

| Solids. | Grains. |
|--------------------------|---------|
| Sodium chloride | .11 |
| Sodium sulphate | .08 |
| Potassium sulphate | .10 |
| Iron oxide | Trace. |
| Lithia | Trace. |
| Silica | .34 |
| Carbonic acid (combined) | 1.11 |
| Total solids | 8.28 |

Temperature of water at springs, 52° F.
The water is of the light alkaline-calcic class. In addition to its properties as a table beverage it is said to be very useful in dyspepsia and indigestion and the early stages of Bright's disease. The water is extensively sold in Baltimore and other cities. James K. Crook.

CHATTANOOGA, TENN.—A city of about 50,000 inhabitants, situated in the southeastern portion of Tennessee, upon the Tennessee River. It is 762 feet above sea level, and the surrounding mountains are from 1,320 feet—Missionary Ridge—to 2,160 feet—Lookout Mountain,—both of which points are easy of access. The scenery is varied and beautiful, and the atmosphere is exhilarating and pure. The spring is early, opening in March, and the vegetation rich and varied. The soil is dry and loamy, and the drainage good. There are occasional winds and fogs, but the city is so surrounded by mountains that it is greatly shielded in this way from the winds. The climate is indicated in the accompanying table, kindly obtained for the writer by Dr. W. A. Applegate, of Chattanooga. From this it is seen that the winter climate is moderate and the summer not excessively hot. The relative humidity is quite high, and the average number of clear and fair days not remarkably large in comparison with other health resorts in the South. The daily range of temperature is also seen to be large.

CHATTANOOGA, TENN. LATITUDE, 35° 4'; LONGITUDE, 85° 15'. CLIMATIC DATA FROM OBSERVATIONS FROM 1879 TO 1899 INCLUSIVE.

| | January. | February. | March. | April. | May. | June. | July. | August. | September. | October. | November. | December. | Year. |
|----------------------------------|----------|-----------|--------|--------|-------|-------|-------|---------|------------|----------|-----------|-----------|-------|
| Temperature (Fahr.)— | | | | | | | | | | | | | |
| Average or normal | 41.4° | 45.4° | 51.1° | 61.0 | 68.5° | 75.9° | 78.4° | 77.0° | 71.8° | 61.6° | 50.3° | 43.7° | 59.9° |
| Average daily range | 16 | 17.4 | 18.7 | 20.1 | 20.8 | 19.8 | 18.4 | 18 | 19.2 | 20.1 | 18.5 | 17.1 | 19.3 |
| Mean of warmest | 52.2 | 54.0 | 56.6 | 65.0 | 71.8 | 78.9 | 81.1 | 80.8 | 75.8 | 67.2 | 55.8 | 47.2 | 60.3 |
| Mean of coldest | 33.6 | 33.8 | 45.7 | 55.4 | 65.4 | 72.2 | 75.4 | 73.8 | 68.1 | 56.5 | 45.4 | 38.1 | 55.3 |
| Highest or maximum | 75 | 78 | 85 | 90 | 93 | 98 | 101 | 100 | 98 | 91 | 79 | 73 | 88.4 |
| *Lowest or minimum | 3 | — 3 | 15 | 25 | 40 | 45 | 56 | 54 | 38 | 27 | 16 | 3 | 26.9 |
| Humidity— | | | | | | | | | | | | | |
| Average relative | 76% | 71% | 67% | 64% | 69% | 73% | 75% | 77% | 76% | 74% | 71% | 74% | 74.2% |
| Precipitation— | | | | | | | | | | | | | |
| Average in inches | 6.19 | 5.32 | 5.95 | 4.52 | 3.89 | 4.49 | 4.22 | 3.80 | 3.70 | 2.71 | 3.71 | 4.31 | 52.81 |
| Wind— | | | | | | | | | | | | | |
| Prevailing direction | N.E. | N.W. | N.W. | S. | S.W. | S.W. | S.W. | N.E. | N.E. | N.E. | S. | S. | |
| Average hourly velocity in miles | 6.9 | 7.5 | 7.7 | 7.1 | 5.5 | 4.9 | 4.8 | 4.6 | 4.6 | 5.2 | 6.1 | 6.6 | 5.9 |
| Weather— | | | | | | | | | | | | | |
| Average number of clear days | 7 | 7 | 9 | 11 | 10 | 9 | 8 | 9 | 12 | 15 | 11 | 8 | 116 |
| Largest number of clear days | 12 | 13 | 18 | 18 | 19 | 16 | 15 | 21 | 23 | 22 | 14 | 207 | |
| Smallest number of clear days | 3 | 3 | 4 | 5 | 2 | 4 | 2 | 5 | 5 | 8 | 6 | 1 | 47 |
| Average number of fair days | 11 | 10 | 11 | 12 | 15 | 15 | 16 | 15 | 12 | 10 | 9 | 11 | 147 |
| Largest number of fair days | 17 | 17 | 15 | 18 | 23 | 19 | 22 | 19 | 12 | 15 | 14 | 15 | 212 |
| Smallest number of fair days | 4 | 6 | 5 | 6 | 7 | 11 | 8 | 10 | 6 | 4 | 5 | 6 | 78 |
| Average number of cloudy days | 13 | 11 | 11 | 8 | 6 | 6 | 7 | 7 | 6 | 6 | 9 | 12 | 102 |
| Largest number of cloudy days | 22 | 16 | 17 | 14 | 13 | 15 | 13 | 12 | 13 | 15 | 17 | 180 | |
| Smallest number of cloudy days | 7 | 8 | 4 | 3 | 1 | 1 | 1 | 3 | 0 | 3 | 3 | 8 | 42 |
| Average number of rainy days | 14 | 12 | 13 | 11 | 11 | 12 | 14 | 12 | 9 | 8 | 9 | 11 | 136 |
| Smallest number of rainy days | 9 | 6 | 7 | 6 | 5 | 6 | 6 | 5 | 5 | 3 | 5 | 63 | |
| Largest number of rainy days | 24 | 22 | 21 | 17 | 16 | 19 | 19 | 18 | 16 | 13 | 19 | 17 | 221 |

*Lowest on record is — 10° on February 13th, 1899.

Judged from its climatic conditions solely, Chattanooga would hardly fall within the list of genuine health resorts, although, like so many partisan reports upon health resorts, its "climate conditions" are vaunted as "unsurpassed by any point in this country." It is needless to say that the writer who makes this statement gives neither full climatic tables nor any series of results obtained in the treatment of disease. Undoubtedly a residence in some of the high localities about the city offers,

in the pure and bracing atmosphere, mild winter temperature, and attractive scenery, substantial climatic advantages in the treatment of pulmonary tuberculosis; for the chief end of all climatic treatment of consumption can well be accomplished here, namely, constant exposure to pure outdoor air. A sanatorium, for instance, on Lookout Mountain, conducted as Falkenstein or the Adirondack Cottage Sanatorium is, would doubtless exhibit equally good, if not better, results. Formerly malaria was very prevalent here, but since the sanitary condition of the city has been improved, this disease is said to have disappeared to a very great extent.

The outdoor attractions are many and varied; excursions to the various battlefields—Chickamauga, Missionary Ridge, Lookout Mountain, and Orchard Knob—are all full of interest. The view from Lookout Mountain, as the writer can testify from personal experience, is a striking one, looking down upon the winding river and the other lesser heights. The roads are good, and driving and wheeling are popular amusements.

The accommodations are excellent both as regards hotels and boarding-houses. "Lookout Inn" on Lookout Mountain is open all the year and affords the best of accommodations.

Chattanooga is a railroad centre and is easily accessible from all directions. Edward O. Otis.

CHAULMOOGRA.—CHAWUL-MUNGRI. The seeds of two species of *Gynocardia* (fam. *Flacourtiaceae*) of South-eastern Asia; also the oil expressed from them and the bark, the latter not being an article of commerce with us. The seeds of commerce are commonly referred to *G. odorata* R. Br. This species, however, does not yield the ordinary seeds, which contain no prussic acid, but a different variety, rare in commerce and rich in prussic acid. The species yielding the commercial seeds appears undescribed, though it is indefinitely referred to by vari-

ous authors. The bark employed is possibly that of the *G. odorata*, because prussic acid is developed in its infusion, which is also astringent, hence much like wild-cherry bark. It is used as a febrifuge. The fruit pulp is used to poison fish. The seeds and the oil expressed from them are extensively employed, externally and internally, in the East, as a remedy for leprosy and for various skin diseases.

The plant is a tree, and bears directly from its trunk

and large branches, globose berries, as large as a shaddock, containing numerous seeds. The latter are about one inch or one inch and a quarter long, irregularly ovoid, angular from pressure, and dull gray. The kernel shrinks away from the testa in drying, the latter being thin and brittle. The oily kernel, at first white, becomes brown. It has a disagreeable odor and taste. The seeds consist of about half their weight of a brownish-yellow fixed oil, of a specific gravity of about .945. The active portion of this oil appears to be its 12 per cent. of gynocardic acid, with 2 of cocinic, 4 of hypogæic, and 60 of palmitic acids. The oil has been considerably employed in professional practice, both externally and internally, in skin diseases. The dose is ℥ iij.—iv. after meals, gradually increased. Doses of ℥ x. have been found irritating to most persons, resulting in vomiting and purging.

Gynocardic acid has also been employed and is said not to cause nausea. An ointment made of fifteen to twenty-five grains of this acid to the ounce of vaseline has been recommended as an application to dry patches of eczema.

False chaulmoogra is the seed of *Hydnocarpus anthelmintica* Pierre, a related plant. It is similarly used in native practice, and also as an anthelmintic.

Henry H. Rusby.

CHEILITIS GLANDULARIS APOSTEMATOSA.—Deriv.—*χειλος*, the lip; glandularis, having the appearance or form of glands; and apostematosus, from *ἀπόστημα*, an abscess.

SYNONYM.—Myxadenitis labialis.

Under this name Richard Volkmann (Virchow's *Archiv für pathol. Anatomie*, 1870, L., pp. 142-144) describes five cases of a peculiar chronic inflammation of the lower lip.

SYMPTOMS.—Swelling of the lower lip gradually ensued without being especially painful and the lip became hard and tense, giving the face an unpleasant, idiotic expression. The mobility of the lip was very much impaired and in one case almost lost. The swelling involved the entire width and breadth of the lower lip to its union with the chin. In one instance the upper lip was also affected. The surrounding cutaneous integuments were somewhat erythematous in appearance. Upon close examination the mucous glands in all cases were found to be swollen to the size of a hemp seed and even larger, and were very numerous throughout the mucous membrane. When the lip was everted the follicular openings were seen to be much dilated and in some instances admitted a fine sound. On pressure, which gave rise to only moderate pain, an opaque mucous or muco-purulent discharge appeared, giving to the lip, which had been previously dried carefully, the appearance of being covered with small dew drops. In three cases abscesses occurred which originated in the glands or in the surrounding peri-acinous connective tissue. Furuncles formed in the fleshy part of the lip, which became inflamed without being especially painful, and at times the skin, but more frequently the mucous membrane, was perforated with small openings, and showed very marked tendency to fistulae and secreted a muco-purulent discharge for weeks and months. In one case there existed simultaneously on the inside of the lower lip twelve to fifteen such openings which admitted a larger sound with ease and led to irregular fistulous passages extending through the substance of the lip. True ulceration did not occur in these openings, in any case, and no evidence of syphilitic ulcers or plaques could be demonstrated on the lip or on the mucosa of the mouth and pharynx. Two of the cases, although subjected to energetic treatment for some time with potassium iodide and local applications of silver nitrate, the point being introduced into the follicles under anesthesia, and applications of lead water, showed but very little improvement. The remaining three cases were cured in four to eight weeks; potassium iodide, gargles of potassium chlorate, and mild cauterization being employed. All of the patients were adults. Three had previously been syphilitic shortly before the attack, and in one of

these a fading syphilitic eruption on the palm was still present; with the exception of a few slightly enlarged lymphatics no local evidence of syphilis could be detected. Two patients were in perfect health and denied all history of syphilis. The course of the disease in all five cases was very similar, although differing in severity. It is quite certain that catarrhal inflammation of the labial glands existed in all these cases, accompanied by suppuration in places; actual suppuration occurred partly in the gland and partly in the peri-acinous connective tissue, hence Volkmann proposes to call the affection cheilitis glandularis or myxadenitis labialis. He is undecided as to the rôle syphilis plays in this disease; he is, however, inclined to think that it does not exert a direct influence. It is more probable that the etiological factor is to be sought for solely in the catarrhal condition of the mouth and pharynx, which always existed simultaneously, and probably spread by means of the secretion of the oral cavity through the outlets of the labial glands to the acinous bodies.

Emmanuel J. Stout.

CHELOID. See Keloid.

CHEQUEN.—CHEKAN. The leaves of *Eugenia Chequen* Molino (fam. *Myrtaceae*). A large and beautiful white-flowered shrub of Chili and Bolivia, closely resembling the common European myrtle. The leafy twigs were originally used, but in this form by far the greater portion is inert woody fibre. The leaves average about half an inch or more in length, frequently with an obscure tooth on one side, thick, coriaceous, bright green, smooth and punctate, and aromatic in taste and odor. They contain four or five per cent. of tannin and two or three of volatile oil, the latter consisting chiefly of pinene, with some cineol. Chequen belongs, therefore, to the Eucalyptus series of aromatic drugs, its action being specially upon the respiratory mucous membrane, through which the oil is largely excreted. Its use is as a tonic expectorant, particularly in catarrhal conditions. It is commonly given in the form of the fluid extract, in doses of 4 to 8 c.c. (fl. 3 i.—ij.). Henry H. Rusby.

CHERRY, WILD.—*Prunus Virginiana*. "The bark of *Prunus serotina* Ehrhart, collected in autumn" (U. S. P.). The bark of *Prunus Virginiana* L. should not be collected. It is the choke-cherry and is mostly only a shrub. This contradiction will probably be corrected in the next edition of the Pharmacopœia by dropping the word "Virginiana" from the title.

P. serotina is a large, graceful tree, with spreading, slender branches covered with red or purplish, smooth, shining bark; that of the trunk, however, is dark and exfoliating. Its wood is the valuable cherry, so extensively used for house-finishing and cabinet work. In general aspect it resembles the domestic cherry trees, but is much larger and has a rounder and more spreading top. The flowers are small (less than 1 cm. across), and borne in long, slender, rather erect, terminal racemes. Calyx cup-shaped, five-toothed. Corolla, of five-reflexed, broadly obovate white petals. Stamens, twenty or so perigynous. Ovary, simple, one-celled, two-ovuled. Fruit, a round, black, bitterish-sweet drupe, nearly 1 cm. in diameter. Stone, one-seeded.

The wild cherry tree grows in nearly all parts of the United States and Canada. In the Middle States, and in some of the Western ones, it is very abundant and large; in the extreme South it is less common, and in New England, although common, it does not attain its maximum size.

Wild cherry has been recognized by each edition of the Pharmacopœia, from the first, in 1820, to the present. Although occasionally employed in Europe, it is essentially a local drug.

The bark should be collected in the autumn, when its hydrocyanic odor and taste are the most perceptible, and that of the root, moreover, is said to be preferable to that of aerial portions; but it is an abundant and cheap drug, largely called for in domestic and other informal

medicine, and apparently indiscriminately gathered. Much of it is nearly devoid of its proper odor. The Pharmacopœia description is as follows: "In curved pieces of irregular fragments, one-twelfth of an inch (2 mm.) or more thick, outer surface greenish brown, or yellowish brown, smooth, and somewhat glossy, marked with transverse scars. If collected from old wood and deprived of the corky layer, the outer surface is nut-brown and uneven; inner surface somewhat striate or fissured. Upon maceration in water it develops a distinct bitter-almond odor; its taste is astringent, aromatic, and bitter. The bark of the small branches is to be rejected." The spurious bark of the choke-cherry is much thinner and tougher, consisting largely of bast fibres, which are lacking in the genuine.

Wild-cherry bark contains substances analogous to the *emulsin* and *amygdalin* of bitter almonds. Upon being macerated in water and subjected to distillation it yields *hydrocyanic acid*, and a *volatile oil* having the properties of that of almonds. It also contains *tannic acid*.

Wild cherry is used as a sedative bitter tonic and a sedative expectorant; the sedative property due to its hydrocyanic acid, the bitter probably to its amygdalin only. It is somewhat astringent.

The above qualities express its entire value as at present understood. As a substitute for quinine it is entirely obsolete. Dose from 2 to 4 gm. (3 ss. ad i.). The fluid extract (*Extractum Pruni Virginiana*, strength $\frac{1}{4}$) and the infusion (*Infusum Pruni Virginiana*, strength $\frac{4}{100}$) are official, and represent it well. The syrup (*Syrupus Pruni Virginiana*, U. S. P., 15 per cent.) is frequently used as a basis for cough mixtures; its taste is rather pleasant.

ALLIED PLANTS.—See *Almonds, Bitter and Sweet*.
ALLIED DRUGS.—Cherry-laurel leaves, Peach seeds, and also Almonds and Hydrocyanic Acid.

W. P. Bolles.

CHEST, DEFORMITIES OF THE.—The chest is a box or cage enclosing and protecting the heart, lungs, and great vessels; but it is also an organ, which by its rhythmical expansion and contraction plays an important part in the respiratory act. It consists of the thoracic skeleton and of the soft parts covering it; but the position of the clavicles, scapulae, and shoulders is so closely related to the shape and development of the chest as to require some discussion in this article.

The size, shape, and mobility of the chest vary with the race, age, sex, development, occupation, and idiosyncrasies of the individual, and it is as difficult critically to define its normal limits as it is those of the nose, ear, or any other organ or part. It is often impossible to say when normality becomes peculiarity, or peculiarity deformity.

According to Vierordt,¹ one expects to find in a well-constructed thorax, bilateral symmetry, slightly marked supraclavicular depressions, and a barely recognizable prominence at the junction of the manubrium and corpus sterni. The true ribs should so leave the sternum that there is increasing obliquity from above downward, making the angle between their free borders almost a right angle. The thorax should be well developed, and the scapulae should lie flat upon the back; only the lower intercostal spaces should be visible. The dimensions of the chest should be proportionate to the size and development of the body, and in adult life its transverse diameter should exceed its antero-posterior in the ratio of three to two or less. Vierordt's Tabellen² give various chest measurements according to the most reliable observations. The mean value of chest play, or the difference in chest circumference between inspiration and expiration, is thus given as three or four inches. According to Lee,³ the average expansion of eight hundred United States recruits was three and four-fifths inches.

Departures from the typical standard are very frequent, and may be quite marked in perfectly healthy persons. The two sides are rarely perfectly symmetrical; indeed, Vierordt himself says in another place that in right-

handed people the right semicircumference of the chest is the larger by .5 to 2 cm.; in the left-handed, on the contrary, the left semicircumference of the chest is equal to or but slightly greater than the right. The chest may be small above and wide below; the angle of Louis may be more than usually prominent, and the epigastric angle exceptionally acute. The supraclavicular fossae may be marked, without disease; but if they are unequal, apical tuberculosis may be suspected. Certain ribs, as the second, third, and fourth, may project in front, or the lower ribs may be depressed. All these peculiarities are more or less atypical without being exactly abnormal.

The broad chest of man with the square shoulders, and scapulae placed posteriorly, correlated with the upright posture and pendant, but freely mobile and active arms, is one of the most characteristic and striking peculiarities of the human skeleton. According to Hutchinson,⁴ this position of the scapulae is a very important factor in the development of respiratory power. Human respiration is, or should be, bellows-like, the fixed flap being the spine and posterior chest wall, rather than piston-like, as it often is in cramped or rigid chests.

In the human embryo at the fourth month the quadrupedal or deep chest, with the antero-posterior diameter exceeding the transverse, still persists; at birth these diameters are nearly equal. The infant is round-chested and round-bellied, and only after three or four years of age do the chest and abdomen begin to assume the more flattened shape characteristic of adult life. In adult man the proportions of the chest are the reverse of those in the quadruped, the transverse exceeding the antero-posterior diameter in the ratio of three to two or less. Of the quadrupeds only certain monkeys, moles, and bats, all animals possessing great power and freedom of motion in the anterior extremities, have broad chests. The evolution of the human chest may be arrested before it is complete, either from congenital defect in growth or vigor or from faulty habits in childhood; we then get a long, rounded chest, a degenerate or rudimentary type, and one often associated with other defects, as will be pointed out in the sections on the phtisical chest and on round back.

Chest deformities may be divided for convenience of discussion into four groups:⁵ the congenital; those due to static conditions, whether pathological or not; those due to external constriction or pressure; and those due to conditions of the internal organs. Deformities of the chest due to violence, to new growths, to local disease, or to double or non-viable monstrosities, are beyond the scope of this article.

I. CONGENITAL DEFORMITIES.

The individual bones of the chest may be imperfect or wanting, fissured, misshapen, or augmented, and the thoracic skeleton may be deformed as a whole.

Spine.—The thoracic spine, like the cervical and lumbar, may contain too many or too few vertebrae. Dwight⁶ states that since he has been looking for such anomalies, he has found them with surprising frequency. The commonest anomaly of number in the dorsal region is to have eleven or thirteen vertebrae present. Noble Smith⁷ quotes a case in which four and one-half thoracic vertebrae were absent, namely, the right half of the third, the fifth, the sixth, the eighth, and the ninth. There were only two cervical vertebrae present in this case. Wedge-shaped half vertebrae on one side or the other, as in the above case, are not extremely rare; or a vertebral body may be made up of two unfused halves. The arches may be incomplete—*spina bifida*,—a condition which may extend to a great part or the whole of the spine, and is then called *rhachischisis*, with which, as with ordinary *spina bifida*, protrusion of a sac and various anomalies of the soft parts frequently occur. In these cases various abnormal and often extreme bendings and curves of the spine and accompanying chest deformities are often seen. The best recent article on *rhachischisis* is that by Thorn-dike.⁸

It is well for bone specialists to remember, and probably for others to forget, the possibility of anomalies in number when counting vertebrae in the living subject; also that one or more spinous processes may be bifid, or project to one side or posteriorly without pathological significance.

Sternum.—According to Dwight,⁶ the sternum is about 9.5 per cent. of the total height for men and about nine per cent. for women. It may be entirely or partially absent, or more or less fissured longitudinally or perforated. These defects, like the unclosed arches of a *spina bifida*, are due to the failure of the primitive layers to unite in the median line. When large the gap is covered by a membrane; when small it may be entirely unnoticed during life. Holes, fissures, and defects are more common and of greater extent toward the upper part of the sternum. The xiphoid is often deflected, split, or perforated.

Ribs.—Supernumerary ribs may occur, especially in the lower cervical and upper lumbar regions. Cervical ribs on one or both sides may sometimes be palpated at the root of the neck during life, and may cause trouble by pressure on the brachial plexus and require removal. In these cases the pleural sac may rise abnormally high, and has been opened (Planet⁹). Ribs may also be absent or rudimentary. Hurler¹⁰ reports five cases of rudimentary first ribs in English, and Helm¹¹ sixteen cases in general surgical literature. Cases occasionally occur in which several ribs on one side with their costal cartilages are imperfectly developed and fail to meet and unite with the sternum, or in the case of the lower ribs with the cartilage above, by varying intervals. They may end near the sternum or free border, below the axilla, or farther back, leaving a depression or furrow of greater or less extent to one side of the sternum, or in the lateral chest wall, covered only with skin and membrane, which may rise and fall with respiration, pulsate with the heart beats, and through which the underlying organs may be palpated. Through this unprotected area the lung may protrude, or if in the precordial region an *ectopia cordis* may take place. When such a tendency exists the gap

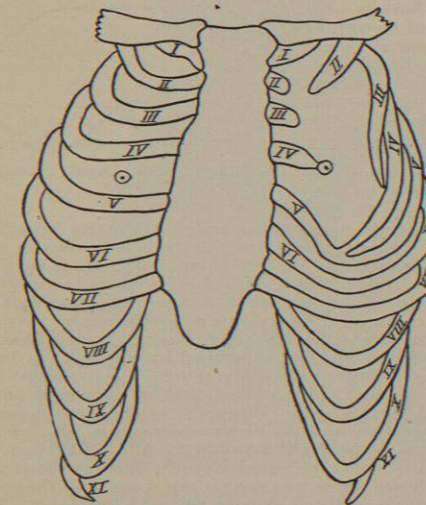


FIG. 1247.—Osborne's Case of Defect of Ribs. (From Haynes.)

should be protected by a celluloid, hard-rubber, or metal plate, and pulmonary hernias have been known to recede under such treatment, or to disappear spontaneously. These defects of the skeleton of the chest wall are due to an arrest of growth of fetal structures, which fail to join by a larger or smaller interval.

The following cases are cited as examples of this deformity:

Abercrombie's¹² case was a boy of two months, with absence of the second and third costal cartilages, left side; the corresponding ribs ended free, leaving a small unpro-

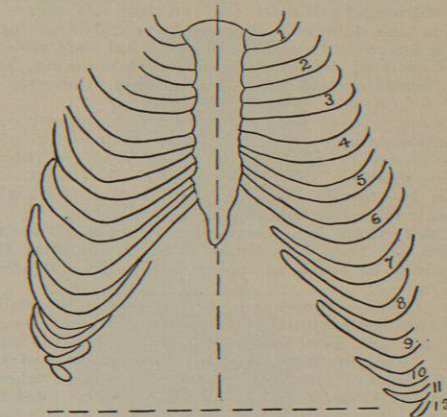


FIG. 1248.—Haynes' Case of Defect of Lower Ribs on the Left Side. (From Haynes.)

TECTED space. The fourth rib lay near its cartilage, but was not joined to it. There was a notch on the left side of the sternum near the third interspace.

Bennett's¹³ case was that of a man who died suddenly after an injury. The autopsy disclosed a defective third rib, right side, which failed to reach its cartilage by a considerable interval. This case and another reported by Bennett emphasize the danger of mistaking certain congenital chest deformities for the effect of injury, recent or remote.

Osborne's¹⁴ case was a boy with a triangular depression on the left side of the chest due to defective development of the second, third, and fourth ribs, which were separated from their cartilages by a considerable interval. The extremity of the fourth rib was joined to the fifth costo-cartilaginous articulation.

In Townsend's¹⁵ case the ribs of the left side, except the first two, were represented by short rudimentary processes.

Lallemand's¹⁶ case was a man with a depression as big as a fist on the left side of the chest, due to a deficiency of the third, fourth, and fifth ribs.

Harold's¹⁷ case was a backward boy of seventeen years, whose costal cartilages in the left side below the fifth rib were missing; at this level the left half of the sternum and xiphoid were deficient, and the pericardium was protected only by soft parts.

Homer Gage¹⁸ reported a case of congenital absence of the sixth, seventh, eighth, ninth, and tenth ribs, left side, in a girl of seventeen years. There was severe lateral curvature, convexity to the right, with severe deformity of the chest, and a protrusion in the unprotected area, supposed to be due to a hernia of the stomach. The heart was displaced to the right, though the viscera were not transposed.

In Hayne's¹⁹ case the cartilage of the seventh rib, left side, ended three-fourths of an inch from the sternum, and the seventh, eighth, and ninth cartilages were not joined, but ended free.

Sometimes the costal defect is accompanied by total or partial absence of the greater and smaller pectoral muscles of the same side, as in the case reported by Levy,²⁰ in which the third and fourth ribs of the right side ended below the axilla, leaving a marked depression. There was a well-marked lateral curvature with convexity toward the right.