CLIMATE OF AUGUSTA, GEORGIA, LATITUDE, 32° 28′ N.; LONGITUDE, 81° 54′ W.

	Jan.	Feb.	March.	April.	May.	June.	July.	August.	Sept.	Oct.	Nov.	Dec.
Temperature:												
Average or normal for 29 years	47	50	56	64	73	79	81	79	75	64	54	48
Average daily range for 20 years	18.1°	19.4°	21.4°	22.°	21.9°	19.9°	19°	18.3°	18.5°	20.8°	20.7°	19.5°
Mean of warmest for 29 years	56	58	62	69	77	83	85	84	79	71	60	57
Mean of coldest for 29 years	39	38	50	59	69	74	78	76	70	58	48	38
Highest or maximum for 29 years	80	84	89	93	100	103	105	105	101	94	85	78
Lowest or minimum for 29 years	6	3	22	29	41	46	57	58	41	29	23	7
Average date of last killing frost for 29 years, March 18th.												
Average date of first killing frost for 29 years, November 8th.												
Humidity:												
Average relative for 5 years	74	71	70	66	66	70	76	80	74	74	78	76
Average absolute for 5 years	2.457	2.550	3.414	3.936	5.555	7.441	7.980	8.240	6.563	4.372	3.539	2.366
Precipitation:												
Average in inches for 29 years	4.35	4.30	4.97	3.48	3.28	4.50	5.52	5.27	3.80	2.42	3.08	3.36
Wind:												
Prevailing direction for 29 years	W.	W.	W.	W.	S.E.	S.	S.E.	N.E.	N.E.	N.E.	N.E.	W.
Average velocity in miles per hour	4.5	7.0	7.0	6.5	5.8	5.4	5.1	5.0	5.2	6.2	5.5	6.0
Weather:												
Average number clear and fair days for 5 years	20	18	22	23	25	23	23	23	23	25	22	21
Largest number clear days for 5 years	19	23	22	25	28	29	26	26	27	27	25	24
Smallest number clear days for 5 years	16	14	12	22	22	23	19	18	21	21	19	19
Average number cloudy days for 5 years	11	10	9	7	6	7	8	8	7	6	8	10
Largest number cloudy days for 5 years	15	14	19	8	9	7	12	13	9	10	11	12
Smallest number cloudy days for 5 years	12	5	9	5	3	1	5	5	3	4	5	7
Average number rainy days for 29 years	11	10	10	8	8	11	12	13	7	7	8	9
Smallest number rainy days for 5 years	7	2	9	7	3	6	8	10	5	2	5	6
Largest number rainy days for 5 years	13	14	15	11	13	15	13	19	8	8	13	11

The temperature, in the winter months, not infrequently drops below the freezing point and thin ice is formed, but the changes are not usually abrupt and the cold does not continue long. Only once, in thirty-five years' experience, have I known the mercury to register as low as 5° above zero. The climate of Augusta may be summarized as moderately dry, mild, and equable.

Dr. Richards, in an article in the first edition of this work, calls attention to the fact that the census for 1880 shows the percentage of deaths from consumption to be, for Georgia, 11.14 per 10,000 inhabitants; and the eleventh census shows a similarly small death rate for this disease. Rheumatic and asthmatic cases almost invariably do well here. Its lower altitude makes this region superior to Denver for cardiac cases and tuberculous cases complicated by heart lesions; and it is superior to Florida in that the climate is less debilitating.

When I began the practice of medicine here, I was struck with the comparative rarity of renal diseases, and a riper experience confirms my first observation. This may be explained, in my opinion, by the freestone drinking water, the simplicity of living, and the equable temperature. Be the explanation what it may, it is a fact that renal diseases are comparatively infrequent, and that cases of this class are benefited when brought here, unless the disease has already so far advanced that relief is impossible.

Thomas D. Coleman.

AURICLE, ANATOMY AND PHYSIOLOGY OF.—The auricle or pinna forms with the auditory canal or meatus the external ear. It is placed on the side of the head about midway between the external angle of the eye and the occipital protuberance; the upper border is about on a level with the eyebrow; the lower edge of the lobe is about on a level with the tip of the nose. Its vertical line is parallel to the ramus of the jaw and forms an angle of about 100 or 105 degrees with the horizontal plane of the head. Those ears in which this angle exceeds 112 degrees are called slanting ears. In height the auricle measures from 55 to 60 mm., and in width from 25 to 35 mm. The height of the auricle is generally found to be equal to the length of the nose. The true length of the auricle varies in man from 22 to 49 mm., the average being 35.9 mm.; in woman it varies from 24 to 41 mm., the average being 33.7 mm. The true width * of the auricle varies in man from 33 to 58 mm., the average being 44.4 mm., while in woman it varies from 30 to 61 mm., the average being 40 mm. The anterior third of the auricle is firmly attached to the root of the zygoma and to the squamous and mastoid surfaces of the temporal bone by means of ligamentous, muscular, and cutaneous tissues. The posterior two-thirds is free and is placed so as to form with the lateral surface of the head the cephalo-auricular angle which, opening backward, measures on an average from 30 to 40 degrees, and may vary between 0 and 90 degrees; the angle decreasing in size as it passes upward and forward.

The *framework* of the auricle consists of convoluted folds of yellow reticulated cartilage, from 1 to 2 mm. in thickness, and is covered by its perichondrium. It supports the glandular, vascular, muscular, and cutaneous tissues of the auricle. The cartilage does not enter into the construction of the lobule and is deficient between the tragus and the spina helicis.

The auricle may be considered to be an expansion of the external auditory canal, which it surrounds, and especially so above and behind. It is oval in form, with the longest axis vertical and its broadest extremity above. It has two surfaces—an external and an internal—and a circumferential border. The external surface looks obliquely outward, forward, and slightly downward. It is so folded upon itself that it presents a number of elevations and depressions, which give it a most irregular and characteristic appearance. The outer surface is as a whole concave, while the inner is convex, and the depressions and elevations of one surface correspond in a general way to the elevations and depressions of the other.

The border of the auricle—that is, the upper third of the anterior portion, all of the superior portion, and the upper two-thirds of the posterior portion—is rolled in upon itself and forms the most prominent elevation or crest on the external surface of the organ. It is called the *helix* (Fig. 432, 1, 2, 3). It begins in a thin root, the *crus helicis* (Fig. 432, 1), in the cavity of the concha, and passes obliquely upward and forward, and then in a semicircle upward, backward, and downward, to terminate in a free extremity, the *processus helicis caudatus* (Fig. 433, 2), at the *sulcus helicolobularis* (Fig. 432, 15). The *crista helicis* divides the concha into two parts—the upper and smaller, the *cymba conchæ* (Fig. 432, 19), and the lower and larger, the *cavitas conchæ* (Fig. 432, 20), which is continuous with the external auditory canal. By the incurving of the helix a groove is formed beneath it—the *fossa of the helix*. This groove is well marked in its ascending portion, and gradually becomes shallow as

* The terms "true length" and "true width" are explained further on.

it passes backward, and downward. A small spine, the *spina helicis* (Fig. 433, 1), is given off from the ascending portion of the helix. It serves to give a firm attachment to the attrahens auriculum muscle. This spine, as well as the *processus caudatus helicis*, is only to be seen when the cartilage is denuded of its coverings. At the junction of the horizontal portion of the helix with the descending portion we have a tubercle known as the *Darwinian Point* or *Tubercle* (Fig. 432, *c*), which possesses much morphological importance, as will be shown below. It corresponds to the ear tip of animals.

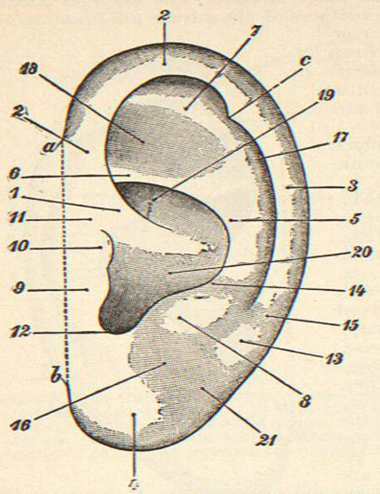

FIG. 432.—Auricle of a Man. (After Schwalbe.) *ab*, Base of the auricle; *abc*, triangle of the auricle; *c*, Darwinian point or tubercle; 1, crus helicis; 2, 2, ascending (anterior upper) portion of the helix; 3, descending (posterior) portion of the helix; 4, lobule; 5, main portion of the antihelix; 6, crus inferius anthelicis; 7, crus superius anthelicis; 8, antitragus; 9, tragus; 10, tuberculum supratragicum; 11, sulcus auris anterior (incisura trago-helicina); 12, incisura intertragica; 13, tuberculum retrolobulare of His; 14, sulcus auris posterior (incisura anthelicis); 15, sulcus helicolobularis; 14 + 15, sulcus obliquus of His; 16, sulcus supralobularis; 17, fossa navicularis or scaphoidea; 18, fossa triangularis; 19, cymba conchæ; 20, cavitas conchæ; 21, sulcus retrolobularis.

A second eminence or crest, the *antihelix* (Fig. 432, 5), begins in the upper anterior portion of the fossa helicis, in two converging crests, the *crura furcata*, or the *crus inferius anthelicis* (Fig. 432, 6), and the *crus superius anthelicis* (Fig. 432, 7). It passes downward and backward in front of the descending portion of the helix. The depression which is formed between the two crests is known as the *fossa navicularis* or *fossa scaphoidea* (Fig. 432, 17). The depression between the crura furcata is called the *fossa intercruralis* or *triangularis* (Fig. 432, 18). The antihelix is separated, by the sulcus auris posterior (incisura anthelicis, Fig. 432, 14), from a rounded eminence—the *antitragus* (Fig. 432, 8),—and in front of this eminence, and separated from it by that portion of the cavity of the concha which is called the *incisura intertragica* (Fig. 432, 12), is a lid-like covering to the auditory canal—the *tragus* (Fig. 432, 9). It is separated from the root of the helix by the *sulcus auris anterior* or *incisura tragohelicina* (Fig. 432, 11).

The most dependent part of the auricle, which is devoid of cartilage and is made up principally of connective and adipose tissues, is called the *lobe* (*lobulus auricularis*) (Fig. 432, 4).

On the inner surface the elevations, as they correspond to the depressions on the outer surface, have received similar names, and are known consequently as the *eminentia fossæ scaphoideæ vel triangularis* (Fig. 433, 7); the *eminentia fossæ navicularis* (Fig. 433, 11); and the *eminentia conchæ* (Fig. 433, 8). From the posterior inferior border of the latter eminence arises a crest, the *ponticulus* (Fig. 433, 10), which passes obliquely downward and forward to the *incisura terminalis* (Fig. 433, 12); and to this crest is attached the retrahens auriculum muscle.

In a like manner the following names have been given to the depressions on the inner aspect of the auricle: the *fossa anthelicis*, (Fig. 433, 5); the *sulcus anthelicis transversus* (Fig. 433, 6); the *sulcus cruris helicis* (Fig. 433, 9); and the *fissura antitrago-helicina* (Fig. 433, 13).

To aid in holding the cartilaginous folds in place and in uniting the auricle to the head, two sets of *ligaments* are provided—the intrinsic and the extrinsic.

The *intrinsic ligaments* are four in number: two are on the inner surface of the auricle and unite the eminentia conchæ with the eminentia triangularis, and also with the eminentia fossa navicularis. The other two are on the outer surface. One unites the antitragus with the processus caudatus helicis and the antihelix, and so fills in the sulcus auris posterior. The fourth extends from the tragus to the helix, and gives off a fasciculus which is inserted in the external auditory canal. It in great measure fills up the incisura intertragica.

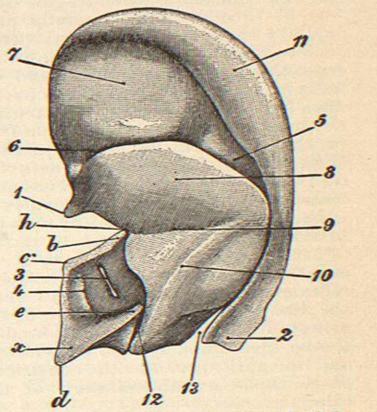

FIG. 433.—Cartilaginous Framework of the Human Auricle (Inner Surface). (After Schwalbe.) *bc*, Upper border of the cartilaginous furrow for the blood-vessels; *cd*, anterior medial border; *de*, posterior medial border; *x*, processus triangularis; *h*, angle of the anterior margin of the concha; 1, spina helicis; 2, processus helicis caudatus; 3, lateral bipartite Santorinian incisura; 4, medial Santorinian incisura; 5, fossa anthelicis; 6, sulcus anthelicis transversus; 7, eminentia fossæ triangularis; 8, eminentia conchæ; 9, sulcus cruris helicis; 10, ponticulus; 11, eminentia fossæ navicularis; 12, incisura terminalis; 13, fissura antitrago-helicina.

The *extrinsic ligaments* are: the anterior, divided into a superior and an inferior fasciculus, which extend from the root of the zygoma to the tragus and to the spina helicis; the posterior, which extends from the mastoid process to the posterior surface of the concha; and, finally, a fasciculus which extends into the external auditory canal.

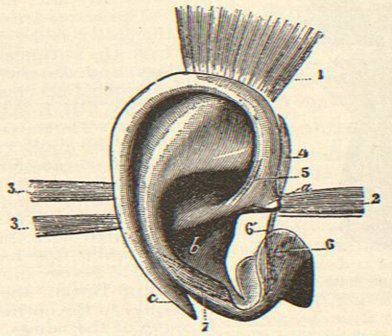
FIG. 434.—Muscles of the Auricle as Seen on the External Surface.

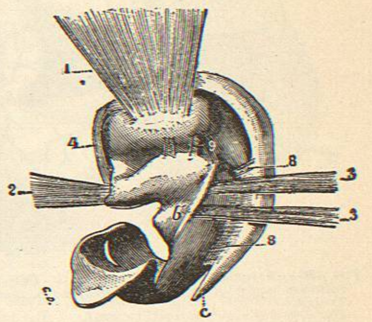
FIG. 435.—Muscles of the Auricle as Seen on the Internal Surface.

FIGS. 434 AND 435.—1, The attolens auriculum or musculus auricularis superior; 2, the attrahens auriculum or musculus auricularis anterior; 3, 3, the retrahens auriculum, or musculus auricularis posterior; 4, the helicis major; 5, the helicis minor; 6, the tragicus, with 6′, its accessory fasciculus; 7, the antitragicus; 8, the transversus auricular; 9, the obliquus auriculæ; *a*, spina helicis; *b*, concha, with *b*′ its posterior thickening or ponticule; *c*, spina caudatus helicis. (After Testut.)

The *muscles* of the auricle are also divided into the intrinsic and the extrinsic group. The first group consists of: I., the *helicis major* (Fig. 434, 4), which extends from the spina helicis to the ascending portion of the helix and the integument covering it; II., the *helicis minor* (Fig. 434, 5), which extends from the root of the helix to the ascending portion of the helix; III., the *tragicus*, a quadrilateral bundle of fibres attached to the external surface of the tragus by two sets of fibres—one of them running laterally and another vertically, while a small bundle of the latter extends to the spina helicis (Fig. 434, 6, 6′); IV., the *antitragicus*, which passes from the antitragus upward and backward to the antihelix and the helix near the spina caudatus helicis (Fig. 434, 7); V., the *transversus auriculæ*, which extends on the inner surface of the auricle from the lower portion of the eminentia navicularis to the eminentia conchæ (Fig. 435, 8); VI., the *obliquus auriculæ*, which consists of two or three fasciculi and extends from the eminentia fossæ triangularis to the eminentia conchæ (Fig. 453, 9).

In man these muscles are merely rudimentary, while in animals they serve, first, to modify the general form of the auricle so as to allow, at pleasure, the manner and the amount of force with which the sound waves are reflected toward the auditory canal; second, to modify the dimensions of the entrance to the auditory canal, so as to influence the amount of sound which is to penetrate to the membrana tympani. The muscles of the tragus and the antitragus are the constrictors, and the muscles of the helix are the dilators, of the external auditory canal.

The second or extrinsic group of muscles of the auricle are: I., the *attollens auriculum*, or *musculus auricularis superior*, which arises from the epicranial aponeurosis, passes downward and with fibres converging, and is inserted into the eminentia triangularis (Figs. 434, 435, 1); II., the *attrahens auriculum*, or *musculus auricularis anterior*, which also arises from the cranial aponeurosis above the zygoma, passes backward, and is inserted into the spina helicis (Figs. 434, 435, 2); III., the *retrahens auriculum*, or *musculus auricularis posterior*—a muscle which is composed of two or three fasciculi that arise from the mastoid process, pass forward, and are then inserted into the ponticulus (Figs. 434, 435, 3). These muscles are also for the most part rudimentary in man, but, when they are capable of voluntary action, the first draws the auricle upward, the second forward and upward, and the third

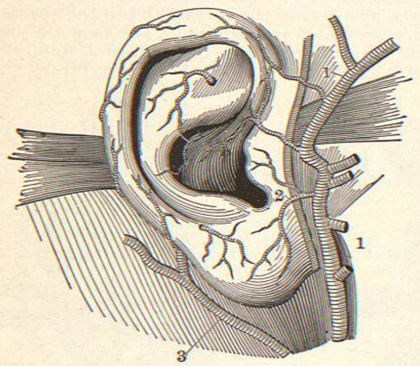

FIG. 436.—Arteries of the Auricle. 1, The superficial temporal; 2, inferior anterior auricular branch; 3, posterior auricular. (After Testut.)

backward. In animals these muscles serve the important function of directing the auricles toward the source of the sound.

The *skin* which covers the auricle, except for its greater delicacy is of the same general construction as that of the surrounding region, with which it is continuous. Owing to a greater development of its subcutaneous connective tissue on the external surface of the auricle, it is more firmly attached to it than on the inner surface. Except in the lobe of the ear it is destitute of fat; on the other hand, it is well supplied with lymphatics, especially so on its inner surface. The *sebaceous glands* scattered over the surfaces of the auricle are found more numerous in the concha and in the fossa triangularis. *Sudoriferous glands* are also to be found on the surfaces of the auricle.

The *arteries* which supply the auricle are derived from the superficial temporal (Fig. 436, 1), and the posterior auricular (Fig. 436, 3), both of them branches of the external carotid. From the first are derived the *superior anterior*, the *middle anterior*, and the *inferior anterior auricular* branches, which supply the anterior portion of the external surface of the auricle (Fig. 436, 2). From the second are derived the *posterior auricular* branches, three or four in number, which supply the posterior two thirds of the auricle, both on its inner and on its outer surface. These arteries are divided into two sets of branches, one set of which pass superficially on the inner surface of the auricle to its border and thence over it to the outer surface, while the other set penetrate through from the inner surface to the outer and furnish the blood supply for the structures of the concha, the antihelix, and the lobule (Fig. 432, 4, 5). Free anastomosis takes place between all of these various branches.

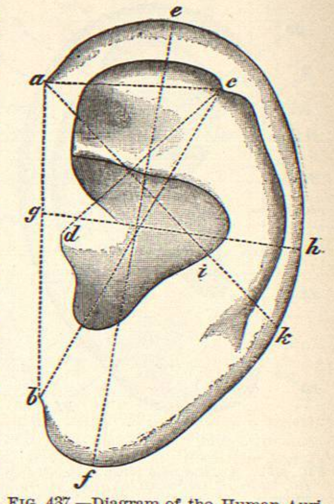

FIG. 437.—Diagram of the Human Auricle, Showing Its Chief Dimensions. (After Schwalbe.) *ab*, Base of the auricle, true breadth; *cd*, true length of the auricle; *ef*, maximum length; *gh*, maximum breadth; *acb*, triangle of the auricle. The line *ak*, is the dividing line between the region of the auricular eminences (*aikfb*) and that of the free fold (*aikce*).

The surface of the auricle is almost everywhere covered with fine soft lanugo hairs, but in the region of the meatus and of the tragus and antitragus, there are apt to be—especially later in life—some very stiff and wiry hairs.

The *nerves* are of two kinds, the sensory and the motor; the latter being derived from the facial and the former from the auricular temporal branch of the inferior maxillary, and also from the temporo-auricular branch of the superficial cervical plexus.

The TRUE AURICLE is to be found only in the mammalia. The movable fold of skin which covers the opening to the auditory canal of such animals as the crocodile is by no means homologous with the auricle of the mammalia; a greater likeness is to be seen in the movable flap of skin to be found in such birds as the owl. On the other hand, the auricle of *man* is but poorly developed when compared with that of most animals, *e.g.*, the kangaroo, the rabbit, the hare, the carnivora, in all of which the auricle is very highly developed, while in the long-eared bat of Britain the surfaces of both auricles are together equal to the entire surface of the rest of the body exclusive of the wings.

To make a comparison between the auricles of man and those of animals it is necessary to have certain fixed points as a means for such comparison. For this purpose we take the true tip of the auricle (Fig. 437, *c*) for one point, and the extremities of the base of the auricle, which corresponds to the front line of its insertion, for two other points (Fig. 437, *a*, *b*). The triangle formed by

joining these points (Fig. 437, *a*, *c*, *b*) is designated by Schwalbe as the auricular triangle, and is the foundation for comparison between the auricles of all the mammalia. A straight line drawn from the true tip of the auricle (Fig. 437, *c*) to the incisura auris anterior (Fig. 437, *d*) strikes the basal line of the auricle close above the tragus; the distance between these two points being the true length of the auricle, while the distance between the two extremities of the basal line of the auricle is its true breadth. That this is the correct index for measurement is seen at once when the auricle of man is compared with that of the baboon and of the ox, by superimposing the outline drawings of the reduced auricles of these over that of the human auricle, in such a manner that the basal line or true breadth of the auricle of all three will be of the same size (Fig. 438). The distance between the two points (c^2–d) is the true length of the auricle of the ox and is extraordinarily greater than that of the baboon (c^1–d), which is itself much larger than that of the human auricle (c–d). However, this noticeable reduction in length is not true of some other measurements. This can be demonstrated if the straight line (Fig. 437, *a*–*i*–*k*) be drawn from the upper insertion point of the auricle to the sulcus auris posterior, at about a right angle to the line which represents the true length of the auricle. The first line divides the auricle into an upper or apical region, and a lower or basal region. The latter (Fig. 437, *a*, *i*, *k*, *f*, *b*) is designated by Schwalbe as the region of eminences or the conservative portion, and the former (Fig. 437, *a*, *i*, *k*, *c*, *e*) as the free auricular fold, or the variable portion. In the ape and especially in man the conservative portion is well marked, while in the majority of all other mammalia it is drawn into the funnel-shaped entrance of the external auditory canal.

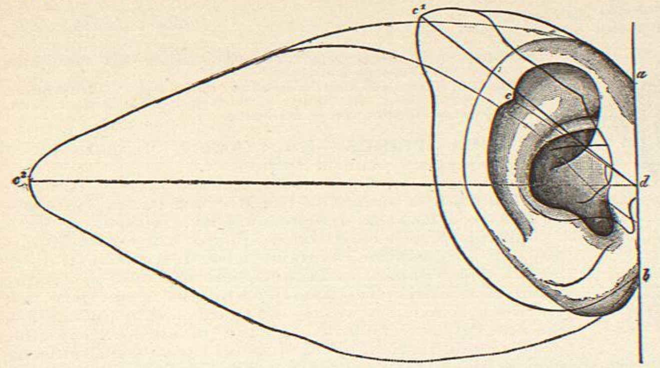

FIG. 438.—The Human Auricle and Those of the Cynocephalus (a Species of Ape) and the Ox, So Arranged as to Show Their Relative Sizes and Shapes. (After Schwalbe.) *acb*, Auricle of the human being (drawn in detail); ac^1b, that of the ape (drawn simply in black outline); ac^2b, that of the ox (drawn in dotted outline); dc, dc^1, dc^2 represent the relative lengths of the three auricles.

It is in the apical portion of the auricle of man that the greatest change occurs. First, there is the marked involution of the free border of the ear in the formation of the helix. In animals only the beginning of the helix is involuted and the auricular tip occupies its highest point. In the higher order of apes the incurving of the helix is completed as far as the tip of the auricle, and in the genus cercopithicus the auricular tip is moved down on the posterior auricular border (Fig. 439, *a*), while in the chimpanzee (Fig. 440) we find a beginning involution of this border. Second, the development of the crus superius anthelicis is connected with the progressive diminution of the human auricle, for if the human auricle is compared with that of the lemur, we find, in the latter, that of the entire antihelix system, only the crus anthelicis inferius (Fig. 441, *b*) and the very lowest part of the antihelix (Fig. 441, *c*) are developed. This last part is an extension of the antitragus, and these two crests are entirely disconnected. A third important point for comparison is the auricular lobe, which exists in man as a loose fleshy convex portion, pendant and free from cartilage. In a few apes the under border of the auricle is convex, but contains for the most part the broad cartilaginous continuation of the helix; only a small space beneath the incisura intratragica being free from cartilage. This is the first indication of the lobe, which exists only in man and the anthropoid apes.

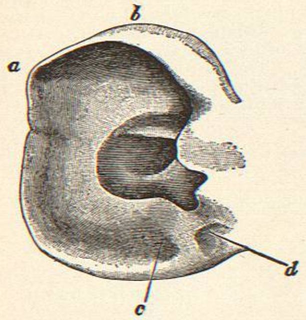

FIG. 439.—Auricle of Cercopithecus Cynosurus. (After Schwalbe.) *a*, True auricular tip; *b*, highest point of auricle; *c*, lower end of the fossa navicularis; *d*, area lobularis; between c and *d* there is a rounded eminence which springs, on one side, from the cartilaginous cauda helicis and extends to the antitragus.

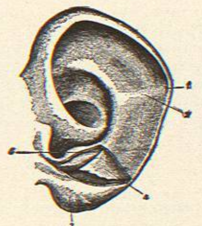

FIG. 440.—Left Auricle of a Chimpanzee. (After Schwalbe.) In the vicinity of the antitragus and the cartilaginous cauda helicis the skin has been removed. At this point the cartilage of the antitragus, the musculus antitragicus and the cauda helicis, can be seen. 1, Tubercle of Darwin's auricular tip: 2, crus anthelicis tertium; 3, lobule; 4, cauda helicis; 5, musculus antitragicus. (Reduced in size.)

Variations from the normal, as regards the dimensions, the form, or the inclination of the auricle, are sometimes observed.

Variations as to the dimensions of the auricle are to be considered from the individual standpoint as well as from a racial standpoint, and it is necessary to distinguish between the harmonious proportion which the width of the auricle bears to its length—*i.e.*, between long ears and broad ears—as well as between large ears and small ears. The proportion which the height of the auricle bears to its width is the physiognomical auricular index, while the proportion between the true length of the auricle and the true width of the auricle is the morphological auricular index. The first may be expressed mathematically by the formula $\frac{\text{width} \times 100}{\text{height}}$ and the second by the formula $\frac{\text{base} \times 100}{\text{length}}$. The first is a true index for comparison between the auricles of different individuals and races, but is of no use, as was shown above, when the auricle of man is compared with that of animals. It is then necessary to employ the second formula.

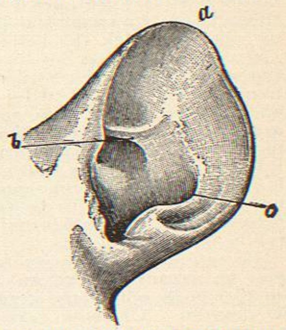

FIG. 441.—Left Auricle of Lemur Macao. (After Schwalbe.) *a*, Apex of the auricle; *b*, crista anthelicis anterior (= crus inferius anthelicis); c, crista anthelicis inferior.

Among races the Mongolians have the smallest auricles, those of Europeans are larger, and the negroes have the largest auricles. As we descend to the anthropoid apes, the gorilla, the chimpanzee, and the orangoutang, and so on to the lower types of mammalia, we find the auricles continue to grow in size, that is, according to the physiognomical index; but when we measure these same auricles according to the morphological index, the reverse is found to be true, *i.e.*, that man has the widest auricles in relation to their length.

Variations in the Form of the Helix.—These are the following: the failure of its posterior or even of its superior

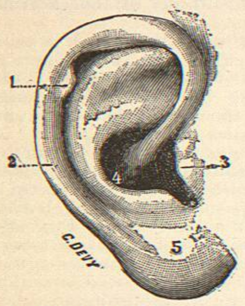

FIG. 442.—Tubercle of Darwin, Looking Forward and Downward, upon a Normally Involuted Helix—the Most Common Type.

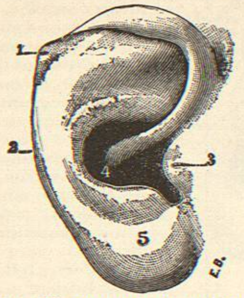

FIG. 443.—Tubercle of Darwin, Looking Backward and Upward upon a Helix Which is Imperfectly Involuted—Pointed Auricle.

FIGS. 442 AND 443.—1, Tubercle of Darwin; 2, posterior border of helix, normally involuted in Fig. 442, not involuted in Fig. 443; 3, tragus; 4, concha; 5, lobule. (After Testut.)

border to become inverted; the joining of the root of the helix with the antihelix; the division of the root of the helix into two or more branches.

Variations in the Antihelix.—Complete absence or greatly diminished size; an absence of its superior crus, or a doubling back of this crus and the consequent formation of an extra fossa.

Variations in the Tragus and Antitragus.—Attenuation or absence; division of antitragus into two tubercles.

Variations in the Lobe.—Very small size; adherence of its edge to the integument of the face; exaggerated vertical development; division into two parts, viz., an anterior and a posterior segment.

Tubercle of Darwin.—Of the many morphological anomalies, one of the most interesting is a projection, more or less marked, which appears on the free edge of the helix at the junction of its superior with its posterior border. It is sometimes found in the form of a simple tubercle or of a triangular plate. In the great majority of cases in which the helix is normally involuted, the Darwinian tip points downward and backward (Fig. 442); but when the posterior border of the helix is not involuted in consequence of arrested development it points upward and backward (Fig. 443), and the auricle terminates in a point as in those of animals. This last position indicates exactly its anatomical significance, but however it be placed on a helix that is involuted or upon one that is not, it is always homologous with the ear tip of animals. It is always to be found in the human embryo before the sixth month, at which time the helix begins to roll in.

Variations in the Inclination of the Auricles.—These may be, as noted above, an abnormal slanting auricle or an auricle in which the cephalo-auricular angle is over 50 degrees. All these variations from the normal are of interest to alienists and criminologists as they are to be found to a greater extent among the degenerate than among normally developed persons.

Physiological Function of the Auricle.—Darwin, Küpper, and others look upon the auricle as an appendage which has become useless in man. On the other hand, there are those who, like Gruber, believe that the auricle acts as a reflector and a conductor of sound waves toward the auditory canal. Weber believes it to be of service in locating the source of sound. Burnett considers that the auricle is a resonator; the region of the helix and its fossa resound to the deeper partial tones, the antihelix and its fossa to the intermediate partial tones, and the concha to the higher partial tones, and these tones are so blended by the auricle as to be received by the auditory nerve as a whole tone.

Robert Lewis, Jr.

The information furnished in the present article has been drawn largely from the following sources:—
L. Testut: Traité d'Anatomie Humaine. Paris, 1897. Third edition.
Karl von Bardeleben: Handbuch der Anatomie des Menschen. Jena, 1897. Das Aeussere Ohr, von G. Schwalbe.

AURORA SPRINGS.—Miller County, Missouri.

POST-OFFICE.—Aurora Springs.

ACCESS.—Viâ Jefferson City, Lebanon and Southwestern Railroad—a branch of the Missouri Pacific system—35 miles southeast from Jefferson City. Hotels.

This resort is located on a spur of the Ozark Mountains, at an elevation of about 1,000 feet above the sea level. The climatic conditions here are of a most salubrious and attractive character and the scenic beauties are unsurpassed. It was a visit to this locality which led Bayard Taylor to remark: "I have travelled all over the world to find in the heart of Missouri the most magnificent scenery the human eye ever beheld." The country may be described as a succession of narrow ravines, and well-wooded, high, dividing ridges, running in a general east and west direction, with picturesque streams of clear water winding through and cutting the ridges at right angles, forming narrow gorges, which have, coursing down their sides, sparkling rivulets and saucy brooks, fed by springs situated on the hillsides. The springs are located under a magnesium limestone formation at the entrance to a charming park and near the headwaters of Saline Creek. The surrounding country slopes gradually to the southeast, and is protected from the winter winds by the higher ground to the north, while the cooler breezes of the summer come from the south and west—down the Osage valley. There are numerous springs in the neighborhood, the principal ones being known as the "Round," the "Bluff," the "Healing," and the "Bath" spring. A sulphur spring is located about seven miles farther down Saline Creek. The Round spring has been analyzed by Prof. Clifford B. Richardson, analytical chemist, Department of Agriculture, Washington, D. C., with the following result:

ONE UNITED STATES GALLON CONTAINS:

Solids.	Grains.
Calcium sulphate	2.42
Magnesium chloride	6.95
Sodium chloride	4.01
Ferrous carbonate	5.13
Ferrous oxide	0.93
Lithia	1.43
Total	20.87

This water is almost a pure chalybeate. It has a sharp tonic effect on the physical economy, bracing up the digestion, promoting the appetite, and inducing healthful sleep and rest. Its best effects have been observed in cases of dyspepsia, rheumatism, scrofulous complaints, and renal diseases, and in the debility resulting from nervous affections and uterine complaints. Visitors will find excellent hotel accommodations and all facilities for hot, cold, and steam baths. *James K. Crook.*

AUSCULTATION. See *Chest Diseases, Physical Diagnosis of.*

AUSTRALIA.—No exhaustive description of the climate of this great continental island, extending from 10° to 40° south latitude, will be attempted here, even if the data were at hand for so doing. The articles upon *Melbourne, New South Wales,* and *Victoria* in the following volumes of this HANDBOOK discuss the climatic conditions of those regions. In the present brief notice only those portions of Australia which are of interest to health seekers, and especially to those suffering from pulmonary tuberculosis, will be considered.

In the first place, it must be remembered that the voyage to Australia possesses considerable value as a health measure; less so now, it is true, than in the days when one had to depend entirely upon sailing vessels. Furthermore, since the high-altitude treatment of consumption has come into favor, the benefits of a sea voyage for this class of patients have been somewhat lost sight of. In those earlier days the voyage to Australia or to New Zealand, around the Cape of Good Hope, was generally selected on account of its length. According to Weber ("Climate and Sea Voyages in the Treatment of Tuberculosis," Boston *Medical and Surgical Journal,* June 8, 1899), the following characteristics are to be attributed to sea voyages: (1) Purity of air; (2) slight range of temperature; (3) abundance of light; (4) constant movement of the air; (5) mental rest.

As this author, however, wisely remarks: "If one examines the conditions of an ocean voyage more exactly, he finds that these advantages are not always completely presented." The purity of the air is wanting in the sleeping cabins and saloons; the heat of the tropics is oppressive; the treatment of a serious illness on a sea voyage is difficult; and there are the storms and calms. "From what I have observed," concludes Dr. Weber, "I would give it as my opinion that sea voyages can do good service in a certain number of tuberculous cases, but that in most such cases other climatic and hygienic methods of treatment exercise at least just as good an influence." "If, however," continues Weber, "persons of strong constitution, who like sea voyages, develop phthisis under the influence of overwork or mental worry, long sea voyages are to be preferred to all other methods of treatment." This statement, as it appears to the writer, can scarcely be accepted without further qualification. (For a further consideration of this subject the reader is referred to "Ocean Voyages in Phthisis," by Dr. Parkes Weber, in *The Practitioner,* June, 1898; and to "Aero-Therapeutics" by C. Theodore Williams, 1894.)

The climate of those portions of Australia which one is likely to visit presents the following general characteristics: In summer the heat is apt to be at times excessive, frequently exceeding 100° F. at Melbourne, Sydney, and Adelaide; but the air is so dry that one is not rendered particularly uncomfortable by it, nor is it enervating. The hot wind which, "arising in the great central Australian desert, sweeps across the pastoral plains, rises over the range of mountains, and descends with fury upon the coast," may raise the temperature to 110° F. These hot winds are often followed by cold blasts from the Antarctic Circle—blasts which lower the temperature thirty or forty degrees in as many minutes. That such hot winds are not very frequent may be judged from the fact that Melbourne, for instance, has only fourteen hot wind days annually. There is the usual amount of dust, that inseparable accompaniment of a hot and dry climate. "In no country in the world," says Lindsay, "is the sky so seldom overcast, or the interruptions to the pursuit of business or pleasure so few." The winters are mild; "snow and frost are rare upon the lowlands and coast of Australia, and in many places are quite unknown." Lindsay enumerates three climatic regions: (1) the Littoral; (2) the Highland, and (3) the region of the Inland Plains.

The *Littoral,* where the principal cities are located, consists of a narrow strip of country, from 30 to 150 miles in breadth, which lies between the ocean and the mountains. Owing to the variability of the climate, the winds above mentioned, the heat, and the dust, this region—with the exception, perhaps, of a few sheltered spots—is not to be recommended to invalids.

The *Highland region,* embracing the mountain range of the Australian Alps and the Blue Mountains, which vary in height from 3,000 to 7,000 feet, extends from Queensland to South Australia. Many varieties of climate are represented in this region, but as yet there are but two or three resorts where proper accommodations can be obtained. These are: Mount Macedon, in Victoria, where is an excellent sanitarium; Bræmar Woodend, situated upon a plateau at an elevation of 2,500 feet, and connected with Melbourne by rail, 44 miles distant; and Catoomba and Mount Victoria, in New South Wales. The latter, at an elevation of 3,490 feet, is 77 miles from Sydney, and has a mean annual temperature of 53° F.

The *region of the Inland Plains,* whose climate is characterized by heat, dryness, and sunshine, is divided into two districts: the Riverina in New South Wales, and the Darling Downs. The Riverina is the centre of the sheep-farming industry. It is bounded on the west by the Central Desert, on the south by the Murray River, on the north by Queensland, and on the east by the Darling Downs, the second district of this region. In the Riverina the summer heat is severe, the thermometer occasionally rising to 110° F., but, on account of the extreme dryness, it is not much felt. "Hot winds and dust storms are frequent, but days of still, cloudless sunshine form the rule in summer." "In winter there is a little morning frost, but the midday is always warm. Autumn and spring present an almost ideal perfection of climate." Accommodations are afforded in the towns, especially at Deniliguin, and "almost every squatter's house has, or has had, its invalid visitant," where the young man with incipient phthisis works out his cure by adopting a pastoral life. There is railroad connection with Sydney and Melbourne from this district.

The Darling Downs have an altitude of 2,000 feet, and are somewhat cooler and less exposed to the hot winds; otherwise the climatic characteristics are similar to those of the Riverina. Accommodations can be obtained at the towns of Toowomba and Warwick; the former is 102 miles west of Brisbane. Droughts are not infrequent in these inland plains, and Hann mentions the report of a reliable person that at a station in Darling it had not rained for thirty months. At times much suffering is caused by the drought.

"Unquestionably the inland climate of Australia is highly beneficial for early phthisis," says Williams, "and can be strongly recommended to more or less vigorous patients with pastoral tastes, who are prepared to spend years in the recovery of their health." It is well to bear in mind, if one contemplates a trip to Australia, that our winter is their summer, and it is strongly recommended that the invalid should plan to arrive there in the winter or early spring rather than in summer.

For the geological formation, vegetation, and scenery of Australia the reader is referred to the general description of the country in books of travel, etc. For the information given above the writer is chiefly indebted to Lindsay's "Climatic Treatment of Consumption," London, 1887, and Williams' "Aero-Therapeutics," London, 1894. *Edward O. Otis.*

AUTO-INTOXICATION.—To the writings of Bouchard and his pupils is due much of the wide interest which during the past decade has been aroused in the subject of auto-intoxication. Bouchard's views, indeed, have not all received acceptance from later investigators, and in many phases the subject is still only an attractive and plausible hypothesis; but with each year new facts are evolved, especially from the domains of physiological and pathological chemistry, which in one place or another furnish the needed link to the gradually forming chain of evidence.

Albu defines auto-intoxication as a poisoning of the organism by the products of its own metabolism, which products may be either normal in character but excessive in amount, or abnormal in character. Among the abnormal products are to be distinguished those which under normal conditions would promptly undergo further change, and those which in the healthy organism are never found or are present only in minute quantities.

The human body is, to quote Bouchard, both a receptacle and a laboratory of poisons. They are contained in the