tion, with the collateral eminence just beyond (compare Fig. 735).

§ 217. *Indusium.*—This term (coupled with the adjective *griseum*) was given by Obersteiner (1892, p. 82) to the thin layer of cinerea upon the dorsal surface of the callosum. It has been discussed by Giacomini, Blumenau, and more recently by Fish, 1893, *a.**

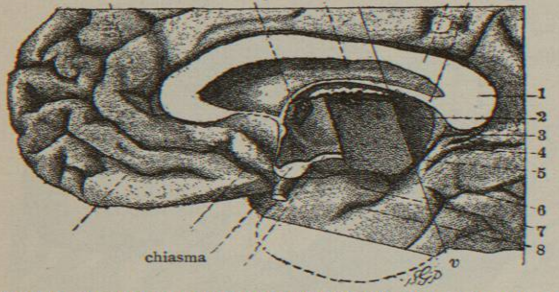

FIG. 743.—Mesal Aspect of Part of the Right Hemicerebrum of an Adult Hydrocephalus; 747. × .7. The dorso-ventral line, *d v*, indicates the transection plane represented in Fig. 731. 1, Splenium; 2, ventral surface of fornix; 3, subsplenial gyres; 4, 5, ?; 6, collateral fissure; 7, uncus; 8, hippocampal fissure. The tip of the temporal lobe, included by the interrupted line just cephalad of *v*, indicates what was removed to expose the parts shown in Fig. 728.

§ 218. In several (perhaps half a dozen) brains in the Cornell museum the callosum presents a decided thinning at about the junction of the middle with the splenial third; most if not all of the individuals were mentally defective in some degree.

§ 219. *Incallosal Brains.*—In addition to about fifteen cases of shortness or thinness of the callosum, there have now been reported at least a dozen instances of its complete absence, together with the mesal part of the fornix. Commonly this deficiency was accompanied with mental and physical weakness, amounting often to idiocy; but Malinverni reported (*Giornale del R. Acad. Torino*, 1874; *Gazette médicale de Paris*, January 16th, 1875; *Gazetta delle Cliniche*, 1874, No. 15; *London Medical Record*, 1874, No. 73) the case of a soldier, forty years of age, who had been noted merely for melancholy, taciturnity, and lack of neatness. A case of total absence of the callosum and fornix is described and figured with unusual fulness by Alex. Bruce, in *Brain*, xiii., 171–190. There are included abstracts of previous cases and reduced copies of the illustrations of some.

§ 220. *Fig. 745 illustrates:* A. The absence of the callosum and of the commissure (mesal part of fornix).

B. The development of the columns as far dorsad as a point corresponding apparently to the dorsal limit of the aula and porta (which is not distinctly indicated).

C. The roofing in of the aula and diacele by a thin (membranous?) tela, the remnant of the primitive roof of the cavities.

D. The absence of the medicommissure and small size of the precommissure, in contrast with the same parts in the incallosal cat (§ 221).

E. The independence of the occipital fissure, and the *apparent* junction of the calcarine with the hippocampal.

F. The radial disposition of the mesal fissures; some of them probably represent the transitory fissures mentioned in § 227.

§ 221. Among other mammals than man the total absence of the callosum has been observed, so far as known to me, only in three cats examined in the anatomical laboratory of Cornell University; one of these (No. 381) has been described in my paper (1883, *c*), and was represented in the first edition of the REFERENCE HANDBOOK, Fig. 4,835. At the Boston meeting of the Association of American Anatomists, December 29th, 1890, I showed the brain of a sheep (No. 2,844) in which the callosum is represented, if at all, by a short thin lamina; but this specimen, fortunately unmutilated and thoroughly hardened, has not yet been figured or described.

§ 222. *Pseudocele* ("*fifth ventricle*," "*ventriculus septi pellucidi*").—This compressed, subtriangular mesal cavity has no connection with the true encephalic cavities either in the adult or at any stage of development. Its anatomical relations are shown in Figs. 687, 732, 735, and others; but they are more clearly understood from the series of diagrams in Fig. 741 based upon my own specimens and the account of Marchand ("Ueber die Entwickelung des Balkens im menschlichen Gehirn," *Archiv für mikr. Anat.*, xxxvii., pp. 298–334).

§ 223. In the cat (Fig. 682) and mammals generally, both the anatomical and developmental conditions are different. The fornix commissure and the callosum constitute portions of two lines of secondary junction of the two hemicerebrums and are continuous at the splenium

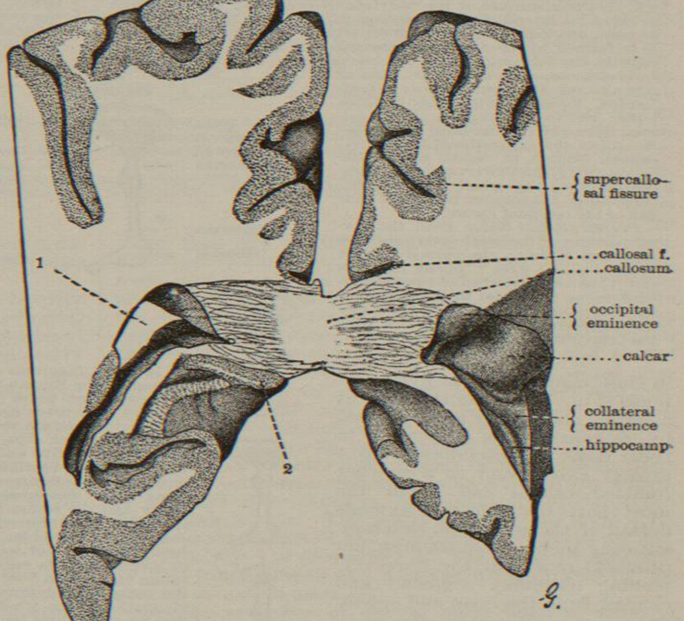

FIG. 744.—Transection of an Adult Brain through the Splenium; 1,824. ×1. 1, Postcornu; 2, section of a subsplenial gyre.

Preparation.—The brain was that of a Pole, male, and was received in the head through the kindness of Dr. F. Cary, a former student. With the special object of furnishing reliable preparations for the elucidation of the celian parietes (see Fig. 732), the sides of the head were sawn off so as to expose the medicornu, and into this was injected a mixture of alcohol (95°) and water, each 2 litres, ammonium dichromate, 10 gm.; the same was injected into the arteries. When the brain was completely hardened it was removed and transected at intervals of about 1 cm.

Defect.—The lines representing the callosal fibres should be continued across the meson.

* I have to record with some chagrin that, upon a series of transections of an adult brain (1,824), sections of which are shown in Figs. 732 and 744, hardened in a mixture of ammonium dichromate and alcohol, the continuity of the cinerea upon the callosum was recognized in October, 1880; notwithstanding its significance, further examination and publication were deferred.

as in man; but cephalad the callosum ends as a point so that the triangular area is not completely circumscribed; commonly, also, the interval corresponding to the pseudocele is narrower than in man.

§ 224. In three apes (orang, gorilla, and chimpanzee*) and in all the monkeys examined by me the conditions are as in man; the mode of development is not known to me.

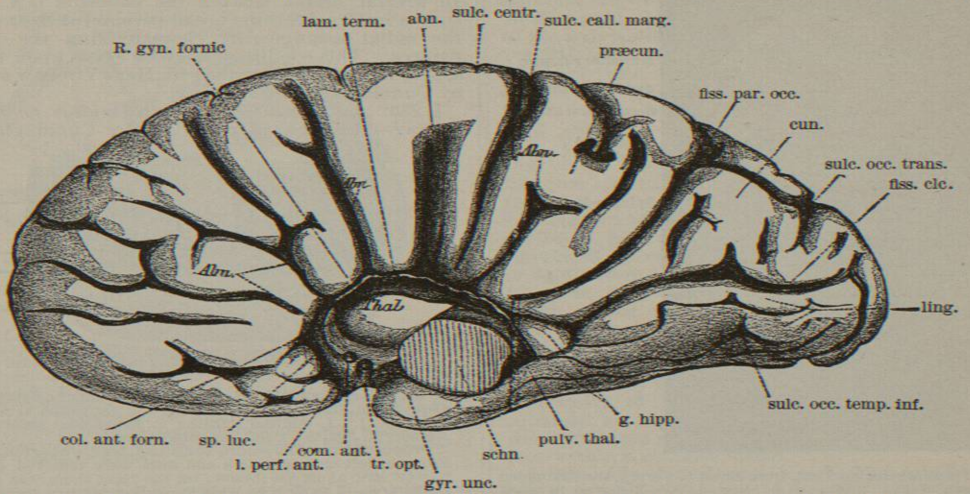

FIG. 745.—Mesal Aspect of the Right Hemicerebrum of an Incallosal, Microcephalic, Adult Brain. × .93. (From Onufrowicz.) *Abn.*, abnormal radiating fissures; *Col. ant. forn.*, fornicolumn; *Com. ant.*, precommissure; *Cun.*, cuneus; *Fiss. clc.*, calcarine fissure; *Fiss. par. occ.*, occipital fissure; *G. hipp.*, hippocampal gyre; *G. unc.*, uncus; *L. perf. ant.*, precribrum; *Lam. term.*, terma [aulatela and diatela]; *ling.*, subcollateral gyre; *præcun.*, precuneus; *Pulv. Thal.*, pulvinar (of the thalamus); *R. gyr. fornic.*, margin of the callosal gyre (*gyrus fornicatus*); *Schn.*, cut surface between the diencephal (thalami, etc.) and mesencephal (gemina); *Sp. luc.*, hemiseptum [?]; *Sulc. call. marg.*, supercallosal fissure [?]; *Sulc. centr.*, central fissure; *Sulc. occ. temp. inf.*, collateral fissure; *Sulc. occ. tr.*, "transverse occipital fissure" [?]; *Tr. op.*, optic tract.

Preparation.—This was the brain of a male idiot, thirty-seven years of age, who had never learned even to feed himself; it seems to have been obtained fresh early and well preserved; the paper ("Das balkenlose Mikrocephalengehirn Hofman," *Archiv für Psychiatrie*, 1887, xviii., pp. 1–24) from which the figure is taken is by Onufrowicz, but this and most of the other figures are by Forel. There are several transections, but the lack of distinct indication of endymal continuity renders them less instructive than they might have been. The weight of the entire brain is not stated. See § 220.

§ 225. To English-speaking anatomists interested in the morphology of the cerebral fissures and commissures are particularly commended the recent writings of D. J. Cunningham, and G. Elliot Smith in the *Journal of Anatomy and Physiology*.

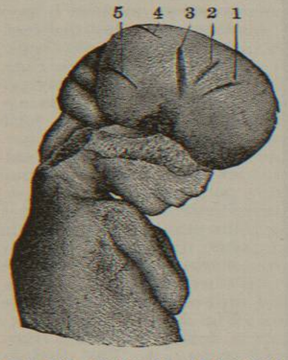

FIG. 746.—Right Side of the Brain of a Fetus Measuring 49 mm. from Nates to Bregma, and Estimated at Twelve Weeks; 1,828. × 1.4. (The left side of the same is shown in Fig. 673, where the mode of preparation is described.)

§ 226. *Fig. 746 illustrates:* A. The condition and relative size of the encephalic segments at this period.

B. The presence of transitory fissures which are absent from the other hemicerebrum (Fig. 673).

C. The indication, so far as these transitory fissures are concerned, that in this individual the right hemicerebrum was more advanced than the left.

§ 227. *Transitory Fissures.*—During the third and fourth months both the lateral and mesal surfaces of the cerebrum present linear depressions corresponding with ental ridges and thus representing corrugations of the wall (Fig. 747). They do not branch. Their general direction is radial. By the end of the fourth month they disappear from the lateral surface (Fig. 748) and partly at least from the mesal, although there is reason to believe that two of them may be practically perpetuated by the formation of the permanent calcarine and occipital fissures along the same lines (Fig. 730).

§ 228. *Fig. 747 illustrates:* A. The great size of the paraceles and paraplexuses at this stage; compare Fig. 667.

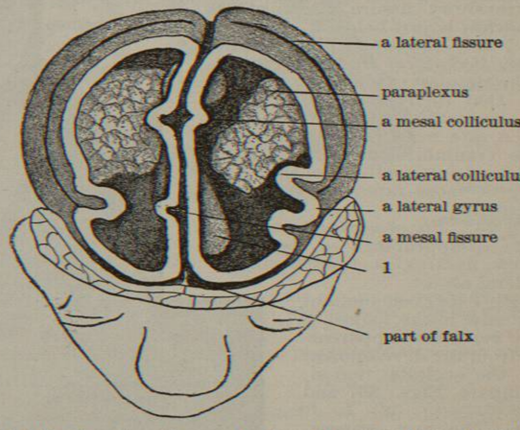

FIG. 747.—Transitory Fissures of a Fetus Measuring 5–6 cm. from Vertex to Nates, and Estimated at Fourteen Weeks; 2,770. × 2.2.

Preparation.—After the exposure of the brain the frontal end of the cerebrum was sliced off so as just to clear the large paraplexuses. Of the falx all was removed excepting the fragment shown. The head was tilted so that the face is much foreshortened.

* A gibbon brain has not yet been available.

B. The slight and nearly uniform thickness of the parietes.

C. Suggestion of a wrinkling or corrugation of the parietes as if from growth within a confined space.

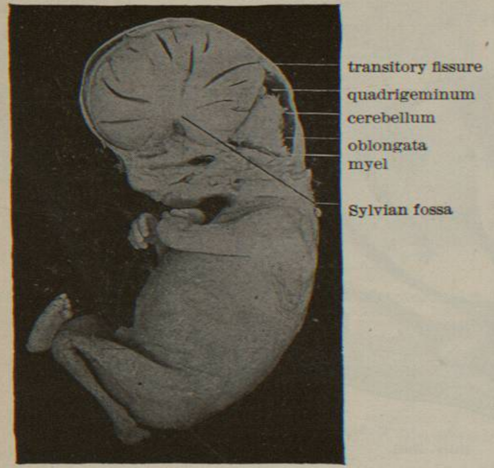

FIG. 748.—Fetus Measuring 7 cm. from Nates to Vertex, and Estimated at Fourteen Weeks; 2,761. × .9. Neg. 1,090. Received in weak alcohol and injected through the umbilical vein with alcohol and zinc chloride.

D. The approximately symmetrical distribution of these corrugations.

E. The length of the fissure on either side, reaching from the Sylvian fossa nearly to the meson.

F. The absence of any indication of branching.

§ 229. *Fig. 748 illustrates:* A. The large number of transitory fissures at this stage.

B. Their general arrangement as radiating from the Sylvian fossa; compare, however, Fig. 747.

C. The considerable difference in their length; one of the longest is indicated by the line from "transitory fissure"; one of the shortest is just below it.

§ 230. *Transitory Fissures Probably Mechanical in their Origin.*—The simplest explanation seems to be that their formation is due to the growth of the cerebral walls at a rate more rapid than that of the cranium; and that their disappearance results from the yielding or more rapid growth of the cranium.

§ 231. *Fig. 749 illustrates:* A. The disappearance of the transitory fissures, at least upon the lateral aspect.

B. The concomitant increase in the length of the cerebrum, apparently from the development of the occipital region; compare Figs. 667 and 673.

C. The non-appearance of the lambdoidal fissure (Fig. 750).

D. The commencement of the postoperculum as a fold of the temporal lobe projecting over the Sylvian fossa.

E. The non-appearance at this stage of the other operculums or of any elevation indicating the future insula.

§ 232. *Abnormal Persistence of Transitory Fissures.*—In several brains lacking the callosum (*e.g.*, the one shown in Fig. 745), the mesal permanent fissures present the radial arrangement characterizing the transitory fissures. This condition likewise exists upon the lateral aspect in the case described by Hans Virchow and shown by Cunningham (1892, Fig. 7).

§ 233. *Are Transitory Fissures Peculiar to the Human Brain?*—Hitherto, as remarked by Cunningham, they

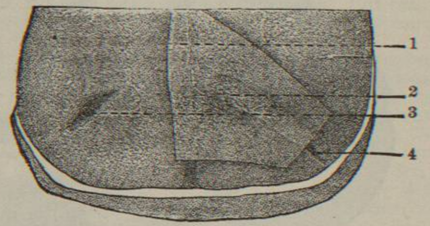

FIG. 750.—Dorso-Caudal Region of the Cerebrum of a Fetus Measuring about 30 cm. from Heel to Bregma, and Estimated at Six Months; 1,817. × 1. 1, Sagittal suture; 2, lambdoidal suture; 3, right lambdoidal fissure; 4, left lambdoidal fissure.

Preparation.—The entire fetus had been preserved in alcohol. From the left side the calva and dura were removed, excepting a narrow strip along the meson; on the right there was left a trapezoidal area, 12 to 25 mm. wide, including most of the sagittal and lambdoidal sutures.

have been observed only in man. Before, however, concluding that they constitute a real human peculiarity they should be looked for in the other primates, where I believe they will be found at corresponding periods of development; the examination of the fetal gorilla described by Duckworth will be interesting in this respect. Cunningham has considered the transitory fissures quite fully, but the subject requires further investigation.

§ 234. *Lambdoidal Fissure.*—In several fetuses estimated at from three to seven months I have observed a fissure directly underlying the lambdoidal suture (see Figs. 750 and 761, and my paper 1886, *a*). It is apparently identical with what are called by Cunningham "external calcarine" and "external perpendicular" (1892, *a*, Plates I. and II.); but I am unable to concur in his disposition of the matter or to decide whether the fissure disappears or persists (see Fig. 777).

§ 235. *Fig. 750 illustrates:* A. The distinct collocation of a fissure and suture at this period.

B. The early appearance (or late disappearance?) of this, the lambdoidal fissure; excepting, perhaps, the dorsal end of the occipital, the rest of this region is smooth.

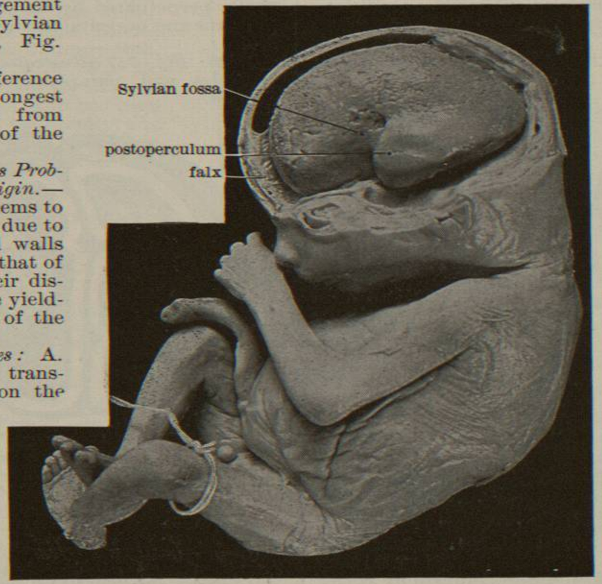

FIG. 749.—Fetus Measuring 8.8 cm. from Vertex to Nates, and Estimated at Four Months; 2,644. × .9. It is not very well preserved and the cerebrum is evidently shrunken.

C. The peculiar sharpness of outline, reminding one of the transitory fissures (Figs. 746 and 747; § 227).

§ 236. *Intercerebral Fissure.*—The interval between the apposed, mesal surfaces of the two hemicerebrums is the *intercerebral fissure* ("interhemispheral," "sagittal,"

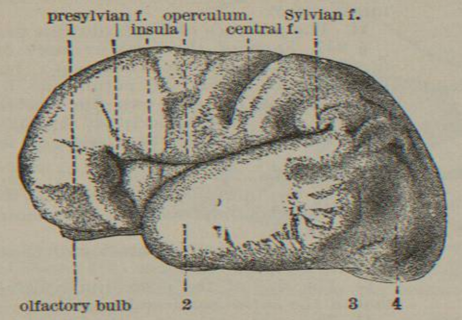

FIG. 751.—Left Fetal Hemicerebrum; 1,820. × 1. 1, Orbital region, unfissured; 2, temporal lobe, unfissured; 3, slight furrow, the preoccipital fovea; 4, circular depression, unidentified (see § 241).

Preparation.—The fresh hemicerebrum was placed in a mixture of alcohol and glycerin, equal parts; after two days half the mixture was replaced by alcohol; after two days more alcohol alone was used, and renewed on the following day. The original mixture seemed to prevent the usual distortion of fetal brains, and to facilitate the removal of the pia. Unfortunately the age and size of the fetus were not recorded.

or "great longitudinal") (Figs. 682, 707, and 739). It differs from ordinary fissures in the following respects: 1, It is mesal or azygous, while all others are lateral or in pairs; 2, although its sides are formed by cinerea, its bottom, the callosum, is apparently alba, with a comparatively thin layer of cinerea, the indusium, § 217; 3, although the pia has the usual relation, the arachnoid, instead of passing directly across, dips into it to a greater or less depth on account of the falx (Figs. 687 and 732); 4, it is, in one sense, a superfissure (§ 328) since in its depths are concealed the callosal fissures.

§ 237. *Poles and Lobes of the Cerebrum.*—The two ends of either hemicerebrum are distinguished as the frontal and occipital poles respectively, and the tip of the temporal lobe as the temporal pole. For topographical convenience, and not because they represent perfectly natural divisions, either anatomical, histological, or physiological, each hemicerebrum may be regarded as forming five lobes, the insula and the frontal, parietal, occipital and temporal lobes (Figs. 757 and 758). In a general way, but by no means accurately, the last four lobes coincide with the cranial bones for which they are named.

§ 238. The *insula* (*lobus opertus*, "central lobe") is nearly or quite covered in the adult brain by folds (operculums) from the adjoining lobes (Figs. 762 and 767); excepting at part of the ventral side the insula is surrounded by an irregular furrow, the circuminsular fissure (Figs. 781 and 782).

§ 239. The other four lobes have more or less complete natural boundaries on either the lateral or mesal surface, but not on both. The primary division is by the line of the central fissure (Fig. 751) into a frontal region and an occipito-temporo-parietal region. The former, although commonly accepted as a single lobe, is so extensive as to be conveniently subdivided by a line continued dorso-cephalad from the presylvian fissure into a *postfrontal* and *prefrontal* lobe, the latter including the orbital surfaces.

§ 240. The region caudo-ventrad of the central fissure line is divided first by the occipital fissure into a *parietal* and an occipito-temporal portion, and the latter again into a *temporal* and an *occipital* lobe by artificial lines drawn from the preoccipital fovea, the indentation of the ventral margin corresponding with the petrous portion of the temporal bone (represented by the emargination opposite the word *collateral* in Fig. 757) to the splenium on the mesal aspect and on the lateral to the extremity of the Sylvian fissure.

§ 241. *Fig. 751 illustrates:* A. The early appearance of the Sylvian, presylvian, and central fisures, and of a depression which perhaps represents the beginning of the paroccipital. See the ventral surface of this specimen (Fig. 789).

B. The nearly uncovered and slightly fissured condition of the insula at this period; the faint dorso-ventral line just caudad of the end of the line from *insula* represents the just commencing transinsular fissure.

§ 242. *Permanent Fissures.*—The surface of the adult cerebrum presents alternating depressions, *fissures*, and elevations, *gyres* (or "convolutions"). The fissures vary in depth from 1 mm. to 30, and in length from 1 cm. to 10. The intervals between the fissures (and thus the width of the gyres) vary greatly, but an adult brain seldom presents an unfissured surface more than 20 mm. in width. Notwithstanding considerable variations in different brains, and in different parts of the same brain, one can hardly fail to be impressed with the approximate uniformity of the interfissural spaces (when viewed squarely, as suggested under Fig. 763), as if the fissures were produced mechanically by the extension of the surface within a confined space.

§ 243. *Fig. 752 illustrates:* A. The condition of the insula and operculums at this stage. The former is distinctly elevated, but as yet perfectly smooth, while in the otherwise less advanced brain shown in Fig. 751 it has a slight transinsular furrow. The subsylvian fissure is just forming as the ventral boundary of the preoperculum.

B. The demarcation of the subfrontal gyre by the subfrontal fissure.

C. The non-continuity of the parietal and paroccipital fissures.

D. The non-appearance of the precentral and postcentral fissures.

E. The peculiar triangular depression which seems to represent the commencement of the supertemporal fissure.

F. The presence of three fissures or series of fissures caudad of the supertemporal, the middle of which may represent the exoccipital (§ 344).

G. The interruption of the central fissure near its dorsal

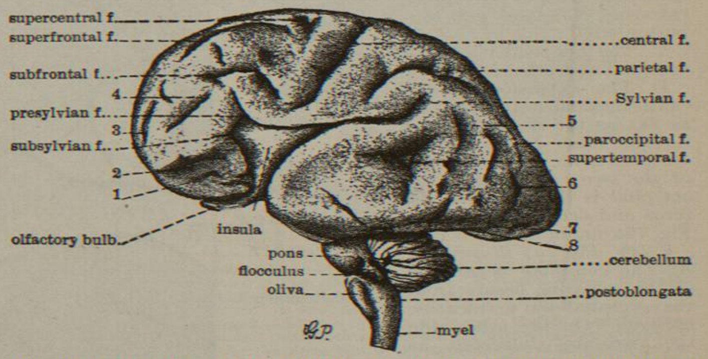

FIG. 752.—Lateral Aspect of the Left Half of the Brain of a Fetus, Size and Age Unknown; 2,278. × 1. 1-8, Fissures not identified with certainty. On the temporal lobe, just dorsad of the pons, the apparent fissure is an artificial crack.

Preparation.—The brain was medisected while fresh and this half placed in alcohol upon its mesal aspect; it has become thinner and wider than natural, but exhibits the fissures more perfectly on this account.

end; so much as appears in the figure is continuous, but near the mesal margin of the hemicerebrum is a slight depression separated from the longer lateral portion by an isthmus (comp. Fig. 772).

H. The small size of the cerebellum, the distinctness of the flocculus, and the prominence of the oliva.

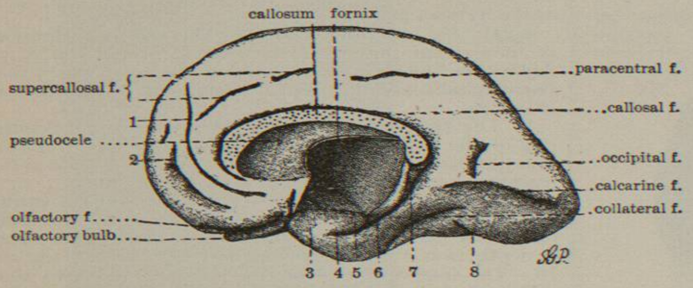

FIG. 753.—Mesal Aspect of the Left (Reversed) Hemicerebrum of a Fetus, Size and Age Unknown; 2,278. × 1. The lateral aspect of the left half of the same brain is shown in Fig. 752. 1, 2, Rostral fissures; 3, tip of temporal lobe; 4, ventral end of hippocampal fissure; 5, uncus; 6 (should have been extended a little farther so as to reach the light band), fimbria; 7, dentate gyre (*fascia dentata*); 8, undetermined fissure.

§ 244. A cerebral fissure is a narrow space vacant of brain tissue and containing only a fold of pia with blood-vessels; yet it has many and sometimes important relations, a complete account of which would embrace about fifty distinct topics. There are also about one hundred problems of a more or less general nature applying to several or all of the fissures.

§ 245. *Fig. 753 illustrates:* A. The existence of three independent furrows between the callosum and the margin of the hemicerebrum along the line of what is commonly called the calloso-marginal fissure.

B. The distinctness at this period of the four total or collicular fissures, occipital, calcarine, collateral, and hippocampal.

C. The independence of the occipital and calcarine.

D. The extension of the calcarine alone nearly or quite as far as the point reached in some other brains by the occipital alone or by the stem of the two. Sometimes the occipital is the longer in the fetus and occasionally, as in Fig. 754, union fails to occur.

§ 246. *Fig. 754 illustrates:* A. The complete separation of the calcarine fissure from the occipital by a calcarine isthmus. On the other side the two are connected as usual.

B. The bifurcation of the calcarine at each end, constituting a long zygal fissure (§ 307).

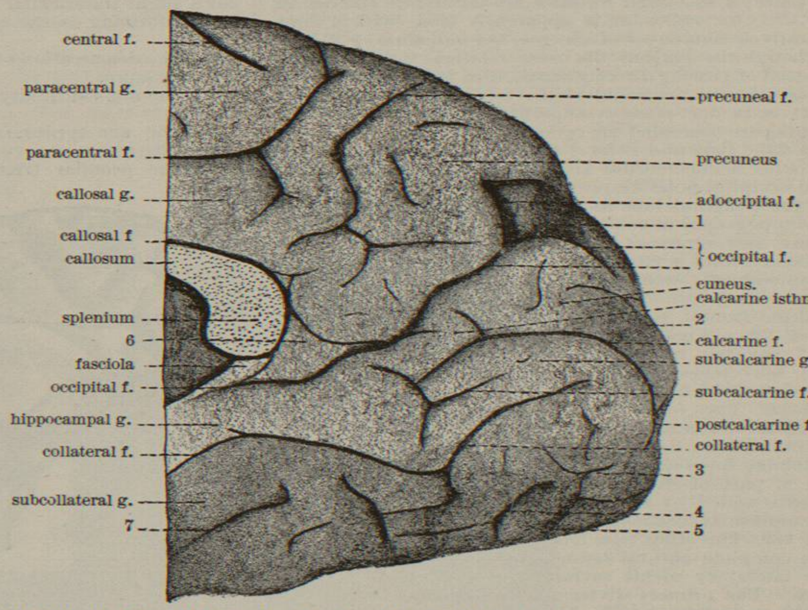

FIG. 754.—Caudal Half of the Mesal Surface of the Right Hemicerebrum of an Adult Female Paretic. No. 2,358 in the Museum of Cornell University. × 1.

C. The extension of the occipital fissure so as to represent what is usually the common stem of it and the calcarine.

D. The presence of a "spur" extending caudad from the occipital toward the calcarine upon the isthmus.

E. The appearance of trifurcation of the dorsal end of the occipital. The middle extension, however, is continuous with the fissure only superficially; the cephalic branch is apparently my adoccipital; the caudal, although doubtless the dorsal part of the occipital, presents an unusual curve and is invisible from the lateral aspect.

F. The extent of the precuneal fissure.

G. The considerable extension of the central upon the mesal aspect.

H. The presence of a subcalcarine fissure.

§ 247. Each of the forty or more fissures demands monographic treatment; but the limits of this article will permit the detailed consideration of only two, the central (§§ 269–303) and the paroccipital (§§ 309–325), as exemplifying different phases of fissural study.

§ 248. *Fig. 755 illustrates:* A. An early stage in the formation of the Sylvian fissure, the presylvian fissure being represented by a mere notch.

B. The incomplete separation of the calcar and the occipital eminence.

C. The size of the postcornu relatively to that of the entire hemicerebrum.

D. The corrugation constituting the collocated calcar and calcarine fissure.

E. The equally distinct collocation of the occipital fissure at this period with the adjoining colliculus, occipital eminence, sometimes called "bulb of the posterior cornu."

§ 249. *Collocation of Permanent Fissures with Cranial Sutures.*—In the adult the dorsal end of the occipital fissure has a notably constant position at the mesal angle of the lambdoidal suture, as seen in Fig. 670. With fetuses of between three and seven months this suture is decidedly caudad of the occipital fissure, but is distinctly collocated with the lambdoidal fissure (Fig. 750); this collocation does not persist after the seventh month, and it is not yet known whether the fissure disappears or changes its position. The approximate collocations of the central and other fissures with sutures are considered in the article *Brain, Surgery of the.*

§ 250. Fissures should be studied before gyres, because: 1, They are simpler, being represented by lines instead of planes; 2, they are more commonly entirely independent of other fissures; 3, they are comparable with the rivers of a region which are employed as boundaries of the subdivisions; 4, themselves structureless, they really represent the locations of a greater amount of cinerea than lines of equal width and extent on the gyres, and have thus a greater, presumptive, physiological significance, although there seems to be a difference of opinion as to the functions of the intrafissural cinerea.

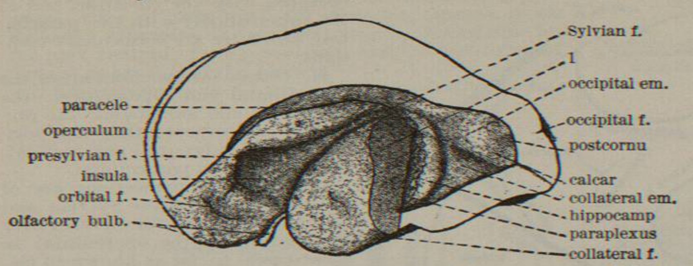

FIG. 755.—Left Hemicerebrum of a Fetus, Size and Age Unknown. Opened from the lateral aspect; 1,819. × 1. 1, Obliquely cut surface; the unshaded area represents a surface cut parallel with the meson. The line from *paraplexus* ends somewhat vaguely; it should reach the narrow zone between the hippocamp and the cut surface marked 1. See § 248.

§ 251. With children born at term the main fissures are always well defined, and in some cases there seems to be little difference between infant and adult cerebrums in respect to fissural complexity, although the insula is always less developed and less completely covered by the operculums (see Fig. 663). Such brains are often more readily obtained and removed than those of adults, and if well preserved and carefully handled may materially aid both teaching and research.

§ 252. For the elucidation of the intricacies of adult fissures, *fetal brains are much more serviceable than those of monkeys.* This, in contravention of the view and practice of Meynert, has been insisted upon by me (1886, *g*). Some of the peculiarities and complexities of the monkey brain are represented in Fig. 787.

§ 253. Adult cerebrums commonly present individual peculiarities which prevent their serving as types or standards. I have found such in every brain examined; not merely, for example, in that of the philosopher, Chauncey Wright (Figs. 768, 770, 788) but also in that of a mulatto; simple in several respects, it has peculiarities and complexities not as yet fully understood (see Figs. 762–766).

§ 254. *Fig. 756 illustrates:* A. In connection with Figs. 663 and 702, the perfection and beauty of form of the human brain at birth.

B. The relatively small size of the cerebellum at birth.

C. The distinctness and prominence of the pons.

D. The lateral extent of the pseudocele; at the genu (cephalic curvature) of the callosum it is 1 mm. deep, representing about one-half of its entire lateral extent.

E. The distinctness and depth of the principal fissures and the large number of minor ones.

F. The peculiar ventral curve of the caudal half of the calcarine fissure, and the concomitant expansion of the cuneus.

G. The length of the fissure in the subcalcarine gyre.

H. The appearance of the cephalic stipe of the paroccipital fissure (18) upon the meson (see Figs. 774 and 775).

§ 255. The study of fissures upon actual brains is facilitated by reference to diagrams such as have been published by C. L. Dana, Eberstaller, Ecker, Jensen, Pansch, Schäfer (in "Quain"), and others. My present views are embodied in Figs. 757 and 758.

§ 256. *Comments upon the Fissural Diagrams* (Figs. 757 and 758).—A. They represent my views at this time, but are not identical with those previously published (1886, *g*, and first edition of the REFERENCE HANDBOOK), and are subject to further modifications with increasing knowledge of the facts. For example, the small fissures caudad of the occipital are but little understood, and the orbito-frontal of Giacomini may prove to be more nearly constant than now supposed.

B. An attempt has been made to indicate the relative depth and constancy of the fissures by lines of three degrees of width; this grouping, however, is provisional.

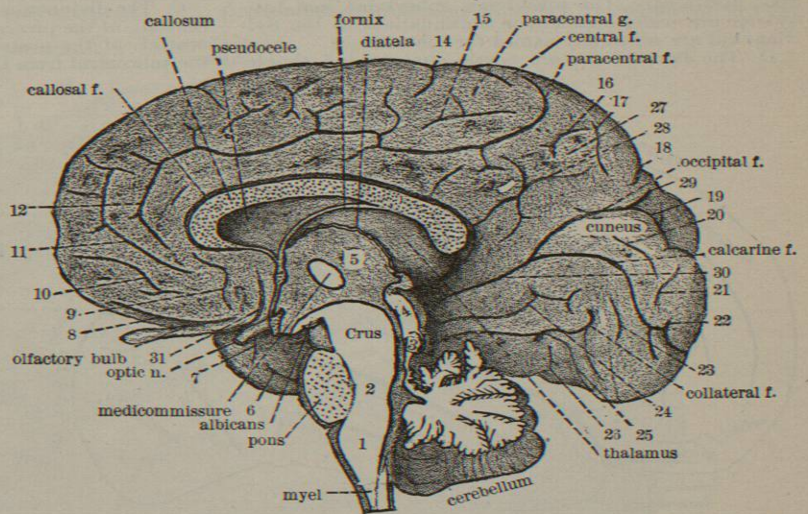

FIG. 756.—Mesal Aspect of the Right Hemicerebrum of a Male Child, at Term; 478. × .84. Other aspects of the same specimen are shown in Figs. 663, 774, and 775. 1, Postoblongata; 2, preoblongata; 3, postgeminum; 4, pregeminum; 5, thalamus, its mesal surface, forming the lateral wall of the diacele; the dorsal, pial surface is designated by the line from the word *thalamus;* these are parts of one and the same organ, separated by the membranous diatela; but the triangular area dorso-cephalad of them marked *pseudocele* and apparently separated only by the narrow white area marked *fornix*, is the *hemiseptum*, part of the mesal surface of the cerebrum; 6, 9, 16, 17, 21, 23, 24, 25, 26, 31, unidentified fissures; 7, postrhinal; 8, olfactory; 10, 11, rostral fissures; 12, supercallosal fissure, continuous with the paracentral; 15, intraparacentral fissure; 14, inflected fissure; 18, cephalic stipe of paroccipital fissure; 19, a ventral branch of the occipital fissure; 20, 21, intracuneal fissures; 22, dorsal branch of the calcarine fissure; with the more caudal of the two ventral branches perhaps it represents the forked fissure sometimes called *postcalcarine;* 27, precuneus; 28, precuneal fissure; 29, dorsal end of the occipital fissure; 30, the common stem of the diverging occipital and calcarine.

Defects.—The specimen spread while hardening under its own weight, and is therefore wider and thinner than natural; this is, however, an advantage for the study of the fissures. The naturally considerable cranial flexure became still more marked as the brain rested upon the lateral aspect while photographing, and this, for convenience, is preserved in the drawing. The thalamus is unnaturally, though very instructively, uncovered by the callosum so that its caudal prominence, the pulvinar, is visible. The habena is not distinctly seen. The cerebellum is not represented accurately as to details, but is enlarged in Fig. 702. The hypophysis is lacking, and the aulic region is not shown in detail.

C. Each separate line represents what I now regard as a fissural integer so far as the human brain is concerned. The following are also regarded as integers, although continuous with others: occipital, calcarine, postcalcarine, postrhinal. The presylvian, subsylvian, and basisylvian are really branches or continuations of the Sylvian, but are separately named for convenience.

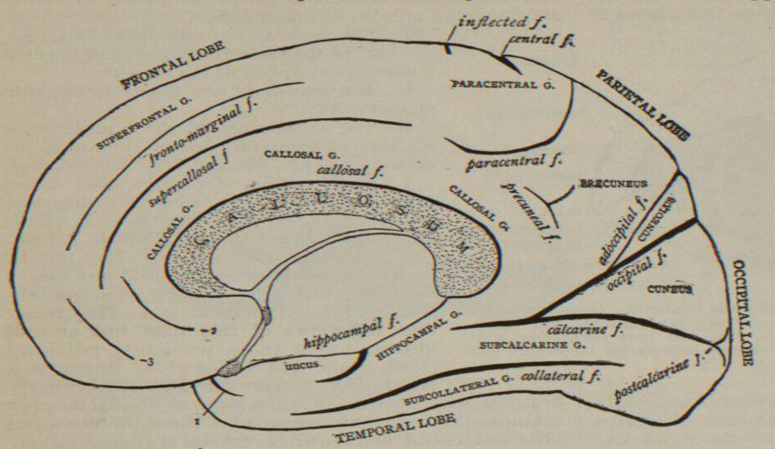

FIG. 757.—Diagram of the Fissures upon the Mesal Aspect. The outline and certain fissures are from the mulatto brain (322), which was hardened within the cranium. 1, Postrhinal (amygdaline) fissure; 2 and 3, rostral fissures.

D. The fissure lines are nearly straight and simple, excepting where branching is a practically constant feature, as, *e.g.*, with the paroccipital, paracentral, precuneal, and postcalcarine.

E. The connections are of two distinct kinds: primary, invariable, and inevitable from the mode of formation of the parts; secondary, and more or less common, but not necessary.

F. *Invariable* and apparently inevitable fissural connections are (1) of the Sylvian with the basisylvian, presylvian, and subsylvian, all which might be regarded as its continuations or branches; (2) of the callosal with the hippocampal.

G. *Usual* connections are of the occipital with the calcarine, and of the supercallosal with the paracentral, but there are occasional exceptions.

H. *Common* connections are of the superfrontal and supercentral; the precentral and subfrontal; the precentral and supercentral; the postcentral and subcentral and parietal; the parietal and paroccipital.

I. *Occasional* connections are of the precentral with the Sylvian, and of the central with the Sylvian over the margin of the operculum; in these cases, so far as known to me, the junction is seldom very deep.

§ 257. From the deservedly popular fissural diagrams of Ecker, the publication of which has so materially advanced the general knowledge of the subject, these differ mainly in the following respects:

A. The omission of branches and contortions.

B. The inclusion of the callosal, inflected, adoccipital, postrhinal, postcalcarine, medifrontal, precuneal, and postcentral fissures.

C. The disjunction of the supercallosal from the paracentral; of the precentral from the subfrontal and supercentral; of the postcentral from the subcentral; and of the subcentral from the parietal.

D. The recognition of the adoccipital fissure and the cuneolus.

E. The introduction of the exoccipital as probably representing the true "ape-fissure" of Wernicke.

F. The combination of the "transverse occipital" of Ecker with the caudal portion of his "interparietal" as a distinct fissural integer, the paroccipital.

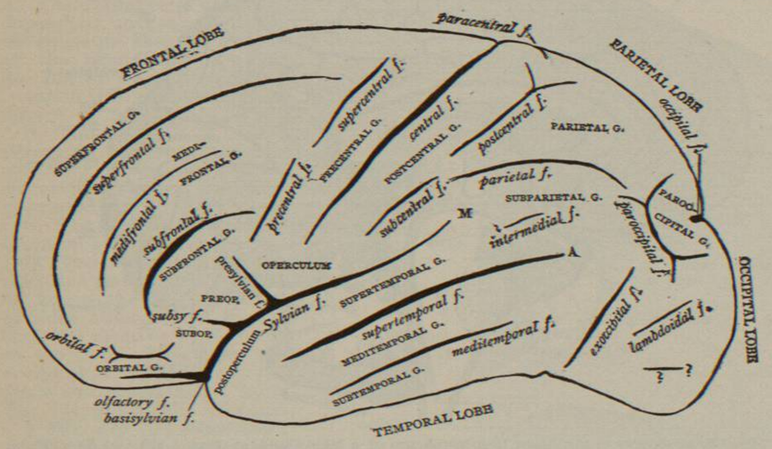

FIG. 758.—Diagram of the Fissures upon the Lateral Aspect. The outline and certain fissures are from the mulatto brain (322), which was hardened within the cranium. M, the "marginal" gyre; A, the "angular" gyre; Preop., the preoperculum; Subop., the suboperculum; Subsy. f., the subsylvian fissure. The interrogation points on the lateral aspect of the occipital lobe indicate my doubts as to the existence of certain fissures, or as to the names that should be applied to them if they do exist. The subtemporal fissure is not shown (see Fig. 765).

G. The adoption from various writers of what seem to be the best fissural names of a single word each—*e.g.*, from Huxley, *collateral;* from Owen, *callosal, hippocampal, medifrontal, subfrontal, supercallosal;* from Wernicke, *fronto-marginal;* from Jensen, *intermedial;* from Pansch, *occipital* and *parietal;* from Schwalbe, *precentral* and *postcentral;* from Meynert, *preoccipital;* from Lussana and Lemoigne, *inflected* (Ital., *inflesso*).

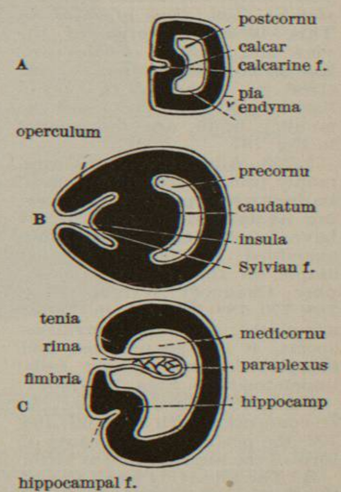

FIG. 759.—Schematic Transections of the Three Paracelian Cornua in the Order of their Complexity. See § 259.

H. The substitution of several mononyms for polyonyms, viz.: of *presylvian* for *ascending branch of the Sylvian; subsylvian* for *anterior branch; basisylvian* for the part ventrad of the presylvian; and the restriction of *Sylvian* to the "posterior branch."

I. The replacement of *lingual lobule* and *fusiform lobule* (not at all easy to apply correctly), by *subcalcarine gyre* and *subcollateral gyre*, names at once associated with the fissures which respectively constitute the dorsal boundaries.

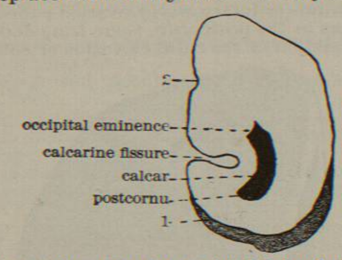

FIG. 760.—Transection of the Left Occipital Lobe of a Fetus, Size and Age Unknown; 2,278. × 1.5. This figure is almost diagrammatic in its simplicity; it shows very clearly the relation of the calcarine fissure to the calcar as represented in Fig. 759, A.

J. The use of one and the same word, *fissure*, for all the cerebral depressions excepting the two foveas.

K. The use of one and the same word, *gyre*, for all subdivisions of the lobes, excepting the cuneus and precuneus, already well distinguished by mononyms, and the cuneolus.

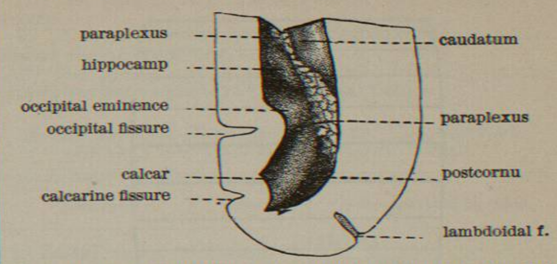

FIG. 761.—The Caudal Part of the Right Hemicerebrum of a Fetus, Measuring 14 cm. from Nates to Bregma, and Estimated at Four Months; 1,816. × 1.5. (See § 261.)

Preparation.—This is part of the specimen shown in Fig. 727, where the mode of preparation is described; the postcornu was exposed by removing the paracelian roof along the lines in that figure. The plexus was partly cut away, although not so represented in this figure.

§ 258. *Total and Partial Fissures.*—Of the permanent fissures most affect merely the cortex and the adjacent alba and are therefore sometimes called *partial* fissures; the central, for example, though constant and deep, is only a partial fissure. But others represent corrugations of the entire parietes, so that the ectal depression, fissure, is opposite and obviously correlated with, an ental elevation or colliculus; the fissures commonly enumer-

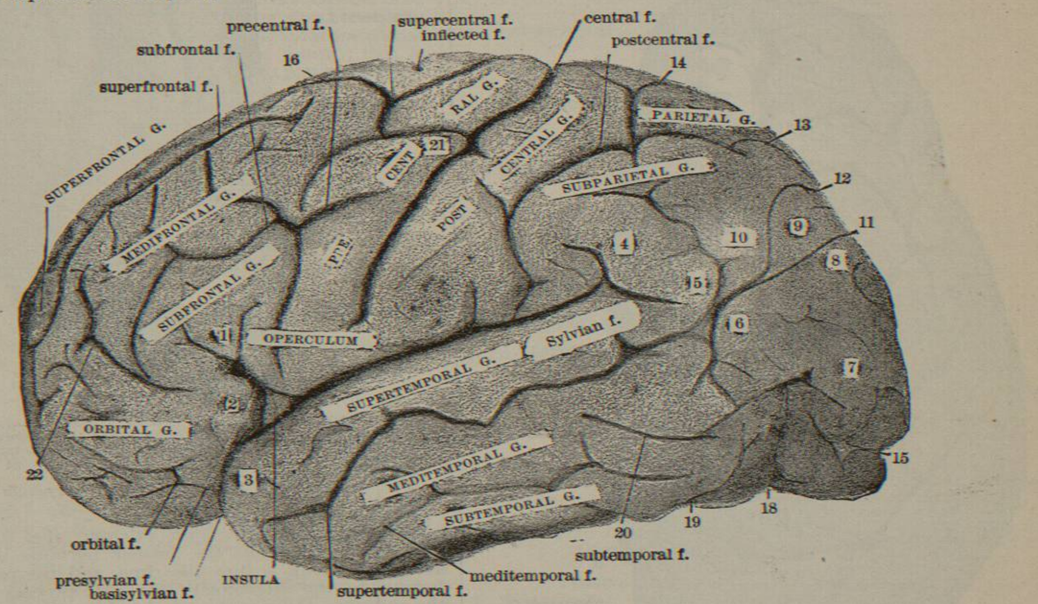

FIG. 762.—Lateral Aspect of the Left Hemicerebrum of a Mulatto; 322. × .8. 1, Cephalic part of the operculum demarcated from the rest by a fissure that does not extend through its entire thickness; 2, preoperculum; 3, postoperculum; the subsylvian fissure is probably represented by a short indentation, visible only when the postoperculum (3) is removed; 4, what is commonly called the "supramarginal gyre"; 5, may represent part of what is called the "angular gyre"; 6, a supergyre overlapping the concealed, caudal part of the angular; 7, unidentified occipital gyre; 8, 9, portions of the unidentified supergyre that overlaps the lateral part of the paroccipital gyre; 10, gyre at the caudal (apparently dorsal) side of the dorsal, deflected end of the supertemporal fissure; 11, opposite the dorsal end of the occipital fissure (this is, however, invisible, and the straight fissure that extends laterad from 11 between 8 and 9, and curves ventrad at 6, may possibly be the exoccipital or Wernicke's fissure, one of the so-called "ape-fissures"; it has apparent, though not real, connections with the occipital and supertemporal fissures); 12, curved fissure in the same supergyre, superficially connected with the supertemporal; 13, cephalic stipe of the paroccipital fissure; 14, dorsal fork of the postcentral fissure; the subcentral is not indicated by a separate number and is continuous with the postcentral; 15, caudal extremity of the calcarine fissure, really simple and independent; 16, cephalic radius of the triradiate supercentral fissure (see Fig. 765); 18, 19, 20, unidentified occipito-temporal fissures; 21, just ventrad of the strait between the central and supercentral fissures (see Fig. 764); 22, the most cephalic of three distinct fissures crossing the medifrontal gyre.