The Clinical Recognition of the Scaphoid Type of Scapula and of Some of Its Correlations

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THE CLINICAL RECOGNITION OF THE SCAPHOID TYPE OF SCAPULA AND OF SOME OF ITS CORRELATIONS

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In my communication, "The Scaphoid Scapula, a Frequent Anomaly in Development of Hereditary, Clinical and Anatomic Significance," presented to the St. Louis Medical Society, Feb. 5, 1910, I indicated the relative frequency of the scaphoid type of scapula in our population in dry bones and in fetal, embryo and monster forms. The main thesis of that communication was: The scaphoid scapula is an anomaly in development originating in the progeny from some abnormal circumstance operating in the parents, is thereafter transmitted from parent to child, and so on through several generations, and unless the abnormal circumstance again becomes operative in the descendants, the scaphoid scapula finally disappears and the racial type again becomes dominant.

I showed that it occurred most frequently in individuals deviating from the average in physical or mental endowments, or both, and stated that the natural habitat of the scaphoid scapula was in the deviate. I showed further that in individuals of the second generation in whose parents a definite abnormal circumstance—syphilis—had operated, the scaphoid type of scapula was correlated with certain conditions, such as

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nocturnal incontinence; with certain physical signs, such as catarrhal affections, adenoids, an abnormal degree of lymph-gland palpability, and above all, with vasculosclerotic changes occurring very early in life; in some detectable by the ordinary methods of clinical investigation as early as the fourth, and as a rule as early as the tenth, year of life; and in older individuals a degree of arteriosclerosis out of all proportion to their years. Even in individuals of the third and fourth generations, the last-mentioned correlations, amounting almost to parallelisms, will be frequently found. It is to the clinical recognition of the scaphoid type of scapula and of the correlations just mentioned, and to the recognition of others in the living subjects, that I desire at this time to direct attention, since the appreciation of certain of these correlations is fundamental in the study of the causation of the scaphoid type of scapula and in the consideration of the many weighty and intricate problems that appear to the intimately associated with it.

The recognition of the scaphoid type of scapula in the living subject will not be found difficult if one remembers its characteristics as shown by my studies of dry bones, embryonal and fetal forms. Of these characteristics the following are usually readily discernible in the living subject: first, the vertebral border below the scapular spine is more or less concave; this may be almost or quite straight, slightly or distinctly concave; second, the scapular index is as a rule less; that is, the bone is longer in proportion to its breadth than in the average type (this may be roughly estimated in the living subject by noting the proportion between length and width of the body of the bone); third, the vertebral border in the

Fig. 1.—A group of scapula of the scaphoid type, all having rather decided incurvations of their vertebral borders.
scaphoid type more nearly parallels the long scapular axis and a straight line than in the average type of scapula; fourth, as a rule, the spine in the scaphoid type forms more nearly a right angle with the long scapular axis than does the spine of the average type; fifth, the vertebral border buds, tuberosities, varying in size and number, are much more common in the scaphoid, especially in those nearer straight, than in the average type of scapula; sixth, in the same subject having scapulae of the scaphoid type, differences in size and form and specific differences in the contour of the vertebral borders are common.

Only in exceptionally thin individuals may one determine the other characteristic of the scaphoid type of scapula previously described; namely, the constant absence of lips and intermediary surface in those scapulae which have marked concavity of the vertebral borders. Two or more characteristics will invariably be found in those individuals having the scaphoid type of scapula and these may usually be determined by inspection and palpation. In individuals who are exceptionally muscular or obese, the x-ray may supplement inspection and palpation, an expedient I have not thus far found necessary.

As a matter of course all clothing must be removed, at least to the hips, and the patient should assume his natural attitude, standing several feet in front of the examiner in good illumination. To appreciate natural attitudes fully, the patient should be inspected from the front, laterally, and from the rear, during which the shape of the chest, the abdomen, the course of the clavicles, the length of the neck, the muscular development, the spinal curves, etc., are studied. Then by examination of the scapular region, in average in-

Fig. 2.—A group of scapulae of the scaphoid type, all having more or less straight vertebral borders except the one with a star next it, whose border is slightly convex—a border-line scapula.
individuals the upward and outward slant of the scapular spines, the graceful downward and outward curves of the vertebral borders beneath the fibres of the trapezii and the underlying mass of the rhomboids attached to these borders may be made out easily. The course of the long scapular axis may thus be readily determined to be downward and outward, so that the bases of the scapular spines will be found to be from 2 to 6 cm. nearer the spinal axis than are the inferior angles.

In individuals having the scaphoid type of scapula, the picture is completely changed. The chest is frequently narrowed in all diameters, especially anteroposteriorly. There is often a narrow costosternal angle and floating tenth ribs; the clavicles very frequently take rather a horizontal course increasing the dimensions of the supraclavicular regions, and there is often undue prominence of the acromioclavicular articulation. The shoulders hang, drooping downward and forward. The vertebral borders stand out prominently, wing-like, and especially that portion of the borders merging into the inferior angles. There is paralleling of these borders with each other and of these with the spinal axis, so that the distance between the inferior angles of the scapula and the bases of their spines is nearer equal, and in some instances the bases of the spines are further away from the spinal axis than the inferior angles of the bones. In many instances, even when the individual is caused to approximate the vertebral borders of his scapulae by drawing the shoulders directly backward, the phenomena just described will still be apparent, though to a somewhat less degree. The sluggish attitudes of such individuals, especially of the shoulder regions, the frequent lowering of one shoulder and usually on that side where the scaphoid type of scapula is

Fig. 3.—A group of average scapula, the dominant racial type, excepting the one with a star and that with a dagger near, these being border-line scapula but nearing the average type.
most marked, the changed relations of the vertebral borders with each other and of these with the spinal axis, have their foundation in the anatomic characteristics of this type of scapula mentioned above.

In individuals having average scapulae, marked differences between them in the same individual will rarely be found; but this is so frequent in the scaphoid type of the scapula that it must be considered as one of its chief characteristics. Marked differences will be noticed not only in the contour of the vertebral borders, but in some cases in the breadth and length as well. The differences in size, and especially the differences in contour of the vertebral borders, should also be considered in determining the presence of the scaphoid type of scapula. In the cases in which the difference is quite decided, causing the lowering of the shoulder on the side where the scaphoid type is most marked, lateral curvature of the spine is not infrequent. In some individuals who have acquired better attitudes of their shoulder regions an accentuation of the anterior curve in the dorsolumbar region occurs.

In thin individuals having the scaphoid type of scapula, the hollowing out of the vertebral borders may be readily appreciated merely by inspection. But to appreciate this better and the degree of it in each scapula, to appreciate the shapes of the bones as well as the presence of the vertebral border buds, palpation of the scapula should not be neglected. The marked differences of shape and size of the scapula, as well as the degree of concavity of their vertebral borders and the number and size of the vertebral border buds, may be well appreciated in the living subject; but to facilitate this study, I reproduce here three series of bones illustrating the anatomic characteristics found in my studies of dry bones (Figs. 1, 2 and 3).

Before considering the clinical recognition of some of the correlations of the scaphoid type of scapula and the better to appreciate these, it will be well for the moment to direct our attention to the individuals in whom these are associated, and then by looking at a composite picture of such individuals to study the correlations at closer range. Confining our studies in the beginning to the individuals in whose parents an abnormal circumstance—syphilis—has operated, we shall find that such individuals, as previously pointed out, are of retrograding, deviating types. In any one of these, when compared with either parent or with his cousins, his uncles and aunts or with the average members of the community in whose parents the abnormal circumstance has not operated, deviation will be found in the physical or mental development, and usually in both. Among such progeny will be found many of the heretofore recognized anatomic, physiologic, psychic and psychoneurotic stigmata which I shall not here particularize.

In only a few instances have I thus far found the well-marked scaphoid type of scapula in individuals even approaching average development. Such individuals are usually undersized, have sluggish attitudes, meager musculature and are strikingly lacking in the harmonies of physical development. They range in stature from dwarfs to giants, but whether the one or the other, or merely undersized, disharmony characterizes their physical development. Many of them, apparently physically normal at birth, in their later development show retardation or grow by fits and starts.
until near, either before or after, the usual age of puberty, they shoot up like weeds or forever remain stunted—blighted.

With the beginning of mental development such progeny are either backward and remain so, or they show—and this is the rule—precocity. If disharmony characterizes their physical development, it is especially true of their mental development. They have no childhood. They seem almost to jump from the cradle to adolescence. "My children are old in their ways" is a frequent expression of certain observing mothers, and they may add "They are almost always ailing." Or the unobserving mothers (and ignorance and mother-love and pride make them so) may proudly say "My children are all healthy." Indeed, physicians usually consider such children healthy, or at least free from syphilitic blight, in the absence of "snuffles," eruptions of the skin and mucous surfaces, bone and joint affections, Hutchinson’s teeth, interstitial keratitis, and deafness without otitis. Children of the second generation are as a rule rarely healthy; but to appreciate the truth of these assertions we must, as physicians, study the individuals of families rather than the histories of individuals of families.

While idiocy, imbecility and backwardness in mental development are relatively frequent in the second generation, such mental states are by no means common. My studies of the offspring in whom an abnormal circumstance—syphilis—in the parents is beyond question, show precocious mental development to be the rule. Not only do such children appear like little old men and women in the seriousness of their ways and actions, their preference for books rather than play, and the society of their seniors rather than their kin; but as individuals, their facial expression is lacking in the freshness of infancy, childhood or youth and they ever afterward appear much older than their years. Many of them develop sexual instincts long before puberty, and these are often gratified by masturbation, sexual intercourse, or otherwise. Strenuousness and intensity characterize many of these individuals, and before or during adolescence such mental proclivities, associated with the inherently weak condition, sooner or later lead to an inevitable "break," and they make up a large percentage of the cases commonly classified as neurasthenia, hysteria and dementia praecox. Many cases of epilepsy developing in early or later periods of life are to be found in the individuals of the second and later generations. The incorrigible and so-called criminal classes are increased from the ranks of the second and later generations in a degree probably unequalled by that of any other source. Not a few individuals of the second generation, and many of the later generations, despite their handicap in physical and mental endowments, by learning to adjust themselves to their environment, lead successful, useful and even brilliant lives, though they rarely live out their expectancy in consequence of their abiotic natures.

If the antenatal mortality of syphilitic progeny is so great, it is but reasonable to believe that the influences underlying it are still operative in the living; if not the disease itself, its blighting influences as manifested by disharmony in physical or mental development, or both by inability to stand the stress and strain of ordinary existence, by degenerative and involutorial changes, and by
lowered general resistance. Such progeny are truly abiotic; hence the instability of their natures, their proneness to so-called functional disturbances and to disease, to degenerative and involutive changes, to neuroses, psychoneuroses, psychoses, and above all, to tuberculosis.

In my studies of the scaphoid type of scapula and its correlations I have been greatly impressed by the unusual frequency of tuberculosis in such progeny and in the progeny of later generations. This is not the place to dwell on the ramifications of the scaphoid type of scapula and some of its correlations in general and special pathology, but it seems proper to mention here the abiotrophies of Gowers, the neuroses and psychoneuroses and especially epilepsy, dementia praecox and tuberculosis, since my studies have shown the unusually frequent association with these conditions.

Nocturnal incontinence is relatively frequent in individuals having the scaphoid type of scapula and other correlations. It was present in about 16 per cent. of fifty boys, inmates of St. Joseph's Orphan Asylum, studied in a preliminary way, and it is such a very common condition in the second generation that it may well be considered one of the correlations of the scaphoid type of scapula. Fuchs and Mattauschek, in studying enuresis nocturna in adults, have shown

2. In a paper soon to appear, prepared in collaboration by Dr. O. H. Brown and myself, we shall show the frequent association of tuberculosis with the scaphoid type of scapula and some of its corrections.


in their cases anomalies of skin and tendon reflexes, slight sensory changes about the feet, syndactylyism, deformity of the feet (pes planus, varus and valgus, etc.), the frequent association of the patency of the sacral canal in all degrees from spina bifida to the slightest changes in the form and location of the sacral hiatus, the latter demonstrable only by the x-ray.

These findings caused Fuchs to assume an actual defect of development (myelodysplasia), meaning thereby an anomalous development about the lower part of the spinal cord. Fuchs has correlated the assumed myelodysplasia with distinct anatomic anomalies, and I have correlated similar anomalies with the scaphoid type of scapula.

The histories of catarrhal affections, tonsillitis, bronchitis, gastro-intestinal disturbance and adenoids are unusually frequent in individuals of the second and later generations.

Of the boys studied in St. Joseph's Orphan Asylum having the scaphoid type of scapula and some of its correlations, about 60 per cent. are mouth-breathers. In a family of five children of the second generation, recently referred to Dr. R. P. Scholz, adenoids were found in all, and in four to a degree requiring operation. In a group of ten backward public school children studied with Dr. Scholz, having adenoids and mentioned in my first communication, all had the scaphoid type of scapula and other correlations. Since then Dr. Scholz has kept a careful record of those operated on by himself for adenoids, and in a recent conversation he informed me that fully 75 per cent. of them have the scaphoid type of scapula and some of its correlations. Adenoids, therefore, appear to be a very frequent correlation of the scaphoid type of scapula. The "adenoid face," consisting in a dull, vacant expression, dry and separated lips, poorly developed nostrils, etc., discerned by visual or digital examination, or both, renders the recognition of adenoids an easy matter.

A more frequent correlation is undue lymph gland palpability, and this is so frequent that it is well-nigh constant. Enlarged anterior cervical glands are an almost constant accompaniment of adenoids, but the postcervicals, epitrochlears, and those above and below Poupart's ligament are those more easily palpable and those less frequently involved from the peripheral infections; but even these enlarged from peripheral infections, the postcervicals from infections of the posterior portion of the scalp, the epitrochlears from infections of the more distal parts, and the inguinals above Poupart's ligament from infections, about the genitalia and below, of the distal parts of the extremities. In any case, the history or the presence of such infection, and above all the equal enlargement whether or not the enlargement is peculiar to the individual or due to some peripheral infection.

Pupillary anomalies, consisting of asymmetries and differences in size, are so common in individuals of the second generation as to rank as frequent correlations. Such findings should be considered only when neither iritis nor iridocyclitis causing synechia has existed, points readily determined by the history and inspection. In searching for pupillary anomalies, it must be remembered that clumpy distribution of pigment along the pupillary margin ("Ektropium des Pigment Blattes der Iris"—Bach⁵) may cause a perfectly symmetrical pupil to appear flattened, oblong or

cornered. The examination by focal light may readily exclude this condition. The Argyll-Robertson pupil with an otherwise intact nervous system is relatively infrequent in the second generation, though almost invariably associated with the scaphoid type of scapula and other correlations when present. The same may be said of Hutchinson's teeth, interstitial keratitis, deafness without otitis, hypotonia of certain muscle groups, absent knee-jerks and the usual signs of congenital lues heretofore recognized. Juvenile parësis and tabes are almost invariably associated with the scaphoid type of scapula and its chief correlations, and in my first communication I pointed out the frequency of this association with syphilis of the nervous system, with acquired tabes, parësis and other abiotrophies of Gowers. In my studies of senility, of the later manifestations of acquired lues, and of individuals having the scaphoid type of scapula, I have been impressed with the peculiar appearance of the conjunctive over the sclerotics, which I have noted in my findings as "varnished sclera." The varnished sclera is present as a rule in healthy individuals as early as the thirty-fifth or fortieth year of life and it increases with succeeding years. Its chief characteristic is a shiny, glistening appearance on a rather undulating, and in older individuals, a slightly yellowish background, so that the surface of the conjunctiva lying on the whitish sclerotic glistens like the cornea. In individuals free from senile changes the surface of the conjunctiva has a more smooth and less shiny appearance—is even dull when compared with the surface of the cornea; so that in such persons there is a distinct contrast between the brilliancy of the surface of the cornea and that of the conjunctiva on the bluish-white background of the sclera. The lack of contrast, on the other hand, is probably one reason for the expressionless eyes of tabetics and paretics and the main reason for the "settled look" in the healthiest of us after the thirty-fifth year of life. The undulating appearance is probably due to wasting of the episcleral or subconjunctival tissue and to the thickening of the conjunctival vessels, and, in addition, in older individuals, to wasting of the conjunctive analogous to that of other mucous surfaces and the skin in senility. The presence or absence of "varnished sclera" may be readily determined on drawing down the lower lids when the patient is facing the light and directing his gaze somewhat upward. In such position we may readily appreciate the appearance of the conjunctiva if varnished, its tints, its undulations, and lastly, the undue tortuosity of the conjunctival vessels—a sign usually associated with and paralleling it. When the "varnished" appearance is well marked the tortuous vessels seem to lie, rather, on than within the conjunctival tissue. Punctate hemorrhages into the conjunctival and even into episcleral tissues will frequently be found associated with the signs just mentioned.

Aside from the chief correlation of the scaphoid type of scapula, namely, the characteristics of the individual, probably the most constant, and to my mind the next in importance, is the correlation of vasculosclerotic changes at an unusual period of life and in older persons out of all proportion to their years. The varnished sclera and the undue tortuosity of conjunctival vessels are probably due mainly to vasculosclerotic changes of the conjunctival vessels. The study of these vessels with Luedde's modification of the Zapski binocular corneal microscope, as previ-
ously pointed out, appears to offer a ready means of detecting the presence of vasculosclerotic changes, from whatever cause, long before they might otherwise be recognized in the living subject. At any rate this instrument offers additional means of securing corroborative evidence—and it is impossible to have too much of this. With this instrument one may readily see the blood coursing through the conjunctival vessels and discern thickening, crinkling and aneurismal dilatations of their walls.

In certain congenital deformities correlated with the scaphoid type of scapula, studied conjointly by Drs. Luedde and V. P. Blair, evidence of such changes have been found in the conjunctival vessels of nursing infants. By the ordinary methods of clinical investigation, as previously pointed out, I have found evidence of vasculosclerotic changes as early as the fourth, and almost constantly as early as the tenth year of life in individuals of the second generation. A number of these, studied by me, have also been studied by Dr. Luedde and in no instance has he failed by studying the conjunctival vessels to find evidence of vascular changes. The almost constancy of vasculosclerotic changes in individuals of the second generation and our ability to detect them so early in life warrant the deduction that such changes begin during development in utero—in other words, the children are born with a degree of arteriosclerosis.

Clinical evidence of arteriosclerosis in the living subject is considered ample when two or more of the following findings are demonstrable: undue palpability of radial and other vessels, visible pulsation in the brachials, undue tortuosity in these, the temporals, and other vessels, including the conjunctival vessels, undue accentuation of

the second aortic sound and the determination of the functional worth of the heart muscle. To these must be added an estimation of arterial tension with a suitable apparatus, though alone it is of but little value in determining the presence of arteriosclerosis.

A detailed description of the methods usually employed in studying the cardiovascular apparatus would be superfluous here. But the palpation of vessels is such an important procedure in determining the presence of arterial thickening that I may be pardoned for calling attention to the necessity of accuracy in technic, even in the frequent and time-honored practice of feeling the pulse.

Not only the radial, but the brachial, temporal, posterior tibial and dorsalis pedis, should be palpated and compared, right and left, in our search for vascular changes. Sahli's three-finger method is invaluable in estimating the qualities, tension, etc., of arteries; but in determining sclerotic changes in them it is not to be recommended, because sensation coming in from three fingers is more dispersed than when only from one. In order to determine the sclerotic changes, one should employ, as a rule, one, never more than two, fingers, and two only in cases in which the tension is so great as to interfere with firm palpation with one finger. In counting the pulse, it matters little whether one feels with one's finger-ball or one's finger-tip; but in feeling—in palpating—the vessel-wall with only the ball early and even decided changes may be entirely overlooked. One should, therefore, use the finger-tip in palpating arteries, because the tip is more sensitive than the ball, has less subcutaneous tissue,
and more readily adjusts itself to the vessel. The tip of the finger should be placed perpendicularly to the vessel at first lightly, to become aware of pulsation, then with gradually increasing pressure one should roll or attempt to roll the vessel. A moderate-sized artery, such as the temporal or radial when not thickened, is felt to collapse under the increasing pressure and it is with difficulty differentiated from adjacent structures.

When such a vessel is thickened—sclerosed—the wall remains more round, the finger-tip glides over its rounded surface, and one feels a degree of rigidity not present in normal arteries. Sclerosing arteries are frequently unduly tender to firm finger-tip pressure, more so than adjacent structures, the unpleasant sensation persisting at times for several minutes after the pressure has been removed, a point frequently mentioned by patients. As the finger-tip has less subcutaneous tissue than its ball (one reason why it should be employed), it is evident that its applied pressure should be a point along the course of a given artery where it lies directly over bone and free from overlying muscle. Figures 4 and 5 represent two methods of finger-tip palpation of the radial artery.

In my first communication, I referred to vasculosclerotic changes as a sort of connecting thread between the syphilitic and his progeny.

6. Wertheim-Salomonson (Die Nagelpalpation der Arterienwand, Salomonson, Deutsch. Arch. f. Klin. Med., 1910, xcviii, Nos. 4-6; abstr. in the Journal A. M. A., April 16, 1910, p. 1345) has recently called attention to the value of finger-nail palpation of arterial walls and emphasizes the point that the nail should be placed perpendicularly to the skin, thus calling into play the entire innervation of the nail-bed. Whether the “nail” is more sensitive than the “tip” is questionable. Nevertheless the method seems valuable and should be employed.

In my studies of many individuals and families on which that and this communication are based, a degree of such changes out of all proportion to the years is the one preeminent clinical fact discernible in the individual who has acquired syphilis, and it is the one significant clinical fact discernible in his children and his children's children. It is, probably, the main cause of the frightful antenatal and postnatal mortality among such progeny; probably the main cause of their lessened expectancy in life; of their proneness to disease—to degenerative and involutional changes; to the so-called functional nervous disorders and the underlying cause of tuberculosis in them—for is not the blood the life thereof?

Admitting vasculosclerotic changes to be even a frequent correlation of the scaphoid type of scapula, is it not incumbent on us to search for and establish its cause and that of its other correlations? My studies, extending over a period of more than three and a half years, indicate far-reaching ramifications of the scaphoid type of scapula and its correlations—a rather definite syndrome in both general and special pathology. The frequency of what may be called the scaphoid type of scapula syndrome in our population, occurring in all branches of society, seems to postulate a single cause and one sufficiently potent to modify profoundly the growing organism from its very foundations. Thus far I have found no other cause than syphilis in the ascendants, but my studies have been too brief and too incomplete to enable anyone to draw definite conclusions from them and apply them to every individual in whom this syndrome may be found. This seems certain, however: nothing occurring in the life of an individual after his birth can give him the scaphoid type of scapula and its correlations.
Before one may determine the significance of this syndrome in any individual, the individual must be studied from every angle and in a comparative way with the members of his own family and with average members of his community. With the use of modern refinements in clinical investigation; with the use of laboratory methods, merely to confirm and to control clinical deductions; with patient study of individuals and of the individuals of families rather than the histories of individuals of families on the part of many workers, the ultimate cause or causes, as well as the hereditary, clinical and pathologic significance of the scaphoid type of scapula and its correlations may readily be determined.

My studies thus far warrant my saying at this time that such research on the part of many workers will undoubtedly lead to more complete recognition of syphilis and of its blighting influence in the individual affected, in his children, and in his children's children. Out of such recognition, let us hope a sane prophylaxis may be developed, whereby much suffering which now comes to humanity from this insidious enemy of the human race may in succeeding generations pass away from the earth forever.

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