excluded, and, on the other hand, a misfit be granted admission. From the point of view of screening committees, here is where a calculated risk may have to be taken. If, however, this is always kept in mind and we employ collateral guides such as confidential personality assessments and the like, the margin of error may well be reduced.

There are a few other points that I should like to touch upon very briefly. I am sure it is almost superfluous to state that the applicant should have an unblemished regard for ethics and morality, which we consider to be basic behaviour qualities that will guide him in his professional career.

We must give a thought to those with minor physical defect. In exceptional cases this alone should not be a bar to admission to a medical school. It is a common observation that they turn out to be more dedicated to their work, are dependable, and often are more likely to contribute something to the fund of medical knowledge.

The question of age is important, and we believe that medicine demands maturity in approach. For this reason, in my country we have recently added an extra year to the pre-medical course. The more important reason for this, however, is to increase the number of hours in the humanities.

Language Difficulties

There are about 7,000 islands in the Philippines. Although not all of these are inhabited, sufficient geographical separation led to the development of numerous dialects. It became expedient, therefore, to employ English as the medium of instruction. While the majority of medical students obtain an adequate command of the English language, so as to utilize with advantage the excellent textbooks, journals,

and other publications in this language, it is understandable that some difficulties may creep in at the classroom level. The shades, nuances, and innuendoes sometimes necessary to drive home a point run the risk of being altogether lost. The professor therefore must be careful to transmit his thoughts clearly. It is very fortifying to hear, in our first morning session, an English student, in describing his experience with foreign languages, confess that he sometimes does not understand his own professor discussing in his own language. I am informed that similar situations obtain in other countries.

Finally, I wonder if it would not be an advantage to drop the term "premedical" when referring to the courses necessary as a preliminary to the formal study of medicine. Admission to premedical courses and subsequent rejection by the medical school produce a certain degree of psychic trauma to the student and his family—in other words, a loss of face. A general science course which will permit the rejected student to follow an alternative profession will, we believe, prevent this. We have no doubt that if this introductory course is well organized it will prepare the student not only for medicine but for other callings as well. If we then call this course by another name than "premedical" rejection will lose some of its sting.

We have four medical schools in Manila and we are interested in all phases of medical education. The University of Santo Tomas, which I represent, is particularly interested in this problem of student selection. There is no doubt that the collective opinion set down in this First World Conference on Medical Education will go far towards establishing the basic tenets of efficient medical instruction.

PHYSIQUE AND PERFORMANCE: HONOURS CLASS AT OXFORD

BY

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"Our minds are perpetually . . . wrought on by the temperament of our bodies."—JOHN DRYDEN, 1631–1700.

In 1953 I described the relationship found to exist between physical characteristics and students' choice of faculty at the university (Parnell, 1953a). Final examination results are now available for men whose Sheldonian somatotype had been determined in course of the pilot health survey at the Institute of Social Medicine from 1948 to 1951, and who have since graduated. The results are reported both for their general interest and because they may be found to contribute not only towards improved assessment of personality but also to prediction of performance.

The Sample

The somatotype sample of 321 constitutes 78.2% of the men who joined the student health service, and for whom a first-, second-, or third-class honours result is known. Eleven with fourth-class honours, seven with passes, two who failed, and various others who for one reason or another did not complete the examination are excluded from the analysis on the ground that their numbers were small. Comparison of the distribution of honours-class results for the somatotyped sample with the results of all attenders at the health service showed no significant difference—in fact, hardly any difference at all. How far those volunteering for the health service are representative of the two men's colleges concerned is less easy to answer categorically, because over the five years of the survey only 65% of the freshmen

coming into residence volunteered. In examination results, however, health service attenders did slightly better than the two colleges as a whole (see Table I); they had 3.7% more first-classes, 5% fewer thirds, and incidentally fewer fourths and passes. This raised the question whether athletes might have attended less often than, say, less athletic scholars. Tanner (1952) checked

TABLE I.—*Honours-class Results among Scholars and Commoners who had been Somatotyped*

	Firsts		Seconds		Thirds		Total	
	No.	%	No.	%	No.	%	No.	%
Scholars ..	33	34.4	57	59.3	6	6.3	96	100.0
Commoners ..	22	9.8	131	58.2	72	32.0	225	100.0
Total somatotyped	55	17.1	188	58.6	78	24.3	321	100.0
Total at the two colleges, 1949–53	103	13.4	435	57.2	223	29.3	761	99.9
Whole university, 1951 and 1952 ..	271	8.9	1,695	55.5	1,089	35.6	3,055	100.0

Note.—The following were excluded from the analysis on the ground that the samples were small: 11 men with fourth-class honours, 7 with passes, 2 failures, 6 who went down for one reason or another, 3 who were ill, and 4 who died. The remainder attending the health service were postgraduates, with the exception of a few medical students who in the post-war period did not take an honours degree.

this possibility, and reported that athletes came to be somatotyped quite as often as others. So far as can be ascertained from these two checks of academic and athletic ability, there is no significant bias in the present sample. Although it is neither a complete nor a random

sample it is the best available, and does not appear unrepresentative of the two colleges, at least with regard to the main characteristics considered here. Within the university as a whole the two colleges—Magdalen and Wadham—had outstandingly good results.

Note on Somatotype Methods

Sheldon *et al.* (1940) first described his photoscopic method of rating physique by inspection of standard photographs, and at the same time provided tables for assessing somatotypes in terms of his three components, endomorphy, mesomorphy, and ectomorphy, from seventeen photographic measurements. His photometric method has fallen into disuse on account of the labour involved and because, in his hands, photoscopic estimates which are quick proved sufficiently reliable. Unfortunately for many investigators, especially those possessing no adequate reference file of known somatotypes, photoscopic ratings have proved unsatisfyingly subjective.

Standard Deviation Chart.—The need for an objective method, and furthermore one simple enough to employ in clinical practice, is met now by the standard deviation chart, on which actual measurements are ringed and the profile so formed of height, weight, bone and muscle girth, and fat measurements can be interpreted promptly; in fact, the profile may be sight-read very much in the same way as an electrocardiograph record may be during a clinical interview. The deviation chart itself was given and its use outlined by me (Parnell, 1953b). Fuller details concerning interpretation, together with tables for the objective assessment of dominance, are now available (Parnell, 1954). It suffices here to say that the somatotype estimates used for the present report were derived from opinions based on three separate methods: first, photoscopic; secondly, photometric; and, thirdly, from deviation chart profile and tables. Furthermore, a large proportion had been rated independently by expert somatotypists, whose close agreement was reported by Tanner (1952). Disagreement between expert photoscopic somatotyping and the deviation chart and table estimates does not exceed a half unit in more than 10% of individual component ratings. The deviation chart and tables are a good guarantee of internal consistency, but the photoscopic estimates very occasionally drew attention to dysplasia, which led to revision of the overall estimate employed for the present report.

Somatotype Categories

The somatotype categories to be employed are best appreciated by examining Sheldon's somatotype chart. On this chart are six main sectors dividing physique by dominance in the three components, endomorphy, mesomorphy, and ectomorphy. Endomorphs, with their dominant capacity to put on fat, are plotted in the two sectors lying to the south-west, the more westerly sector including those whose muscularity exceeds their linearity of physique, the more southerly sector those who are more linear than muscular. Mesomorphs, with their dominant bone and muscle development, are plotted in the two northern sectors; ectomorphs, whose physique is linear or light weight for their height, in the south-eastern sectors. Like much technical jargon, the terms for subsectors relating to secondary dominance are clumsy, though not now easily avoided, since they were introduced as long ago as 1940 and have measurable meaning.

Mesomorphs are divided into endomorphic and ectomorphic mesomorphs, depending on whether the first numeral describing endomorphy exceeds the third numeral of the three-figure index which describes ectomorphy. Similarly, ectomorphs are subdivided into mesomorphic and endomorphic groups according to their secondary dominance. Further subcategories are introduced here, each of the six sectors so far described being divided into central and peripheral portions. The central area as a whole contains the more evenly balanced physiques with mid-range body proportions; and the six central subsectors, as well

as somatotype 444, which occupies the central position, are described concisely by their main individual somatotypes. For example, sector C. 354 describes central ectomorphic mesomorphs. Somatotypes with shared primary dominance (e.g. 344) and shared secondary dominance (e.g., 343) lie along lines dividing the six main sectors. In the analysis they are grouped serially with the main sectors, the group as a whole being denoted by a combined symbol (e.g., C. 354-344). The same concise expression is employed for types with the same dominances lying more peripherally, but is prefixed by a capital P. It is perhaps illogical to refer to P. 354, since 354 itself is a central somatotype, but it is not likely to be misunderstood, and has the advantage of reducing the number of terms to be grasped at the outset. The last of these are endopenia, mesopenia, and ectopenia, which are on occasion used to describe sectors where the respective component has a lower than average rating—for example, the endopenic sectors are C.P. 354 and 345, mesopenic sectors C.P. 534 and 435.

Findings

I have commented elsewhere (Parnell, 1952) that when the somatotype distribution of Oxford undergraduates is compared with that of American students it becomes clear that certain physical types do not reach Oxford, although they enjoy university education in the States. The absent somatotypes included on the one hand extreme mesomorphs, men with proportionately large bone and muscle development; and on the other hand those extreme ectomorphic endomorphs whose bodies contain a high proportion of fat and comparatively little musculature. The tendency at Oxford towards central somatotypes with more evenly balanced physiques may be followed further by comparing the incidence of individual types at Oxford with that found by Sheldon in America (see Table II).

TABLE II.—Incidence of the Commoner Somatotypes at Oxford Compared with that of University Students in the United States

Somatotype	Oxford N=405	Incidence per 1,000 Students	
		U.S.A.	Oxford
Ectomorphic			
225	12	20	30
244	10	42	25
235	17	45	42
325	9	21	22
335	14	30	35
Total		158	154
Central			
334	47	50	116
345	10	8	25
344	35	58	87
343	56	47	138
453	5	10	12
443	19	56	47
433	18	24	44
434	14	35	35
Total		288	504
Ectopenic			
533	7	49	17
442	19	29	47
452	6	23	15
451	2	3	5
541	2	3	5
542	6	14	15
532	7	18	17
Total		139	121

From Table II it may be seen that there are 504 central somatotypes per 1,000 Oxford undergraduates, compared with only 288 per 1,000 in the States, and the difference is accounted for mainly by the relative preponderance of types 343, 344, and 334 at Oxford. The explanation of this centralizing tendency is thought to be associated with severity of selection, for the proportion of young men receiving university education in the States is about ten times as high as in the United Kingdom, where, in any case, only a much more limited proportion reach Oxford or Cambridge. Tanner (1952) has also reported Sheldon's comment that the distribution at Harvard resembles that at Oxford more closely.

FIG. 1

**FIRST-CLASS
HONOURS**

FIG. 2

**THIRD-CLASS
HONOURS**

FIG. 3

**SECOND-CLASS
HONOURS**

FIG. 4

**ATHLETES WITH
FIRST-CLASS
HONOURS**

FIG. 5

**D.PHIL. IN
SCIENTIFIC
SUBJECTS**

FIG. 6

Schematic two-dimensional projections of the theoretical spatial relationships among the known somatotypes.

This view that a higher degree of academic selection is associated with more central somatotypes is further supported by examination of those obtaining college awards (see Fig. 1). Among central somatotypes, 31.5% of 219 men were awarded college scholarships or exhibitions, in contrast to only 20.7% of 203 men with peripheral somatotypes, and the difference is significant ($\text{Diff.} \div \text{S.E. Diff.} = 2.58$). Looking at the distribution in Fig. 1, the impression is gained that academic selection is accompanied by physical selection of somatotypes lying close to the line where endomorphy and mesomorphy are held in balance, as though a purse-string were being tightened in an oblong purse the long axis of which stretches from somatotype 551 to 117. A similar tendency is also seen in the distribution of men with first-class honours.

The Somatotype Distribution of Men with First-class Honours

Fig. 2 illustrates the somatotype distribution of men obtaining first-class honours. A contour line has been drawn around the limits of this distribution, and may be compared with that lying beyond, which outlines the limits of the full distribution. It has already been mentioned that the first-class men are confined to a narrower zone of somatotypes with more evenly balanced body proportions, but when the proportion of firsts obtained is examined as a next step by dominance of somatotype, as well as by their central or peripheral position, some remarkable trends are witnessed (see Table III). Most notable is the performance of 43

TABLE III.—The Distribution of Honours-class Results According to Somatotype Dominance

Dominance	Numbers				Percentages			
	First	Second	Third	Total	First	Second	Third	
C. 543, 443 ..	1	8	4	13	7.7	61.5	30.8	100.0
C. 453, 343 ..	10	27	6	43	23.3	62.8	13.9	100.0
C. 354, 344 ..	4	25	7	36	11.1	69.5	19.5	100.1
C. 345, 334 ..	2	26	19	47	4.3	55.3	40.5	100.1
C. 435, 434 ..	8	7	5	20	40.0	35.0	25.0	100.0
C. 534, 433 ..	0	6	2	8	0.0	75.0	25.0	100.0
Total central ..	25	99	43	167	15.0	59.3	25.7	100.0
P. 543, 443 ..	8	20	6	34	23.5	58.8	17.6	99.9
P. 453, 343 ..	4	19	7	30	13.3	63.3	23.3	99.9
P. 354, 344 ..	2	7	2	11	18.2	63.6	18.2	100.0
P. 345, 334 ..	9	29	9	47	19.2	61.7	19.2	100.1
P. 435, 434 ..	7	8	8	23	30.4	34.8	34.8	100.0
P. 534, 433 ..	0	2	3	5	0.0	40.0	60.0	100.0
Total peripheral ..	30	85	35	150	20.0	56.7	23.3	100.0
543, 443 ..	9	28	10	47	19.2	59.6	21.3	100.1
453, 343 ..	14	46	13	73	19.2	63.0	17.8	100.0
354, 344 ..	6	32	9	47	12.8	68.1	19.2	100.1
345, 334 ..	11	55	28	94	11.7	58.6	29.8	100.1
435, 434 ..	15	15	13	43	34.9	34.9	30.2	100.0
534, 433 ..	0	8	5	13	0.0	61.6	38.5	100.1
444 ..	0	3	1	4	0.0	75.0	25.0	100.0
All types ..	55	187	79	321	17.1	58.3	23.6	100.0

endomorphic ectomorphs, of whom 34.9% obtained first-class honours. This is significantly better than the 15% of firsts among all other types; and it compares well with that of all scholars, of whom 34.4% obtained firsts. The 20 central endomorphic ectomorphs, of whom 40% got firsts, actually did better than 23 peripheral ones with 30.4%.

It is evident that somatotype dominance may assist or detract from final performance, but, to determine its importance more exactly in relation to awards on entering the university, Table IV was prepared. This gives the number and percentage of awards to men with each somatotype dominance. Only 34.9% of endomorphic ectomorphs received awards on entry, which is little more than the proportion in the whole sample (29.9%). Yet, as mentioned above, the group as a whole, including commoners, achieved as many first-class honours as all scholars by themselves, and of the 15 scholars with this particular dominance it may be seen from Table IV that as many as 12 (80%) achieved first-class results—an extraordinarily high proportion.

TABLE IV.—Proportion of Awards and Percentage Distribution of Final Examination Results among Men Receiving Awards, According to Somatotype Dominance

Sector	Total No.	No. Awards	Percentage with Awards	Percentage of Scholars and Exhibitioners with		
				First Class	Second Class	Third Class
543-443 ..	47	18	38.3	27.8	66.6	5.6
453-343 ..	73	18	24.7	44.4	50.0	5.6
354-344 ..	47	22	46.8	18.2	77.3	4.5
345-334 ..	94	21	22.4	19.1	76.2	4.8
435-434 ..	43	15	34.9	80.0	13.3	6.7
534-433 ..	13	1	7.7	0.0	0.0	(100.0)
444 ..	4	1	(25.0)	(0.0)	(100.0)	(0.0)
All types ..	321	96	29.9	34.4	59.3	6.3

The next highest level of achievement was shared by peripheral mesomorphic endomorphs (23.5% firsts) and central endomorphic mesomorphs (23.3%). The latter with "north-west central physique," as I have called it elsewhere (Parnell, 1953b), were actually leading in academic eminence half-way through the survey, but young men of similar build in the last two years have not maintained the higher level set at the start. On entering the university, men with this dominance received fewer awards than might have been expected.

The lowest frequency of firsts was found among ectomorphic endomorphs; but this should be treated with reservation, because the sample of 13 is very small. Still, it is worth recording that in a more recent study of men showing symptoms or signs of a breakdown in mental health this somatotype dominance is comparatively common.

The chief and significant example of poor performance, or more exactly of infrequent high-level performance, is in central sector 345-334. In this "eastern central" zone only 4.3% of 47 men obtained firsts; and even if men in the central sector 354-344 are added—the sector which incidentally received much the highest proportion of awards on entry—there is still only a small number, 6 out of 83 (7.2%) with first-class honours. The chief physical characteristics of this combined "north-eastern central" zone are more than average bone and muscle development, more than average linearity of build, but less than average fat.

Distribution of Men with Third-class Honours

The highest proportion of men with third-class honours is found where the proportion of first-class men is lowest (see Fig. 3). It was actually highest among ectomorphic endomorphs, where the small sample of 13, as already mentioned, makes some reservation necessary; but it is equally true of the next highest level, 40.5%, which was found in the "eastern central" zone (sector 345-334), where only 4.3% obtained firsts.

Third-class honours were least often found among mesomorphs—in fact, only 18.3% of 120 central and peripheral mesomorphs together gained third-class honours. This difference in the proportion of thirds obtained by mesomorphs and by "eastern central" somatotypes is significant, but it is only the central mesomorphic ectomorphs who so frequently obtain thirds; the peripheral ones did better. Their better performance may be partly due to their greater relative dominance of mesomorphy over endomorphy, and in this connexion it is noticeable that where this relative dominance is reversed, as it is in peripheral endomorphic ectomorphs, a high proportion of thirds was found.

Apart from these subgroups, ectomorphs as a whole gained a high proportion of thirds. This confirms the findings of Sheldon and Stevens (1942), who reported that in achievement "the university ectomorph seems to enjoy the widest range of possibilities, both for better and for worse." They found that under the protection of the academic sanctuary the ectomorph had a 30% chance of being distinguished, and at the other end of the scale he frequently failed to adapt himself. In the present sample the exceptionally high level of achievement of endomorphic

ectomorphs has already been described, but it would be going too far to insist on the similarity between poor adaptation and third-class honours.

The "eastern central" group (C. 345-334) did, however, receive almost a full share of college awards on entry, 13 out of 47 (27.7%), compared with 29.9% in the complete examination series; and the question arises why the subsequent performance of men with this body build was comparatively disappointing, and why they, with 40.5% of thirds, did less well in finals than commoners as a whole, of whom only 32% were placed in the third class (see Table I). Were they "over-taught" at school and subsequently unable to apply or direct their energies effectively in the greater freedom of the university? Are they very late maturing? Do they have to wait for the late twenties or even thirties for their lower-than-average endomorphy to blossom and bestow a more comfortable outlook, restrain impulsiveness, and bring success? Did selectors in fact knowingly select for qualities other than examination success, or did the bright and eager appearance of these candidates hoodwink their selectors at interview? There is some evidence to come that ectomorph-mesomorphs are specially inclined to take up research: were research workers selecting, as many selectors do, in their own image? Yet another possibility is that caution and incapacity for free self-expression, both qualities found frequently in persons of this build, handicapped the candidate in examination controlled by a set time limit.

Second-class Honours

The next step is to examine the distribution of those obtaining second-class honours. This is the largest single class. Out of a possible total of 120 mesomorphs there were 78 (65%) with second-class honours (see Fig. 4). This proportion exceeds that among 201 other somatotypes, of whom only 54.2% were placed in the second class, and the difference approaches significance ($\text{Diff.} \div \text{S.E. Diff.} = 1.93$). Compared with 56 mesopenes, of whom only 41.1% obtained seconds, the difference is significant ($\text{Diff.} \div \text{S.E. Diff.} = 3.03$). It may be remembered too that mesomorphs contributed a fair proportion of first-class results. Furthermore, mesomorphs provided the lowest proportion of thirds, in contrast to mesopenes, who had the highest proportion of thirds (18 out of 56 = 32.2%). Thus it will be appreciated that, although mesomorphs did not reach the highest examination level most frequently, they did achieve a first-class about as often as would be expected in the sample as a whole; they obtained the highest proportion of second-class honours, and a further item of special interest to selectors is that they least often obtained a third; in short, their performance was comparatively seldom disappointing.

All-round Achievement

While discussing mesomorphs it is appropriate to mention that they take part in strenuous games and field sports much more often than mesopenes, whose physique with its less than average bone and muscle development is comparatively poorly adapted for strenuous exercise. In fact, 54.2% of mesomorphs regularly took strenuous outdoor exercise in the form of Rugby or Association football, hockey, cross-country running, or cycling, in contrast to only 21.6% of mesopenes. And one should add that almost all the mesopenes who did take part had central somatotypes. There was only one peripheral mesopene; he played hockey, but it is not known whether he was any good at the game. A point of greater general interest, however, is illustrated in Fig. 5, in which 22 men are plotted who not only took part in strenuous outdoor activities but also achieved a first-class degree. When compared with the full distribution of first-class men in Fig. 1 it will be seen that all but two ectomorphic firsts, and they are central ones, have gone; the group is mainly concentrated just to the muscular side of the mid-point of the distribution. This enables the reader to recognize the all-round character, literally through physical measurement, as a man at or just on the muscular side

of the distribution centre, a man whose near-central physique is also likely to be associated with a balanced temperament. Cecil Rhodes rated toughness and leadership high among the qualities to be looked for in his scholars, but his was not the first reference to the educationists' ideal of all-round performance.

Doctors of Philosophy

Fig. 6 shows the somatotype distribution of 23 men studying for or having taken their D.Phil. degree in a scientific subject. It is in general necessary that a first- or good second-class honours degree is required before proceeding, and the two- to four-year D.Phil. course entails some original line of research as the basis for a written thesis. There were 12 ectomorphic mesomorphs—more than twice as many as might have been expected from the general distribution—and the manner in which scientific D.Phil. somatotypes tend to cluster in the two endopne sectors may possibly bear witness to the combination of certain temperamental traits needed in scientific research—enthusiasm, precision, meticulous care, tenacity, critical aptitude, and persistence in pursuit of ideas. It is not suggested that these qualities are found exclusively in persons of this one physique, but it is possible that the particular combination of traits may be present most often in association with this particular range of physical characteristics. The smallness of the sample makes any definite conclusion questionable, but its inclusion here serves as a reminder that research, in itself an important university function, may demand qualities other than the ability to pass examinations. Indeed, there is more than a suggestion of contrast in the physical, and probably too the temperamental, traits demanded for success in research and in examinations, because it will be remembered that "north-eastern central" types as a whole had poor examination results.

The Question of Selection

It is hardly necessary to stress that the selection of students for university education badly needs improvement. The problem is well recognized and officially described in "Choosing University Students," a pamphlet published by P.E.P. (Political and Economic Planning). This pamphlet draws attention, first, to the large increase in the number of university candidates to be expected in the next 10 years, resulting from the increased birth rate from 1944 to 1948; secondly, to the high proportion, close on 70%, of students already in receipt of grants from public funds; and, thirdly, to the extraordinary unreliability of current methods of selection in predicting university performance from entry examination, headmasters' reports, and interviews. If parents and the general public are to be assured, first, that the money is well spent, and, secondly, that awards really go to the best students, then there is compelling urgency in the situation. There are as yet no signs that intelligence or other psychological tests are likely to produce a single-handed answer—in fact, Sir Frederic Bartlett (1953) reported that in the case of medical students the predictive capacity of intelligence tests, with the possible exception of excluding a few of the least intelligent, could add nothing to existing methods of selection based on school records and interviews.

Now, both examination and psychological tests concentrate on the mind to the exclusion of physical attributes, although it is to the body that all aspects of personality are inseparably anchored. Difficulty in interpreting physical characteristics has led in the past to these obvious and measurable features being ignored. Thus all attention has become concentrated on a bodiless abstraction, the mind. And this singular mental habit has now brought us to the present dilemma which P.E.P. (1953) summarizes in the following words: "The chief difficulty is that of devising tests capable of revealing information of a kind not primarily concerned with students' academic performance." But it is just this kind of information which somatotyping offers, and it has been shown here that once the top level of intellectual performance has been separated off, in this case by acceptance at the university, then physical features have the power to promote or handicap the efficiency of

intellectual equipment to an extent which many find surprising. It is important to emphasize that these findings have been shown only in conjunction with current methods of selection; it in no way follows that anything comparable would be found in a preselected sample of candidates for university education.

Somatotyping clearly has something valuable to offer in the assessment of personality. The results may be correlated with success in school examinations, in university examinations, in industry, or in the armed Forces, and it is noteworthy that success itself has its own peculiar qualities in each of these differing spheres. Just as it would be folly to discard psychological tests or current methods of selection because, single-handed, they fail to achieve what is wanted, so it will be generally recognized as equally unreliable to attempt to depend on physical measurements alone. One might improve the overall level of final performance considerably, other things being equal, by selecting mesomorphs, for example, in preference to those with "eastern central" physique, but there are obvious dangers in disturbing the balance of temperamental characteristics among the selected group: one might, for example, disturb recruitment for research. Because of the many factors involved it is necessary to proceed with great caution. What is needed is further combined study, in which somatotyping might with profit be included. In any case, up to the present time insufficient data are available to make separate studies of success possible within each faculty, and the association of choice of faculty with somatotype has already been demonstrated (Parnell, 1953a).

That somatotyping is practicable on a large scale is shown by the fact that it was possible to include it for purposes of health assessment at the routine medical inspection and chest radiography carried out on all new entrants at the University of Birmingham in 1952 and 1953. Three measurers and three clerks were employed for one week on each occasion to measure over 700 students, the procedure taking six minutes for each subject. A further week's work by me was required to complete interpretation of the measurements, and it may be claimed, therefore, that the method is economical in both time and money. The information so gathered is now available for forward-looking investigations of both academic failure and the allied problem of mental disturbance.

Summary and Conclusions

The Sheldonian somatotype distributions of men undergraduates at two Oxford colleges have been examined with special reference to selection, awards, and final honours class. They contribute substantially to knowledge of what happens where current methods of selection work comparatively well; they add, however, to understanding of the principles on which better selection might be based. Better selection of university students is a matter of compelling urgency, and the possible use of somatotyping for this purpose in conjunction with other methods is accordingly discussed.

The following were the conclusions derived from the investigation:

1. *All-rounders* who both played games and got a first-class degree congregate somatotypically just on the muscular side of the mid-point of the distribution.
2. More somatotypes with mid-range body proportions were found at Oxford than among the American university students reported by W. H. Sheldon. Certain peripheral somatotypes who enjoy university education in the States do not appear to gain admittance at Oxford.
3. A significantly higher proportion of central somatotypes compared with peripheral somatotypes held college awards at Oxford.
4. *First-class Honours*.—Endomorphic ectomorphs obtained a significantly high proportion of first-class

honours (35%). This compares well with the 34.4% of firsts obtained by all scholars and exhibitioners. It is especially interesting to note that of 15 scholars and exhibitioners with this dominance 12 obtained firsts—an extraordinarily high proportion of 80%. In contrast to all this a significantly low proportion (4.3%) of central mesomorphic ectomorphs ("eastern central" sector C. 345-334) obtained firsts.

5. *Third-class Honours*.—The highest proportion of men with third-class honours was found where the proportion of first-class men was lowest—the eastern central sector. The lowest proportion of thirds was found among mesomorphs.

6. *Second-class Honours*.—Mesomorphs, of whom 65% obtained second-class honours, had the highest proportion. The lowest proportion (41.1%) was found among mesopenes. The difference is significant.

7. "Ectomorphs were found to enjoy the widest range of possibilities for better and for worse." These words were used by Sheldon and Stevens (1942), and their results are here confirmed. Mesomorphs were most consistent in attaining a good level of performance with first- or second-class honours. Endomorphs did well when supported by sufficient mesomorphy.

8. *Awards*.—Endomorphic ectomorphs who did exceptionally well in finals received only a near-average proportion of awards on entry. Ectomorphic mesomorphs received an outstandingly high proportion of awards at entry, but in their final examinations these scholars and exhibitioners did least well.

9. Doctors of philosophy in scientific subjects show a significant tendency to be central ectomorphic mesomorphs.

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So diverse and voluminous have medical statistics become since 1948 that a guide to them such as Benjamin provides in the *Journal of the Royal Statistical Society*, Ser. A, 1954, 117, 210, will be widely welcomed. While the sources of raw statistics are no doubt well known to trained statisticians, there are many medical men who must have occasional recourse to a type of information that is apt at first to seem as forbidding as it is unfamiliar. For them the new guide will be particularly useful. It is one of a series being published by the Royal Statistical Society. The list of 76 references is split up under headings that correspond to general headings in the text, so that the key papers to the statistics of a subject, or the sources of its statistics, may be discovered the more readily. Besides official statistics published by the Registrars-General and other Government offices, Benjamin discusses the statistics of general practice, the hospital service, clinical trials, genetics, and other branches of the subject.