Somatotyping – development and applications

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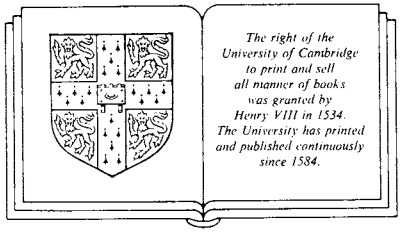

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Any scientist worthy of his salt labours to bring about the obsolescence of his own work.

(Theodosius Dobzhansky)

Early physique classifications

Somatotyping is the most recent development in the twenty-five century history of morphological taxonomy and constitutional investigation. Tucker & Lessa (1940*a*,*b*) in their review of the history of human classification defined constitution as the sum total of the morphological, physiological and psychological characters of an individual, in large part determined by heredity but influenced in varying degrees by environmental factors or, simply, the total biological make-up of an individual.

Physicians have been prominent in the history of constitutional investigation, particularly in studies of interrelations of morphology and susceptibility to disease. In the fifth century BC the Greek physician, Hippocrates, described people with long thin bodies as of *habitus phthisicus*, and observed that they were susceptible to tuberculosis. He called those with short thick bodies *habitus apoplecticus*, and said they were susceptible to vascular disease and apoplexy. In the first century AD Celsus, a Roman medical encyclopaedist, wrote that above all things one should know the nature of constitution, why some people are fat and some thin.

Other early physicians turned their attention to relationships between temperament and susceptibility to disease. In the second century AD Galen, a Greek physician, applied the idea of four bodily 'humours', which had persisted for the seven centuries since Pythagoras and Empedocles. He suggested that the physician needed to ascertain a patient's temperament in terms of humours in order to diagnose and treat disease. In the fourth century BC Aristotle observed that a specific body always involves a specific character. Avicenna, early eleventh century Arab physician and philosopher, recommended the study of temperament as it related to character.

In the late eighteenth and early nineteenth century typologies following the pattern of Hippocrates were popular in France. Halle in 1797, followed by Rostan in 1828, described three types of physical constitution as *type digestif*, *type musculaire* and *type cerebrale*. Here for the first time the important distinction of predominant muscular development was recognized.

The development of anthropometry added new dimensions to the study of

morphology. Anthropometry was first used in studies of morphology in the seventeenth century when Elsholtz, at the University of Padua, established a method for taking measurements on the body. Two hundred years later Quetelet, a Belgian mathematician and astronomer, was the first to study the measurements of man statistically. Unaware that Elsholtz had used the word anthropometria, he thought he had invented it.

Late in the nineteenth century di Giovanni carried out a long series of anthropometric studies in the school of clinical anthropology that he founded at the University of Padua. His pupil, Viola, influenced by Beneke at the University of Marburg, differentiated three morphological types. He called subjects with large, heavy bodies and relatively short limbs macrosplanchnic, those with small trunks and relatively long limbs microsplanchnic, and those with intermediate variation normosplanchnic. He himself observed that microsplanchnic was approximately the same as the old term *habitus phthisicus*, and that macrosplanchnic was approximately the same as *habitus apoplecticus*. In order to distinguish between the long-limbed, small-trunked microsplanchnics and the large-trunked, short-limbed macrosplanchnics, Viola derived a measure of trunk volume and morphological indices from manipulation of eight trunk measurements and the length of one arm and one leg.

An important trichotomous classification, formulated by Huter about 1880, divided people into three types: cerebral (with ectodermic structures predominating), muscular (with mesodermic structures predominating) and digestive (with endodermic structures predominating).

In *Körperbau und Charakter* (1921) Ernst Kretschmer (1888–1964) described four physical and psychic types, deriving from his acute clinical observations and a minimum of measurements. These he called the athletic, pyknic, asthenic and dysplastic physiques. Later he substituted the word leptosomic for asthenic and made a distinction between the linearity and the slenderness, fragility and gracility of the leptosomic type. Kretschmer's types, which resembled the 'groupings' of di Giovanni, recognized a gradual gradation from psychoses to 'normality'. He had a significant and far-reaching influence on constitutional investigation despite criticism for limited sampling, scanty measurements, lack of indices, subjective estimates, and failure to classify data according to age, sex and social status.

The twentieth century produced considerable interest in constitutional investigation in the United States as well as in Italy and Western Europe. There is an excellent detailed review of these early workers in Tucker & Lessa (1940*a*,*b*) and another by Tittel & Wutscherk (1972). Pearl, Ciocco and Draper were primarily interested in relationships between physical type, temperament and susceptibility to various diseases. Those best known for their classifications of constitutional types were Bean, Bryant, Gold-

thwaite, Mills, Davenport and Stockard. There is a similarity of overall picture of variations of physique in such classifications as hypersthenic, sthenic and asthenic; fleshy, medium and slender biotype; lateral, intermediate and linear; and so on.

Early in this century biologists and anthropologists readily accepted the existence of discrete types and tried to find them in what we recognize today as the complex continuum of human variation. Sheldon's somatotype concept of continuous variation was a striking advance over previous systems of classification. He recognized that every individual instead of being of a particular type, was a mixture of all the three basic components of physique, but that these were present in varying degrees in different individuals. These three components, according to Tucker & Lessa (1940*b*), he originally called *pyknosomic*, *somatosomic*, and *leptosomic*, but then adopted the names *endomorphy*, *mesomorphy*, and *ectomorphy*, which are strikingly reminiscent of Huter and Von Rohden. However, Sheldon makes no allusion to his inspiration for these words. Without comment he merely lists Van Rohden in the bibliography.

The contributions of W. H. Sheldon

W. H. Sheldon (in collaboration with S. S. Stevens and W. B. Tucker) in 1940 introduced his concept of 'somatotype' in *The Varieties of Human Physique*. The subtitle was *An Introduction to Constitutional Psychology*. Sheldon declared that his purpose was 'to provide a three-dimensional system for description of human physique', but also that morphological classification was merely a means to the end of creating 'an analogous schema for the description and classification of temperament' (pp. xi, xii). It was a promising and innovative departure from constitutional systems that classified the human species into between two and five 'types'. (The 'analogous schema' appeared in *The Varieties of Temperament*, 1942.)

Sheldon's books evoked markedly antithetical responses from the academic community and from the general public. Meredith (1940) was among the first of the scientists who responded to and bitingly criticized the methodological weaknesses. On the other hand Aldous Huxley popularized the words 'somatotype', 'endomomorphy', 'mesomorphy' and 'ectomorphy' and so publicized the idea of easily recognized relationships between physique and temperament. In *Ends and Means* and in articles in periodicals he adopted the new words and welcomed the prospect of using them to describe and match physiques and temperaments. The words have become part of our vocabulary.

The facts of Sheldon's early biography do not foretell that temperamental perversity, and an unfortunate predilection for deliberately antagonizing

the Establishment, which would jeopardize success and brilliant achievement. William Herbert Sheldon was born on 19 November 1898 in Warwick, Rhode Island, the youngest of the three children of William Herbert Sheldon and Mary Abby Greene. He was proud of his parents' pre-Revolutionary New England ancestry. He liked to talk of his mother's descent from a Revolutionary General Greene and of his parents' friendship with such contemporary luminaries as William James, whom he claimed as his godfather. This may well be one of his several, probably apocryphal whimsies, like that of his avowed descent from Benjamin Franklin.

By his own account, William was his mother's favourite. A precocious, gifted, versatile son, a voracious reader, thirsty for knowledge, avidly curious, he liked to say that he was raised with a litter of Irish setter pups. He referred to his father as a locally renowned naturalist and hunter, who brought him up on Rhode Island's then unpolluted and sparsely populated shores and in the nearby New England forests. He had affectionate memories of his father, who taught him the migratory and nesting habits of the shore birds. He also showed him the trees and shrubs where the cecropia, the luna, the promethea, and the polyphemus silk moths laid their eggs, and encouraged him to watch for the hatching of the eggs, to see them grow into exotic caterpillars and to marvel at the hundreds of feet of fine silk thread they spun for snug cocoons to pupate in until the long winter gave way to spring. Sometimes he watched the evanescent moth push the silk threads apart and struggle on to a twig to spread its wings to dry on an early warm day of spring, then fly away to find a mate – and having mated, die. In the family library he learned natural history in William Hamilton Gibson's self-illustrated *Sharp Eyes* and *Eye Spy*, Gene Stratton Porter's *Moths of the Limberlost*, and Hornaday's *American Natural History*.

From early boyhood Sheldon collected and traded the large copper early American cents, the 'old pennies'. By the time he was at Brown University he was a formidable expert and trader, familiar with most of the collectors and collections in the Boston–Providence area. According to him, he paid for most of his education from his numismatic profits. He continued through life to collect and trade the early coppers. By 1950 he had amassed a collection second only to that of George Clapp, the philanthropist founder of ALCOA (Aluminum Company of America), who had bequeathed his own collection to the American Numismatic Society in New York.

Sheldon made a hobby of applying rating scales and the principles of taxonomy to the grading and classification of coins. He established scales for rating condition, value and rarity. In his book *Early American Cents* (Harper & Bros., 1949) – which he said he wrote because 'ever since childhood I have wanted to read it' – he brought order and system to the identification, grading and evaluation of every known variety of early cent.

He provided a catalogue, plates and tables, which enable amateurs to identify accurately any large cent. He published a sequel, *Penny Whimsey*, in 1958. These two scholarly, authoratitive and charming out-of-print collectors' items are his only non-controversial writings.

Sheldon attributed his combined interests in morphology, psychology, philosophy and the philosophical concerns of religion to his boyhood and youthful environment. He formalized his interests in his undergraduate programme at Brown University (where he graduated in 1918), at the University of Colorado (where he received a masters degree in psychology in 1923), and at the University of Chicago (where he completed his PhD in psychology in 1925). While he was a graduate student at the University of Chicago he met Sante Naccarati, a young Italian anthropologist, who was on a fellowship in the United States investigating possible relationships among morphology, temperament and intelligence. Naccarati introduced him to the teachings of his master, Viola, and of di Giovanni and Pende, of the Padua School of Clinical Anthropology. Sheldon and Naccarati found much in common and planned to join in collaborative research, which they hoped would lead to a technique for combining some of the findings and methods of Viola with those described in Kretschmer's study, *Physique and Character* (*Körperbau und Charakter*, 1921). For his PhD dissertation ('Morphologic Types and Mental Ability', University of Chicago, 1925), Sheldon repeated the study that Naccarati had completed. While he was beginning his teaching career at the University of Chicago, he and Naccarati continued to ponder possible ways of investigating morphology, intelligence and behaviour. Their collaboration ended prematurely when Naccarati was killed in an automobile accident during a summer holiday in Italy in 1929. Twenty years later Sheldon referred to the loss of Naccarati as a singular personal tragedy that delayed his progress toward new techniques for describing human morphology and analysing its relationships with behaviour and function.

Meanwhile Sheldon decided he needed a medical education in order to proceed effectively with his investigations of human morphology and behaviour. When he entered medical school at the University of Wisconsin in 1929 he also taught psychology part-time. He graduated from medical school in 1933 and completed his internship in 1934.

Following medical school Sheldon spent two years (1934–1936) in England and Europe, financed by a travelling fellowship awarded by the National Council on Religion in Higher Education, and a grant from Dorothy Whitney Elmhirst of Darlington, England. He was committed to write *Psychology and the Promethean Will*, a philosophical statement of his conception of the 'religious problem' (as opposed to 'theological problems') and the need for what he chose to call a 'biological humanics'. He said he visited Kretschmer, Freud, Adler and Jung, and discussed with them his

ideas about what he would call 'somatotyping'. He was disappointed that Kretschmer was not ready to embrace a three-dimensional concept of human physique, despite its obvious close relationship to his own studies of physique and behaviour. Sheldon's talks with the four greats of European psychiatry were exciting and stimulating, but did not lead to the collaborative research that he had hoped for.

In England he became acquainted with prominent British intellectuals such as Aldous Huxley, Julian Huxley, Gerald Heard, Christopher Isherwood and Bertrand Russell. It was Sheldon's most exciting, provocative, stimulating, golden time. When he finished the promised book he returned to the United States, filled with plans for setting up a Constitution Project as the umbrella for research and writing that would encompass somatotype, psychology, psychiatry, philosophy and religion.

Sheldon's golden dreams came to an abrupt end in 1936, in an emotional crisis involving a girl he called 'Starlight'. He said he was 'engaged' to her. When she unexpectedly married another man, he wrote to the new husband an emotional, ill-advised and threatening letter. Its outraged recipient widely distributed copies of the offending document in high academic circles. The repercussions from this incident prejudiced Sheldon's opportunities for academic appointment for the rest of his life. Several loyal colleagues at various institutions arranged for him to share space for carrying out his research and for writing his books. But after 1936 he held no formal, salaried academic posts. Thereafter, he was dependent upon his own resources and privately obtained funds to pay research assistants and to meet other expenses.

In 1936 the Divinity School of the University of Chicago made informal arrangements for Sheldon to lecture and to pursue his interest in religion and psychology. During this period he persuaded the departments of physical education at the University of Chicago, Oberlin College, the University of Wisconsin and several other institutions to cooperate in collecting the first somatotype photographs, as extensions of their 'posture picture' programmes.

Between 1938 and 1940 Sheldon worked with Professor Smith S. Stevens on the conceptual rationale of the somatotype method. Stevens, trained as a physicist, was Director of the Psycho-Acoustic Laboratory in the Harvard Psychology Department. His interests centred on hearing as a physical, psychological and physiological phenomenon. He was devoted to good scientific method, and found the logic of Sheldon's schema attractive. Despite reservations about seemingly premature inferences he collaborated with Sheldon as co-author of *The Varieties of Human Physique* (1940) and *The Varieties of Temperament* (1942).

Earnest A. Hooton, widely known and popular Harvard professor of

anthropology, was an early supporter of Sheldon's somatotype research. Sheldon's originality and flair appealed to Hooton, who was openly enthusiastic about the prospects of somatotyping. Sheldon dedicated *The Varieties of Human Physique* (1940) to 'Earnest A. Hooton whose studies in physical anthropology have vitalized constitutional research'. In this book he defined somatotyping as the quantification of three components, which he called *endomorphy*, *mesomorphy* and *ectomorphy*. He rated each component on a 7-point scale. The ratings were made from standardized photographs and were expressed as a series of three numerals, to sum to no less than 9 and no more than 12. He endeavoured to relate his ratings to a series of measurements and indices, and gave guidance on descriptive features to assist rating. He accumulated his primary data from studies of 4000 college men. But he made a number of assertions for which he provided *no* evidence. Ensuing controversies over various aspects of Sheldon's methodology cooled Hooton's enthusiasm. Although he applauded Sheldon's creativity and originality, he deplored his intransigence in the turbulent academic debates over the permanence of the somatotype, the validity and validation of the method, the claims for embryological origins of the three somatotype components, and the appropriateness of using the same rating scale for males and females.

In 1938 Sheldon met Dr Emil Hartl, an ordained minister with a degree in psychology, the Director of the Hayden Goodwill Inn. Hartl was so impressed by the idea of a close relationship between physique and temperament that he invited Sheldon to set up a project to study the 200 delinquent boys in residence at the Goodwill Inn. During much of the study Sheldon lived at the Inn. World War II interrupted this study in 1942, but Sheldon completed it when he returned to Boston after his military service.

In 1942, soon after he had completed *The Varieties of Temperament*, Sheldon joined the United States Air Force as a Major in the Medical Corps. Thus he temporarily solved his continuing employment problem. He was stationed at Kelley Field, where he successfully set up a somatotype research project. He took somatotype photographs of several thousand enlisted men and other Air Force personnel. Some of the findings from the study were published as reports of the School of Aviation Medicine (Sheldon, 1943*a*,*b*, 1944*a*).

During his tour at Kelley Field, Sheldon fell ill with what was at first believed to be brucellosis, traced to a dairy supplying the military. When his illness persisted he was hospitalized several times for a series of tests, and at length the diagnosis of Hodgkin's disease was made. Following a course of deep radiation therapy, Sheldon was retired from the Air Force with the permanent rank of Major on full disability pension. The prognosis was poor, and he suffered from the unpleasant side effects and malaise associated with

radiation therapy. He returned to Chicago, where he slowly convalesced, with no recurrence of Hodgkin's disease symptoms. During this period he married Milancie Hill, a former student, who was now a graduate student at the University of Chicago. (His first marriage, to Louise Steger in Chicago in 1925, had ended in divorce in 1928.) He and Milancie went to Boston, where Sheldon resumed and completed the study of delinquent boys at the Hayden Goodwill Inn. (Milancie Hill's marriage also ended in divorce about 1948.)

At Harvard before the War, Hooton's graduate student, C. Wesley Dupertuis, became Sheldon's most devoted student and champion of somatotype method. When Dupertuis became the resident anthropologist in Dr George Draper's Constitution Laboratory in the Columbia Presbyterian Medical Center in New York, he and Dr J. R. Caughey (Draper's associate) set up a somatotype study in the outpatient clinics. Draper retired in 1945, Caughey left to become Dean of Case Western Reserve Medical School, and in 1946 Dupertuis persuaded Sheldon to join him in the Constitution Laboratory, with the nominal title of Director, without salary or formal academic appointment. After he moved to Columbia Medical Center, Sheldon completed his book *Varieties of Delinquent Youth* (Sheldon, 1949), the report on the Hayden Goodwill Inn study.

During Sheldon's post-War residence in Boston he became acquainted with Eugene McDermott, a geophysicist, who was president and founder of Geophysical Services, Inc., which later became Texas Instruments. Fascinated by Sheldon's somatotype concepts, particularly by his hypothesized relationships between physique and temperament, McDermott made several modest contributions to help with the progress of the delinquency study at the Hayden Goodwill Inn. He continued his support of Sheldon's ongoing research at Columbia Medical Center. Sheldon included McDermott as co-author of *Varieties of Delinquent Youth*, although his collaboration consisted solely of financial and moral support.

Sheldon and Heath

Barbara Heath (then Barbara Honeyman Hirsch) in Washington, DC, in 1944 met Frederick Wulsin, a professor of anthropology at Tufts University, and Hooton's former student, long-time associate and friend. Wulsin introduced her to Sheldon's *The Varieties of Human Physique* and *The Varieties of Temperament* and kindled her interest in somatotype research. He told her he had been familiar with Sheldon's pre-publication research, and found his ideas exciting and persuasive. He said Sheldon had written two exceptionally great books which 'made good anthropological

sense' and added that 'his analysis of temperament sheds more light on human conduct than any other point of view I know'.[1] Inadvertently Wulsin pointed Heath down the road that was to lead to her five-year association with Sheldon.

Heath promptly bought the Sheldon books, read them, re-read and studied them, and gave her serious attention to the possibility that she herself might take part in somatotype research, and continue her formal education beyond her Smith College bachelor's degree in history. Wulsin encouraged her and arranged meetings with his academic colleagues who were interested in somatotype research. Following correspondence, Hooton asked his graduate student, William Laughlin, on holiday in Oregon, to get in touch with Heath in Portland. Laughlin, fresh from a Columbia summer seminar on somatotype with Sheldon, was enthusiastic about the inherent potential in somatotype research.

Later that year Heath visited Boston and talked at some length with Hooton. He expressed intense interest in somatotype research and confirmed his sense of its potential value. At the same time he warned that anyone who worked with Sheldon should be aware of his temperamental difficulties, which had consistently interfered with harmonious relations with his peers, and of his chequered career in academia. He then arranged for Heath to spend a day with Stanley Garn, another graduate student, who was working on two somatotype projects – one a cardiac study at Massachusetts General Hospital, the other a growth study at the Forsyth Dental Clinic. He also arranged a meeting with Dr James Andrews, Assistant Curator of Somatology at the Peabody Museum, Harvard University, who was supervisor and statistical analyst of the somatotype study of Army personnel which Hooton had initiated at demobilization centres at the end of World War II (Hooton, 1959). Andrews told Heath that he himself preferred to call the three components *fat*, *muscle* and *length*, and rejected outright Sheldon's requirement that the sum of the three components in a rating should be no less than 9 and no greater than 12, but said nothing about the 7-point scale and other Sheldon strictures.

Heath also met Smith Stevens at the Harvard Psycho-Acoustic Laboratory. He referred to the controversies Sheldon had generated and expressed serious reservations about the course of somatotype research. He suggested that 'the best possible idea would be to save random somatotype photographs for twenty years, then dig them out and start drawing conclusions'.[2] Stevens seemed to have lost his original interest in somatotype, and had little contact with Sheldon after the publication of the first two books. In Boston, Heath visited the Hayden Goodwill Inn, where she talked at some length with the two Sheldon associates who remained loyal friends and collabora-

tors to the end of Sheldon's life. These were Emil Hartl, the Director of the Inn, and Roland Elderkin, a social worker, who carried out much of the case work for Sheldon's study.

A little later Heath visited Sheldon at the Constitution Laboratory in Columbia Presbyterian Hospital in New York. There she met Wesley Dupertuis, who showed her the procedures of somatotype photography and data collection in the Presbyterian Hospital clinics. At the time Sheldon was completing the final draft of *Varieties of Delinquent Youth*, and gave her a copy of the draft chapter 'The Psychiatric Variables', which impressed her greatly. Heath returned to Portland intensely excited about somatotype research. Despite their various reservations, the people she had talked with encouraged her to pursue her interests. She had the impression that Dupertuis' imminent departure, to take up his post as clinical anthropologist at Case Western Reserve Medical School, would leave something of a vacuum in the Constitution Laboratory and would substantially slow down Sheldon's data gathering. She accepted Sheldon's apparent view of himself as a 'misunderstood genius' who had the bad luck not to attract competent and loyal associates.

In the year that followed Heath stirred up a good deal of interest in the potential of somatotype research among the teaching staff at the University of Oregon Medical School, where she worked as research secretary in the Psychiatric Clinic. In May 1948 Howard Lewis, the professor of medicine, invited Sheldon to visit the medical school and to give a series of lectures there. Tentative plans were made for seeking funds to support a somatotype research project in the medical school clinics.

At the same time, in a lively correspondence, Heath and her friend Frederick Wulsin carried on long discussions about somatotyping and William Sheldon. Wulsin cautioned Heath that she might find herself 'riding herd more or less indefinitely on a prima donna'. When she sent him a copy of the chapter from the *Varieties of Delinquent Youth* manuscript he wrote: 'Sheldon takes a perverse delight in saying things that will infuriate some of his readers. Why do it?' What is the use? It is not a skilful method of persuasion. So likewise he waxes lyrical about humor. It is clear that he is painting his own philosophy and point of view. It is all right for him to feel that way, but this is not the place to tell the world about it. Rather this volume should give the *impression* of complete objectivity, even though that be an impossible ideal.'[3]

For about a year Heath wrestled with the conflict between lifelong habits of conventional conformity and the desire to take part in somatotype research. She weighed the risks and faced up to the inevitable disapproval of much of the community. Then in the autumn of 1948 she moved to New York. She became acquainted with the routines and activities of the

Constitution Laboratory – two rooms in the Presbyterian Hospital Department of Medicine. Soon she was filling a number of roles as an associate of Sheldon. She rapidly learned the techniques of making somatotype ratings and soon made independent ratings of hundreds of somatotype photographs, which correlated almost perfectly with Sheldon's ratings. She took charge of the measuring and photographing of subjects in the clinics, acted as clinic secretary, often typing Sheldon's letters as he dictated them, and in the evenings took courses in biology at Columbia University. Dr Paul Fejos, Director of the Viking Fund (now the Wenner-Gren Foundation), encouraged and assisted her in improving her photographic skills.

Pleased with Heath's contributions to the work of the Constitution Laboratory and apparent prospects for continued progress, Eugene McDermott set up a fund of $100 000 to support the research of the laboratory. He and Sheldon called the fund the Biological Humanics Foundation. Sheldon was its nominal president. Heath was secretary and treasurer, and was now referred to as the Executive Secretary of the Constitution Laboratory. At the same time Sheldon named McDermott co-author, with Hartl, of *Varieties of Delinquent Youth*, which was then in press, and proposed that McDermott and Heath be co-authors of the forthcoming *Atlas of Men*.

In 1949 Sheldon persuaded the departments of physical education in half a dozen midwestern colleges and universities to cooperate in a project for taking somatotype photographs of the incoming autumn classes of young women. A few months later he made similar arrangements with east coast Ivy League women's colleges. With a team of three young women, Heath obtained somatotype photographs of almost 4000 college women – the first (and only) large collection of female somatotype photographs. Sheldon announced that an *Atlas of Women* based on these data was forthcoming, a companion volume to his *Atlas of Men*. During this period Heath also helped to photograph and measure about 1800 women in mental institutions in New York and Massachusetts. She made somatotype ratings of all these photographs. She helped to set up a longitudinal study of children at the Gesell Institute in New Haven, Connecticut. Within two years she had studied and rated at least 12 000 somatotype photographs. She had somatotyped more subjects by Sheldon's method than anyone except Sheldon himself.

When *Varieties of Delinquent Youth* was completed Sheldon began to write the text and to prepare the somatotype photographs for the proposed *Atlas of Men*. Despite the fact that Sheldon's data were wholly cross-sectional, with one photograph of each subject, he proposed to show each of the known somatotypes at ages 18 to 65 and over at five-year intervals. He prepared tables of somatotypes distributed according to the criterion of