those of more narrowly-built Barnevelds, nor was I able to find a distinction between the eggs of the broader and more narrowly-built Leghorns. It may therefore be said that the difference in the form of the eggs is to be put down to a difference of race. But even then it is remarkable that there should be such a resemblance between the general bodily build and the shape of the eggs.

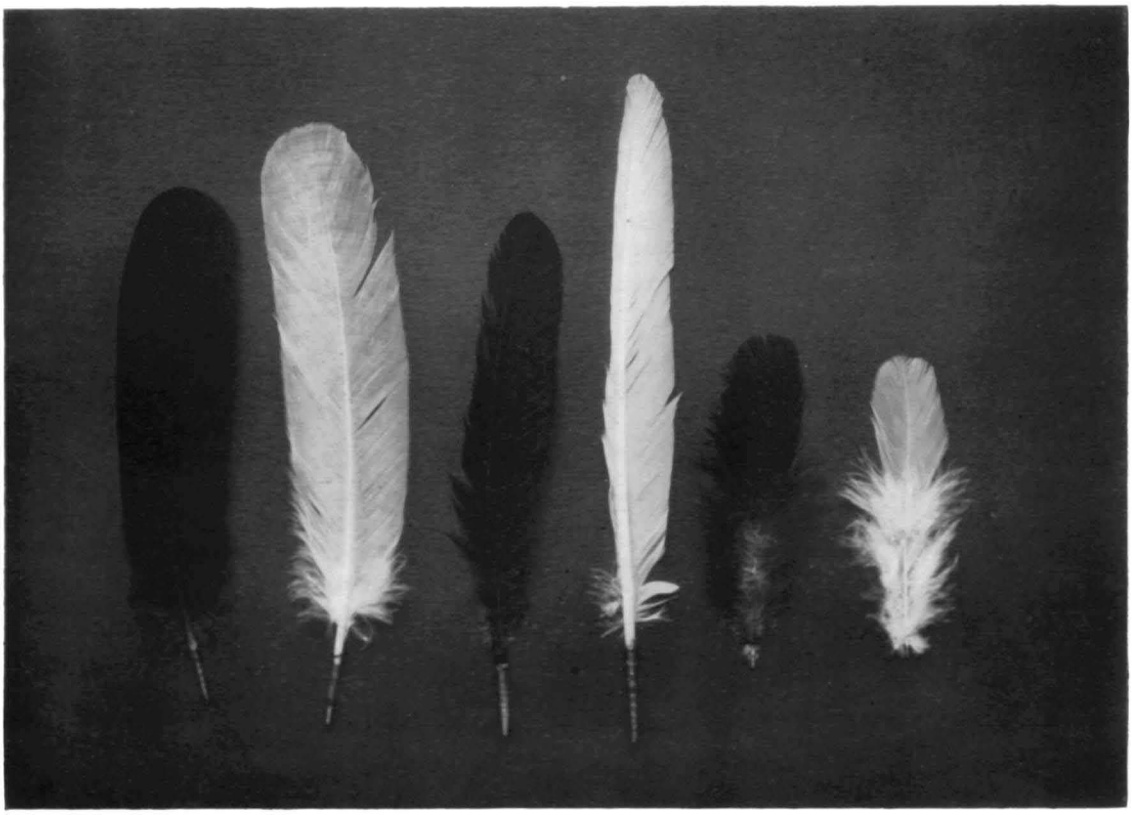
The same holds good with respects to the feathers. The breadth-index was determined in the case of 5 Leghorns and 5 Barnevelds, 6 wing-feathers, 6 tail-feathers, and 30 dorsal-feathers being taken from each hen, altogether that is, 60 wing-feathers, 60 tail-feathers, and 300 dorsal-feathers. In the following table the average indices of the feathers of each hen separately are given. Both the table and the figure show that the Leghorns, in harmony with their slighter build, have narrower wing, tail, and dorsal-feathers than the Barnevelds. This is true of the average breadth of the feathers of each hen, but also of nearly every separate feather.

	60 Wing-feathers		60 Tail-feathers		300 Dorsal-feathers	
	Leghorns	Barnevelds	Leghorns	Barnevelds	Leghorns	Barnevelds
Hen I	11.6	15.2	17.3	26.8	26.1	30.4
Hen II	12.2	15.4	15.5	27.4	22.5	34.8
Hen III	12.9	14.4	19.8	25.9	23.7	33.3
Hen IV	11.2	13.2	18.1	22.4	19.6	30.5
Hen V	12.4	15.5	19.1	23.5	24.2	30.3
Total	60.3	73.8	89.8	126.0	116.1	159.3
Average	12.1	14.8	17.9	25.2	23.2	31.9

The types of build in animals as in men are characterized not only by the form but also by physiological and psychological qualities. The draught-horse is calm and quiet, not easily startled, it does not react violently to stimuli from its environment, and will stand still for a long time; it belongs to the quiet, sure tempo-type. The saddle-horse, on the other hand,

gives the impression of liveliness, it is more easily startled, reacts more violently, and is more uneasy and skittish. It belongs to the quick, restless, uncertain tempo-type. There is a similar difference between the massive, inelegant, quiet bulldog and the slender, lithe, mobile, restless greyhound, which is characterized by the superfluous movements in its gait. No less distinct is the difference between the Barnevelds and the Leghorns. The Barnevelds are more calm, more quiet, less mobile, and react more feebly to stimuli from the outside; the Leghorns, on the other hand, react more violently to impressions, they are more mobile, more restless, more timid, and more inquisitive. If one approaches a number of tame hens in the company of animals they are not familiar with, for instance a cat or a dog, the Leghorns flutter noisily off, whereas the Barnevelds retreat much more quietly and less rapidly. Unusual objects such as coloured cloths arouse the curiosity of the Leghorns in a marked degree; the Barnevelds look at them, too, but are much less engrossed by the strange objects.

Summing up, we may say that euryblastia and leptoblastia determine not only the form of the body, but are at the same time accompanied by the development of particular physiological and psychological functions



Tail Wing Dorsal-feather

Fig. 10.