

# Body Types and Tuberculosis

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**I**MPLICIT in the psychosomatic approach is the realization that biological and psychosocial factors must be coordinated in the understanding of the patient's illness. The major emphasis, however, in psychosomatic research has been to demonstrate that somatic pathology can be caused by psychological factors. Relatively little investigation to date has been directed toward the understanding of physical illness as a function not only of the patient's reaction to stress but also of his constitutional makeup—a factor which may significantly relate to the stress pattern itself.

The relation of body habitus to the etiology and course of mental illness has received considerable investigative inquiry. Kline and Tenney,<sup>5</sup> for example, recently have shown significant correlations between somatotype and diagnosis as well as between somatotype and prognosis of schizophrenic patients. In the area of physical illness, however, clinical observations have linked various diseases with specific body builds, but research evidence supporting these assertions have been relatively scanty. Diabetics are alleged to be of endomorphic body build. Mesomorphs are supposed to be more prone to high blood pressure, cerebral and coronary hemorrhage, and per-

haps peptic ulcer. Ectomorphs, on the other hand, are alleged to be the healthiest of the three basic physique types, yet it is claimed that they especially manifest illnesses of the skin and ailments of the respiratory tract.

Sheldon, Dupertuis, and McDermott,<sup>11</sup> in their investigations in the field of "constitutional medicine," have offered some evidence of the correlation between physical illness and morphology, as illustrated in Fig. 1A and B. A comparison of the four body-build distributions, shown in this figure, reveals a striking difference in physiques between samples of male gallbladder and duodenal-ulcer cases, a group of schizophrenic patients having marked withdrawal symptoms along hebephrenic lines, and a "normal" sample (Jones Beach, N. Y., bathers).

The aim of the present study was to investigate the relationship between body structure and tuberculosis, an illness whose etiology has for many centuries been linked with a specific body build. The report covers one portion of a comprehensive investigation of constitutional and psychosomatic factors related to the onset and course of illness among tuberculosis patients.

## Review of the Literature

In the extensive medical literature dealing with the incidence of and resistance to tuberculosis, the role of physical habitus has received persistent emphasis. Long<sup>7</sup>

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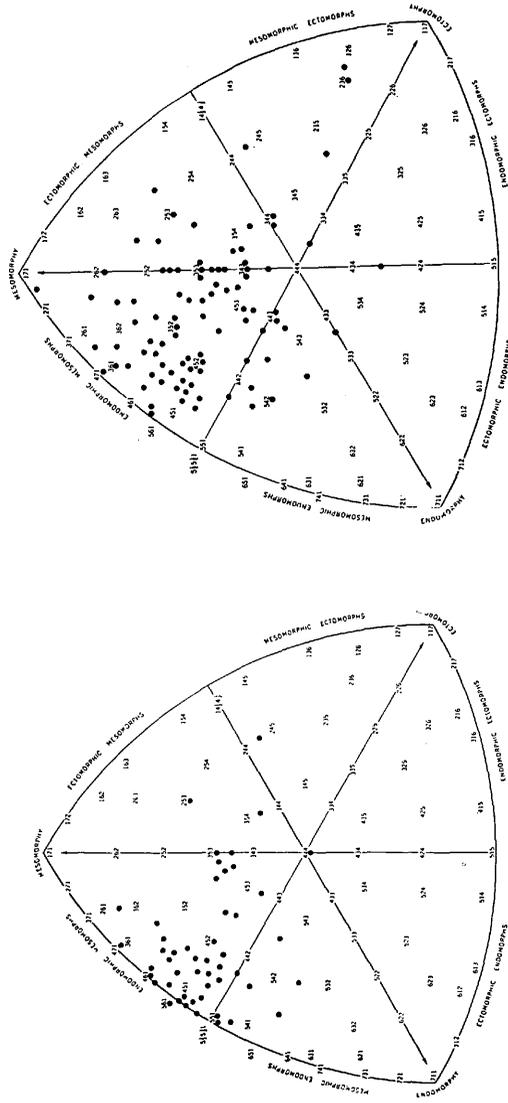


Fig. 1A. Somatotypic distribution of 50 men with gallbladder disease (left) and 92 men with duodenal ulcer (right). See Fig. 1B. (Reproduced with permission of W. H. Sheldon and Harper and Brothers, N. Y.)

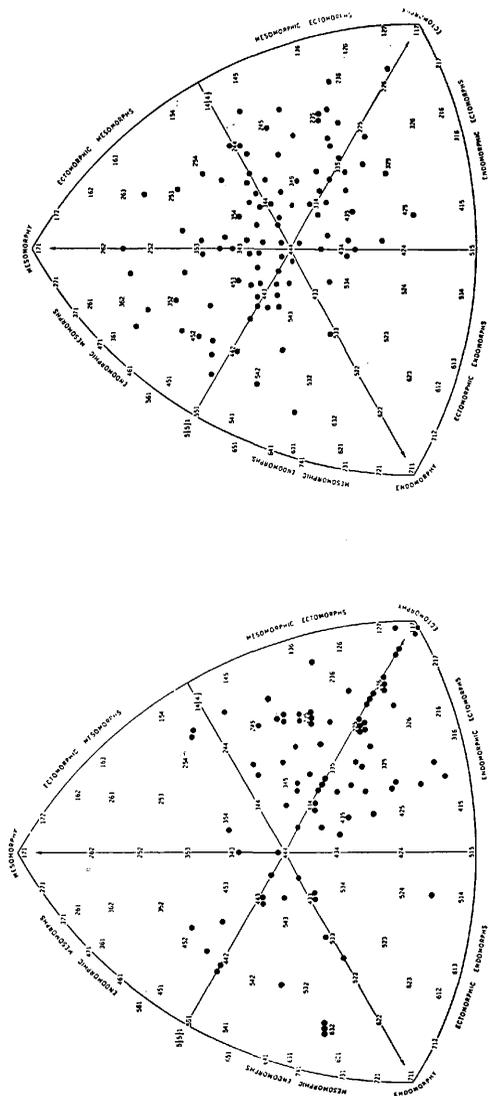


Fig. 1B. Somatotype distribution of 85 psychotic patients (left) and a random sample of 1400 men from a normal population (right).

quoted Hippocrates as having written, in 425 B.C., that the "form of the body particularly subject to phthisical complaints was the smooth, the whitish, that resembling the lentil, the reddish, the blue-eyed, the leucophlegmatic, and that with the scapulae having the appearance of wings." Hippocrates also had described two antithetical physical types which he labeled *habitus apoplecticus* (thick, strong, and muscular) and *habitus phthisicus* (delicate, linear, and weak). The former was allegedly more susceptible to apoplexy, and the latter was prone to tuberculosis. Although there has been disagreement with Hippocrates regarding the predominance of these features among persons afflicted with tuberculosis, most clinical observers in subsequent centuries have given similar or slightly modified versions of Hippocrates' classic description. According to medical as well as popular conceptions, tuberculosis was more often than not associated with a body that was thin and narrow ("resembling a lentil"), with sharp, winglike shoulders and thin, clear skin, generally covering a flabby musculature.

In more recent times, however, a number of medical workers have attempted to supplement clinical observations with objective measurements of the body dimensions of patients in the hope of finding a significant relationship between body structure and tuberculosis. Draper,<sup>2</sup> a leading investigator in this field, has indicated the widespread interest in the problem with the statement, "The thorax has been the object of more anthropometric study by the clinician than any other part of the body." He concluded, from his own measurements of 100 patients, that in people with tuberculosis the thorax is inclined to be relatively flat, narrow, and long. This depiction of the tuberculosis patient as having a thin, frail bodily frame has been consistent with the traditional view, although a number of studies have contested this. Weisman,<sup>15</sup> for example, measured the ratio of anteroposterior to transverse chest diameter in several hundred tuberculosis

patients. A comparison of their chest measurements with a control group of normal, healthy subjects revealed that the patients were less inclined to have chest dimensions that were flat and narrow.

Inspired by Stiller's<sup>14</sup> conception of the "asthenic habitus," as well as by Kretschmer's<sup>6</sup> extensive research on the relationship between body build and mental illness, German investigators have assiduously examined the physical dimensions of the tuberculosis patient. Their measuring techniques have been based largely on Kretschmer's threefold classification of physiques in which persons are designated as pyknic, asthenic, or athletic. The pyknic individuals are short, stocky, and barrel-chested; the asthenics are long-limbed, slender, delicate, and narrow-chested; and the athletic persons are broad-shouldered, well-muscled, with large chests and narrow hips.<sup>6</sup> Ickert<sup>3</sup> applied these anthropometric classifications and found that the body types of the majority of consumptive patients conformed to the traditional mold, i.e. they were of the asthenic type. To explain his findings, he advanced the theory that the "asthenic habitus" itself did not lead directly to the incidence of the disease. Instead, this particular body structure was a resultant of the action of the vegetative nervous system, the organs of internal secretion, and other biochemical factors which make people succumb to tuberculosis in ways independent of their physique.

In contrast to Ickert's findings, Potthoff<sup>8</sup> was unable to discern a preponderance of asthenic body types among his tuberculous adults, nor was he able to detect a characteristic shape of thorax among his subjects. He concluded, therefore, that there was no demonstrable constitutional structure that was unique for tuberculosis. It also is interesting to note that in Ickert's study tuberculosis patients of the athletic type were a rarity as compared with the observations of Curschmann,<sup>1</sup> who reported that a disproportionately small percentage (1.5 percent) of tuberculosis patients were stout,

most of whom had an unfavorable prognosis.

Inconsistent results from studies dealing with the physique of tuberculosis patients also were reported in this country. Jones and Bogen,<sup>4</sup> relying on a simple inspection technique borrowed from Kretschmer, observed a significantly greater number of asthenics among male bedfast patients and a predominance of pyknic types among convalescent, ambulatory males. The reverse trend appeared to exist among female patients. However, when the authors took into account the problem of nutrition and increased weight among ambulatory men, they could not find any clear-cut relationship between body build and tuberculosis. Pryor and Mathiasen,<sup>9</sup> on the other hand, reported that tuberculous children showed a significant trend toward a slender build.

Despite the efforts of the above-mentioned investigators to avoid the limitations of clinical observation by "objectively" correlating body build and tuberculosis, all too often their studies were based on faulty techniques for measuring physiques, inadequate statistical methods, the absence of control subjects, as well as the drawing of unjustified conclusions from their data. Careful studies such as those of Draper, and Jones and Bogen, have relied on extensive measurements of the thorax and other single parts of the body. However, they did not employ any procedure for patterning the separate body components into an integrated unit. As Sheldon<sup>10</sup> has indicated, such individual anthropometric measurements "will no more tell the story of a physique than would some of the words of a narrative, rearranged at random, tell its story."

Another flaw evidenced in studies which made use of the Kretschmerian system pertains to the procedure by which all body builds are arbitrarily classified into one of three basic body types. Most physiques however, cannot be pigeonholed as either pyknic, athletic, or asthenic, but instead reveal varying mixtures of these types.

In the present study an attempt was

made to avoid the difficulties and limitations of previous methods of correlating physique and tuberculosis. By using Sheldon's somatotyping procedure, the authors were able to obtain a high degree of reliability in the determination of an individual's body type. The Sheldon method of bracketing a physique within certain defined boundaries also eliminates the Kretschmerian pitfall of "pure" types and provides a continuous distribution in which every individual physique has a place.

### Materials and Methods

#### Somatotyping Rating Procedure

All tuberculosis patients admitted consecutively to the Veterans Administration Hospital, Madison, Wisconsin, during a period of sixteen months, were scheduled for somatotype photographing. This procedure was carried out during each patient's first month of hospitalization. Most of the subjects were photographed within one week after admission. In all, 412 patients were somatotyped. This included all

TABLE I. BACKGROUND DATA OF 400 SOMATOTYPED TUBERCULOSIS PATIENTS

Number of white patients	300
Number of Negro patients	91
Patients of other races	9
Average age (mean)	43 years
Medical admission diagnosis	
Minimal tuberculosis	17%
Moderate tuberculosis	36%
Far-advanced tuberculosis	47%
Treatment background	
Original treatment begun at this hospital	25%
Original treatment begun elsewhere (duration of 4 months or less)	21%
Original treatment begun elsewhere (more than 4 months)	46%
Retreatment	8%
Known duration of disease	
Up to 6 months	23%
6 months to 1 year	19%
1 to 5 years	31%
5 years	27%

patients admitted during this period except for a small number who either were too ill to be moved from their beds or refused to be photographed. Twelve of the subjects subsequently were found not to have tuberculosis. The remaining 400 patients constituted the subject population. Pertinent background data on the subjects are presented in Table 1.

The procedure used in this study for taking somatotype photographs is a highly standardized one described in Sheldon's instructions for posing. Each photograph showed the nude subject, standing erect on a pedestal, in three aspects: anterior, lateral, and posterior. In addition to the photographs, information was obtained on each subject's current height and weight, as well as his weight history by five-year periods from the age of fifteen to the present. The somatotype ratings were made by one of the present authors (W. D.) and included not only the basic three-component somatotype evaluations but also ratings for the secondary components of dysplasia, *g* component, *t* component, asthenic component, dysmorphism, and special observations of specific physical characteristics. The somatotype ratings were based on Sheldon's classification system. In his delineation of physiques, Sheldon identified the following three basic components which are present in varying amounts in all physiques:

1. *Endomorphy*—a relative predominance of soft roundness throughout the various regions of the body. Where endomorphy predominates, there is a central concentration of mass, no muscle relief, and short, tapering limbs.

2. *Mesomorphy*—a relative predominance of muscle, bone, and connective tissue. The mesomorphic physique is normally heavy, hard, and rectangular in outline, showing broad shoulders and hips and sturdy pelvis.

3. *Ectomorphy*—a relative predominance of linearity and fragility of the body. Where ectomorphy predominates, there are narrow shoulders lacking in muscular relief, fingers and toes generally are slender

and long, and the head may appear too large for the slender neck.

An individual's somatotype, determined from the photographs; is designated by three numerals which indicate the relative strength of endomorphy, mesomorphy, and ectomorphy, respectively. Using a 7-point rating scale for each of the morphological components, a 7-1-1 would represent the somatotype rating of an extreme endomorph, a 1-7-1 the most extreme mesomorph, and a 1-1-7 the most extreme ectomorph. A 4-4-4 rating falls at the midpoint of the scale with respect to all three components. In the detailed analysis of somatypes employed in this study, measurement was further refined by a 13-point rating system, using half-digit units so that a rating of 5-4½-2½, was possible. The secondary variables of dysplasia, *g* component, etc., were rated similarly on either a 7-point or on more refined numerical sets of scales.

#### Somatotype Groupings

For purposes of statistical analysis, the somatotype data were distributed into seven main groups. These included groups in which each of the three basic components was predominant as well as groups in which various combinations of physique patterns predominated. The seven groups were defined as follows:

1. *Endomorphs*—individuals in whom the first component is greater than either of the other two by at least one step. EXAMPLE: 5-4-2½, or 4½-3½-3½.

2. *Mesomorphs*—individuals in whom the second component is greater than either of the other two by at least one step. EXAMPLE: 3-5-4, or 2½-4½-3½.

3. *Ectomorphs*—individuals in whom the third component is greater than either of the other two by at least one step. EXAMPLE: 3-3½-5, or 3-3-4.

4. *Endomorph-Mesomorphs*—individuals in whom the first and second components are balanced (i.e. do not differ by one full step) and in whom these components exceed the third component by at least one full step. EXAMPLE: 4½-4½-3.

5. *Endomorph-Ectomorphs*—individuals in whom the first and third components are balanced and in whom these components exceed the second component by at least one full step. EXAMPLE: 4-2½-4.5.

6. *Mesomorph-Ectomorphs*—individuals in whom the second and third components are balanced and exceed the first component by at least one full step. EXAMPLE: 2½-4-4.

7. *Balanced Somatotypes*—individuals in whom all three components are approximately equal or do not differ from each other by more than a half-step. EXAMPLE: 3½-3½-4.

Each patient thus was somatotyped and for statistical analysis was assigned to one of the seven somatotype groups. The somatotype distributions then were tabulated in order to analyze the physique patterns of the tuberculous population.

## Results

### Somatotype Distribution

The distribution of the 400 subjects into the seven somatotype groups is shown in Table 2. The mean somatotype rating is 3.64-4.17-3.22. Mesomorphy is the most prominent component, with endomorphy second in order of strength, and ectomorphy third. The largest single group in this series (28 per cent) falls in the mesomorph category. This is followed in size by the endomorph-mesomorph (23 per cent) and

the balance somatotype (21 per cent) groups. The fewest patients are found in the endomorph-ectomorph, mesomorph-ectomorph, and endomorph groups. The ectomorphic group, which corresponds most closely to the Kretschmerian "asthenic" group, comprises only 14 per cent of the subjects.

The distribution of somatotypes is presented in a somewhat different form in Figs. 2 and 3. These figures portray schematic tri-dimensional presentations of the somatotypes of the white and Negro tuberculous subjects. Inspection of these graphs indicate that the groups cluster predominantly between the center and the "northwest" areas. This corresponds to the concentration among endomorphic-mesomorphs and balanced somatotypes observed in Table 2.

In order to determine whether the somatotypes of the tuberculosis patients differ significantly from a nontuberculous healthy control group, it would have been desirable to make comparisons with a sample of healthy veterans having a similar age distribution. Unfortunately, this ideal control group was not available. Instead, the present sample was compared with that of a more selective group of 3000 aviation cadets who had successfully passed the Air Corps physical examination during World War II.<sup>12</sup> The cadet somatotype distribution is presented in Fig. 4.

A comparison of the somatotype distribution in Fig. 1 (male, white, tuberculosis patients) with that of Fig. 4 reveals a number of likenesses and at least one dissimilarity. There is a heavy concentration of midrange somatotypes in both groups, suggesting that both distributions are not markedly different from a "normal" distribution of adult male physiques. But, unlike a "normal" distribution which conforms to a three-cornered bell-shaped curve and includes a smattering of extreme somatotypes, the tuberculosis and cadet distributions are lacking in extreme physiques. With the exception of a sprinkling of extreme ectomorphs among the hospitalized

TABLE 2. DISTRIBUTION OF SOMATOTYPE GROUPS IN 400 TUBERCULOSIS PATIENTS

	No. Patients	Mean component ratings		
		%	Endo.	Meso. Ecto.
Endomorph	25	6	5.10	4.13 2.62
Mesomorph	111	28	3.41	4.95 2.49
Ectomorph	56	14	2.79	3.09 5.07
Endomorph-mesomorph	92	23	4.23	4.39 2.51
Endomorph-ectomorph	9	2	4.31	2.63 4.25
Mesomorph-ectomorph	22	6	2.68	4.09 4.11
Balanced somatotype	85	21	3.61	3.77 3.59
OVER-ALL MEAN			3.64	4.17 3.22

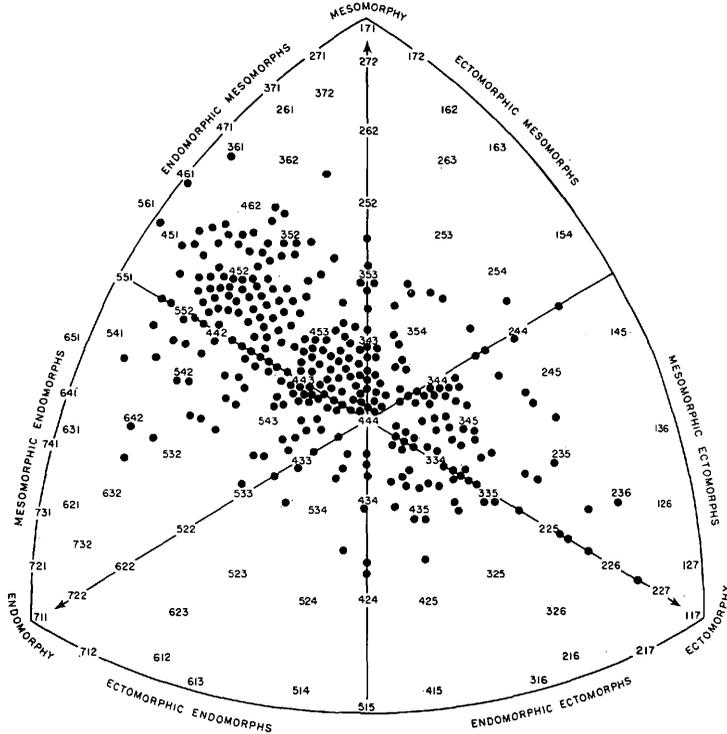


Fig. 2. Somatotype distribution of 300 male, white, tuberculosis cases.

patients, both show a dearth of extreme ratings of endomorphy, mesomorphy, and ectomorphy. The absence of extremes may be attributable to the rejection from the military service of excessively overweight or underweight individuals. The major dissimilarity between the tuberculosis and cadet group is seen in the somewhat disproportionate concentration of patients in the "northwest" area of endomorphic-mesomorphy. The patients tend to be of more massive build than the cadets.

**Distributions of Secondary Components**  
 "g" Component

The frequency distributions of body builds for the secondary morphological components are presented in the tables below. The *g* component (gynandromorphy) refers to the degree or prominence of female characteristics in a male physique. Table 3 indicates the distribution of such feminine characteristics within the present sample. The mean *g* rating is 2.34. This

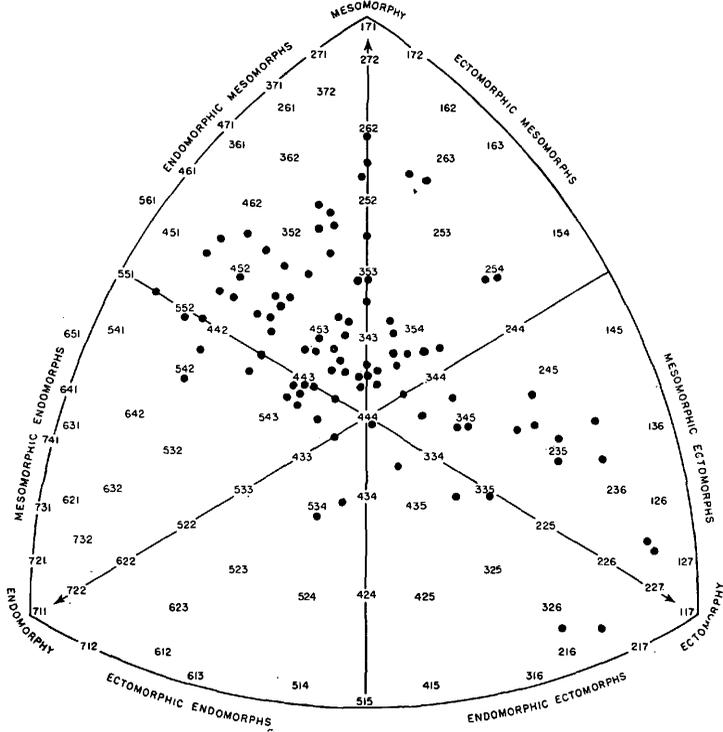


Fig. 3. Somatotype distribution of 91 male, Negro, tuberculosis cases.

compares with a mean *g* of 2.17 for 2500 Army Aviators studied by Sheldon in 1943, and a mean *g* of 2.2 for a population of 4000 college youths.<sup>12</sup> Apparently the physiques of the tuberculosis group show slightly more feminine characteristics.

*"t" Component*

The *t* component refers to the quality of "thoroughbredness" or "aesthetic pleasingness." A physique that has beauty of form and proportion is rated high in *t*.

Conversely, an aesthetically unappealing body is rated low. The distribution of *t* in the present sample is shown in Table 3. The distribution of *t* component is always highly skewed toward the lower values; hence the rating of 1 has been subdivided into tenths and all other ratings into half degrees. Sheldon maintains that the *t* of the general American adult population averages about 1.8. Since the mean *t* rating of the tuberculosis group is 1.8 it would seem that the patients do not deviate from the norm in this regard.

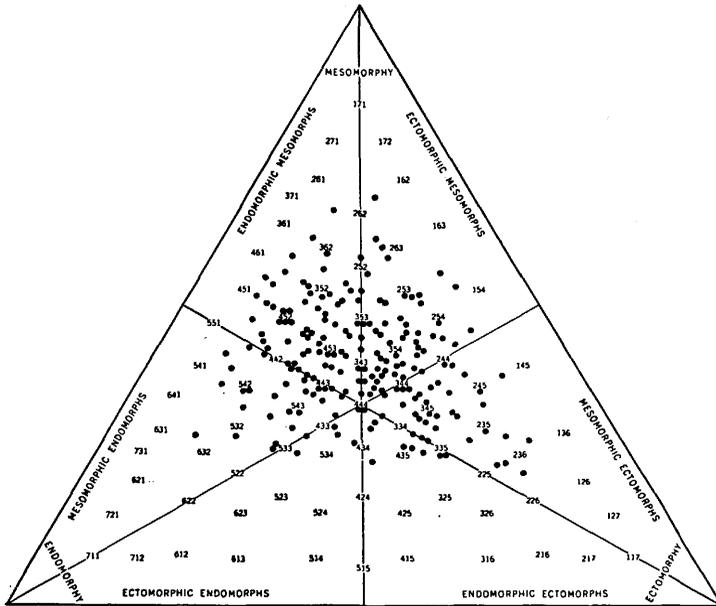


Fig. 4. Somatotype distribution of 3000 aviation cadets of World War II.

*Dysplasia*

Table 4 shows the distribution of dysplasia within the sample. Dysplasia refers to the extent to which a physique presents disharmonious somatotypes in different bodily regions. Where there is a consistency of somatotypes in the head, arm, leg, and upper and lower trunk areas, an individual is rated low in dysplasia. Conversely, a person with ectomorphic arms and legs and endomorphic trunk would present a marked dysplasia. Using a 7-point scale where a rating of 1 signifies no dysplasia, the mean dysplasia rating of the sample was 4.03. This figure is somewhat higher than the mean of 3.76 calculated from the percentage distribution of dysplasia in 4000 college men.<sup>13</sup>

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*Dysmorphism*

The dysmorphism component reflects the extent to which a physique is badly formed. This is not to be confused with dysplasia, which means that the individual is of different somatotype construction in different bodily regions. As shown in Table 4, the mean dysmorphism rating is 2.59. Comparable ratings of dysmorphism in a "normal" population was unobtainable.

*Asthenic Component*

The term "asthenic" has been used by Kretschmer to designate a certain type of physique closely related to the ectomorphic body build. Sheldon and his associates, however, use the term in a different sense, referring not to a specific somatotype such

TABLE 3. DISTRIBUTION OF "G" AND "T" COMPONENTS IN 400 TUBERCULOSIS PATIENTS

g Component			t Component		
Rating	N	Per cent	Rating	N	Per cent
1.0	5	1	1.3	10	2.5
1.5	61	15	1.4	10	2.5
2.0	143	36	1.5	35	9.0
2.5	110	28	1.6	54	13.5
3.0	45	11	1.7	72	18.0
3.5	16	4	1.8	106	26.5
4.0	8	2	1.9	42	10.5
4.5	2	0	2.0	36	9.0
5.0	10	3	2.5	27	7.0
			3.0	7	2.0
			4.0	1	0
MEAN = 2.34			MEAN = 1.81		

as ectomorphy but to a condition of being abnormally weak or without strength. The asthenic frame has been facetiously described by Draper as displaying "poor protoplasm poorly put together" and by Sheldon as being the "flat tires of the population." Asthenic features can be found not only in physiques with a high ectomorphic component but also among mesomorphs and endomorphs. The distribution of the asthenic component in the present sample also is shown in Table 4. The mean asthenic value is 2.85. As of this writing, there are no available norms for the asthenic component in other normal or patient populations which can be used for comparison with the tuberculous group. The only

TABLE 4. DISTRIBUTION OF DYSPLASIA, DYSMORPHY, AND ASTHENIC COMPONENTS IN 400 TUBERCULOSIS PATIENTS

Rating	Dysplasia		Dysmorpby		Asthenia	
	N	%	N	%	N	%
1	0	0	47	12	33	8
2	15	4	165	41	131	33
3	140	35	124	31	134	34
4	122	30	42	10	73	18
5	77	19	18	5	24	6
6	36	9	1	0	4	1
7	10	3	3	1	1	0
	MEAN = 4.03		MEAN = 2.59		MEAN = 2.85	

other series where the asthenic component has been described is that of the 200 delinquent boys studied by Sheldon. Although the component is not numerically evaluated there, it is possible from the descriptions to approximate the ratings on a 7-point scale. The percentage distribution of these ratings (See Table 4) differs from that found in the tuberculous series, but the mean in the two groups is essentially the same.

### Discussion

One unmistakable conclusion may be reached from an appraisal of the results of this investigation. Contrary to popular notions, tuberculosis, at least as far as this sample of male, veteran patients is concerned, seems decidedly not to be a disease uniquely associated with ectomorphy. The majority of the patients studied did not have the slender frame, narrow shoulders, and fragility of features frequently linked with the "scrofulous diathesis." If anything, most of the patients had physiques which were below average in ectomorphy. There actually were almost four times as many mesomorphs and endomorphic-mesomorphs as there were ectomorphs. Because of this trend toward mesomorphy among the subjects, one might conclude that they adhered more closely toward the physical type described by Hippocrates as *habitus apoplecticus* rather than *habitus phthisicus*.

Sheldon<sup>13</sup> reports means of 3.34-4.11-3.42 for the three somatotype components in an American population of 46,000 men. In another study of 100 patients with minimal tuberculosis somatotyped at any Army hospital during World War II, the mean ratings for the three components were 3.36-4.16 and 3.03, respectively.<sup>12</sup> These mean ratings are not markedly different from the mean somatotype rating of 3.64-4.17-3.22 observed in the tuberculous group of the present study. The appropriate data from the two previous investigations was not available to permit a test of statistical significance between the two sets of means.

The slight differences in the means of endomorphy and ectomorphy between the two groups, however, does not appear sufficiently striking to suggest that the physiques of the tuberculous sample differ significantly from those of a normal population of adult men.

In view of these findings, how can one explain the centuries-old notion that tuberculosis is associated with a thin and frail body build? Perhaps one of the most cogent explanations, which has been suggested by other investigators, relates to the problem of weight loss and physical emaciation among individuals having tuberculous symptoms. The relationship between body build and tuberculosis (as measured by the simple inspection techniques in the past) has too often been confused by the fact that the thin, narrow-looking appearance of many tuberculous individuals may have developed as a *consequence* of the disease process. Since until recently the prolonged, smoldering forms of the disease frequently remained undiagnosed as long as they did not produce dramatic symptoms, the emaciated state (often mistaken for "asthenic" body build) of tuberculous persons may have come into being long before they actually felt seriously ill. In other words, the "characteristic" physiques of these individuals may have been attributable to weight loss due to illness rather than a specific body build causing lack of resistance to the illness.

Sheldon's assertion that a person's somatotype undergoes relatively little variation despite nutritional changes is of basic importance to the above problem, where weight loss often accompanies the onset of tuberculosis. In regard to the stability of the individual somatotype, Sheldon has stated,<sup>10</sup> "We have as yet seen no case in which metabolic or nutritional changes led us to the assignment of two different somatotypes for the same individual, although we have somatotyped people from photographs taken at different periods in their (adult) lives when a weight change of as much as 100 pounds had taken place."

Unless one uses a sophisticated measurement device similar to the Sheldon procedure employed in this study, which can reliably classify body build despite fluctuations in weight, one is inclined to agree with the statement of Jones and Bogen:<sup>4</sup> "It is by no means easy for the observer to recognize in this emaciated frame the remains of what may have been at one time a robust, heavy-set athlete." Many of the patients in this study, all of whom were somatotyped during the first two weeks after their hospital admission, did appear undernourished and emaciated. This was particularly noticeable among a large number of patients who came from underprivileged backgrounds, as well as among those whose far-advanced disease may have been a function of longstanding self-neglect and dissipation. These individuals may have looked thin and scrawny, but to the trained observer most of them exhibited the characteristics of fairly sturdy physiques and not those of ectomorphy.

It would have been highly desirable to have objective norms for the asthenic ("weak-looking") component of a normal adult male population or in an unselected tuberculous group in order to appraise this bodily feature in the tuberculous group. About the only thing that can be said in this regard is that a marked asthenic quality has been infrequently encountered by leading classifiers of physique (Sheldon, Dupertuis, and others) among any "normal" population. In their judgment, however, the asthenic component seemed to occur with much greater frequency in certain populations, which included the delinquent and the tuberculous. If this clinical observation is valid, then Sheldon<sup>12</sup> may have been correct in his assertion that "for some twenty-odd centuries at least, medical men have been looking at what I suppose have been asthenic somatotypes and have been calling them by such names as *phthisic habitus*." A clarification of this point of view awaits the establishment of norms for the asthenic quality in other populations.

### Summary and Conclusions

Medical opinion, from the days of Hippocrates to the present, has associated tuberculosis with individuals having a thin, long ectomorphic bodily frame. This *habitus phthisicus* has been suggested by some writers as contributing to a lack of resistance among individuals who develop tuberculosis. Others have maintained that this body type is a resultant of biochemical factors which make certain people prone to tuberculosis in ways independent of their physique. The aim of this study was to investigate the relationship of body type to tuberculosis by using reliable somatotype procedures (in contrast to the faulty techniques for measuring physiques employed in the past).

Four hundred patients admitted consecutively to a Veterans Hospital for pulmonary tuberculosis were photographed for somatotype evaluation according to Sheldon's method. Each patient was rated for degree of endomorphy, mesomorphy, and ectomorphy as well as for the secondary *g. t.*, asthenic, dysmorphic, and dysplastic components. Analysis of the data revealed that mesomorphy and endomorphic-mesomorphy were the predominant body characteristics of half the patients, whereas only 14 per cent of the subjects displayed the thin, narrow ectomorphic physique which traditionally has been associated with tuberculosis. The somatotype distribution of the tuberculous subjects also did not appear to differ significantly from that of a large sample of nontuberculous adults. The morphological characteristics of the tuberculosis patients for the secondary components similarly did not reveal markedly different trends from normal groups. Clinical impression of the data, however, suggests that tuberculosis patients may be uniquely endowed with "asthenic" (weak-looking) bodily qualities.

The alleged relationship between body build and tuberculosis in the past has been

attributed by the present authors to a confusion between weight loss or emaciation that may have developed as a consequence of the disease and the fundamental physique which existed prior to the onset of the illness. As a result of using a somatotype procedure that can reliably classify physique despite fluctuations in weight, the alleged positive relationship between a particular variety of physique and tuberculosis does not appear to exist.

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