LETTERS TO THE EDITOR.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.*]

To the Editor of "SCIENCE:"

It is with mingled pleasure and profit that I have read the very suggestive paper on cerebral nomenclature contributed to your latest issues by Professor Wilder[1]. Some of the suggestions which he has made have been latent in my own mind for years, but I have lacked the courage to bring them before my colleagues. Now that he has broken ground, those who prefer a rational nomenclature to one which like the *present* reigning one, is based upon erroneous principles, or rather on no principles at all, will be rejoiced at the precedent thus set for innovations. As Professor Wilder has invited criticism, I take the opportunity of offering the following remarks upon the leading points of his papers, in so far as they refer to the brain alone.

1. The principles announced are such as zootomists and anatomists generally will agree with, to the fullest extent. He who has himself been compelled to labor under the curse of the old system, the "beneath," "below," "under," "in front of," "inside," "external," "between," etc., of anatomy, as taught at our graduating mills, will look upon the simple "ventral" "dorsal," "lateral," "mesal," "cephalic," (or "nasal" or "proximal") and "caudal" ("distal") as so many boons. I have no hesitation in saying that the labor of the anatomical student will be diminished fully one-half when this nomenclature shall have been definitely adopted. I suppose, however, that the present generation of teachers—I am speaking of our medical schools, not of our universities—will have to become extinct before even the attempt can be made. In Germany the older system has gone out of use almost entirely, and not the least charm about the works of Henle, Schwalbe, Forel, and Gudden, is the fact that these authors have more or less done away with the ambiguous terms once rampant.

2. At present two terms are used convertibly; these are *crus* and *pedunculus*. The chief parts to which these terms are given are the *crus cerebri* (*pedunculus cerebri*) and the *pedunculi cerebelli* (*crura cerebelli*). If anatomists would agree to use the term *crus* only for the cerebral tract, and *pedunculus* for the cerebellar, it would save us the necessity of adding another word. *Crus* would mean what *crus* or *pedunculus cerebri* now designates, *pedunculus* a cerebellar tract. The modifications suggested by Professor Wilder of *præpedunculus*, etc., are excellent. The word *pedunculus* has been applied to a number of other structures, but, I think, inappropriately; thus, *pedunculus conarii*, *pedunculus hypophyseos pedunculus flocculi*, *pedunculus nuclei lenticularis*, *pedunculus substantiæ nigræ*, from all of which it should be removed, as there are other terms in use for these structures, or they are non-descriptive, as the latter two given.

3. In proceeding to comment on some of the terms proposed by Professor Wilder, I wish it to be distinctly understood that I do so merely tentatively and to promote discussion; in so doing I feel certain that I am carrying out that writer's wish. It is but just to state that the majority of the terms cannot be discussed, they are perfection and simplicity combined.

AMYGDALA (*Cerebelli*), W.—Since there is a *nucleus amygdalæ* in the temporal lobe of the cerebrum of man, simians and carnivores, which should be called *amygdala* briefly, just as the *nucleus lenticularis* and *n. caudatus* are termed *lenticularis* and *caudatus* and as the synonym *tonsilla cerebelli*[2] is at our disposal for the similarly named lobule of the cerebellum, I suggest replacing this term as applied to the cerebellum by *tonsilla*.

AREA INTERCRURALIS, W.—I have this term in a manuscript of mine, and am glad to find such a coincidence in baptism, according the priority, of course, to the first publication. I bound this area cephalad by the caudal border of the chiasm, caudad by the cephalic border of the Pons, laterad by the crura, and distinguish the deeper part as a *fossa intercruralis* (*substantia perforata post.*) The gray mass here located is the ventral face of Gudden's [3, 4] interpeduncular ganglion, which I propose, in order to secure nomenclatural uniformity, to term (*Ganglion*) *intercrurale*.

AREA POSTPONTILIS, W.—The objection can be made that this area is not homologous in different animals. A large part of the true Pons in man includes the portion homologous with a part of the *Area postpontilis* of the cat. The roots of the abducens nerve (6th pair) seem to me to constitute a more fixed boundary.

CAUDA STRIATI, W.—I have identified this structure in the cat; it does not make as fine a sweep as in man, but is distinct at the roof of the inferior horn and loses itself as has long been known[5] in the case of the human brain near the *Nucleus amygdalæ*. Professor Wilder's term is the only admissable one, both as being descriptive and on grounds of priority. *Cingulum* is otherwise appropriated.

CONARIUM, W.—Would not the retaining of this name deprive us of that convenient antithesis which can be established between *epiphysis diencephali* and *hypophysis diencephali?*

DENTATUM, W.—Some term should be devised which will at the same time express the fact that this gray mass is a nucleus of the cerebellum and differentiate it from the *nucleus fastigii* (*fastigialis*). *Dentatum* is not appropriate, in my judgment, because in those animals in which it is dentated, there are other dentated nuclei, and also because it is not dentated at all in the rodentia, the carnivora, and ungulata.

EPENCEPHALON.—Are there any reasons why a seperate segment of this name should be made? Some authors limit the term to the cerebellum, which latter is only a dorsal hypertrophy, not an entire segment. The difficulties which Prof. Wilder mentions could be obviated by abandoning the term altogether.

LEMNISCI W.—Can be identified in cat on transverse section; they are not distinct on the surface, nor indeed there well marked in any animal.

LOCUS NIGER.—This ganglion is not black in any animal except man; for this reason I have employed the non-committal designation of *Ganglion Soemmeringii*.[6] It is interposed between *pes* and *tegmentum* like a *diaphragma*.

MONTICULUS.—Modern authors[2], to my knowledge, employ this term only for the highest point of the dorsal cerebellar vermis.

NUCLEUS LENTICULARIS. Might be briefly termed *lenticularis*.

PONTIBRACHIUM, W.—Is identical with the *medipedunculus* of the same author. I have thought that analogous names might be adopted for the other *pedunculi*, thus *Restibrachium*, etc.

STRIATUM. W.—Why not *caudatus*? Both *lenticularis* and *caudatus* are parts of the old *corpus striatum*.

VENTRIPYRAMIS, W.—Since the "posterior pyramids" of descriptive anatomy are no longer known as pyramids, and the more generally used term of *Clavæ* has been employed to designate their intumescence, the prefix *ventri* may not be necessary.

4. Independently of the question of nomenclature, I should like to ask upon what grounds it is stated that *cerebrum* consists of the *prosencephalon* less the *striata*. The tissue of the cortex cerebri and of the two divisions of the *corpus striatum* are even in man continuous, and it would be impossible to peel out the lenticular nucleus from the white substance of the hemispheres. Indeed, embryologically the cortical gray and that of the cerebral ganglia are originally subendymal, and in tracing the development of the brain, as we proceed from reptiles to

man, we find that successively the *caudatus*, the *lenticularis* and the *claustrum* become differentiated from a common gray mass continuous with the cortex at the base of the cerebrum.

I would add in regard to the term CORTEX that the Optic lobes[3, 6] and the Rhinencephalon[5] exhibit the cortical structure as the cerebrum and the cerebellum.

The following terms not included in Professor Wilder's series, are submitted, and for them I invite the severest criticism. Some of them are established by others.

CAPPA (*cinerea*[1])—The gray cap covering the *Optici*, well developed in most mammalia, rudimentary in man.

ECTOTHALAMUS*.—The outer gray thalamic zone.

ENTOTHALAMUS*.—The inner gray thalamic zone.

INTERCRURALE*, (*Ganglion*).—*Ganglion Interpedunculare*[3, 4].

SIGMA*.—The *S* shaped involution of the nerve-cell layer of the cortex which constitutes the basis of the *Hypocampa*.

NUCLEUS TRAPEZII*. — The superior olive. The development of this body seems to bear an inverse relation to that of the true olive. In man the olive proper is highly developed, in the cat poorly—in the latter the nucleus of the trapezium is well marked and folded; in man it is ill-marked.

OBLONGATA*.—The post-pontinal area of man; the *medulla oblongata*.

STRIÆ*.—The *striæ medullares albæ* of the fourth ventricle.

VELUM CEREBELLI*.—The valve of Vieussens; this is the true embryonic starting point of the Cerebellum. The *velum medullare anterius*.

VELUM OBLONGATÆ*.—The *velum medullare posterius*. It arises from the internal division of the *post pedunculus* in its oblongata portion, and covers the posterior part of the fourth ventricle.

VELUM FLOCCULI*.—The *velum medullare inferius*.

GRACILIS* (*Funiculus*).—*Funiculus gracilis*, continuation of corresponding column in cord; part of the posterior pyramids.

CUNEATUS* (*Funiculus*).

TUBERIS* (*Funiculus*).—Funiculus of Rolando; the columnar field containing the Tuberculum of Rolando. There is a *lobulus tuberis*, which is otherwise provided for.

NODI*.—Two symmetrical eminences, situated each in the shallow depression bounded by the *opticus, thalamus* and *habena*, probably corresponding to the *ganglion habenæ (Gangl. habenulæ*[5]*)*. There is a notable large opening cephalad of these eminences, which resembles the opening under the *tænia* containing the vein which gives the latter its bluish color. I can find no notice of this opening anywhere. The eminences are represented obscurely in Fig. 70 of Henle[2].

DECUSSATIO FONTINALIS.**—Fontanen artige Haubenkrenzung.[5]

In conclusion, I would urge the adoption of some brief arbitrary affix or prefix in place of the words commissure and ganglion. He who limits himself to a study of surface contours will not appreciate the absence of such abbreviations as much as he who is compelled to wade through the labyrinth of the internal cerebral structure.

Gris for ganglion would perhaps do; thus *Grishabena, Gristegmentum, Grisfastigium* for *Ganglion habenæ, Ganglion* and *Nucleus tegmenti, Nucleus fastigii*. The term *nucleus* is a very unfortunate one as it has another and very different meaning, which in my experience as a teacher of cerebral anatomy, has led to confusion in the mind of every beginner. Professor Wilder, who appears to be as much at home in etymology as in cerebral anatomy, will solve these problems no doubt better than I could pretend to.

* Terms proposed by myself, not to be found in previous publications.

** A single affix or prefix might be devised in place of *decussatio*, or *fontidecussatio, pinidecussatio, pyridecussatio?*

REFERENCES.

1. *Wilder, B. G.* A partial revision of anatomical nomenclature with especial reference to that of the Brain. "SCIENCE" Nos. 38, 39.

2. *Henle.* Nervenlehre, p. 118.

3. *Forel.* Untersuchungen uber die Hauben Region, Arch. für Psychiatrie, VII.

4. *Gudden.* Ibidem, X.

5. *Meynert.* Vom Gehirn der Saugethiere. Stricker's Handbuch II. p. 724, line 11 from bottom.

6. *Spitzka.* The higher ganglia of the mid and hind brain. Journal of Nervous and Mental Diseases. July, 1880. (Designation of figure 10.)

7. *Schwalbe.* (Hoffmann-Schwalbe), quoting Tartuferi. *Gazetta medica Italiani.* Serie VIII[a]. Tom. III. and *Rivesta sperimentale*, 1878.

NEW YORK, 130 East 50th street. E. C. SPITZKA.

HOW DOES GRAVITY CAUSE MOTION?

To the Editor of "SCIENCE:"

The interesting article by Mr. E. L. Larkin in "SCIENCE" for March 26, on the Interrelations of Gravity, Heat, Motion, etc., induces me to offer you some thoughts on the subject, with the hope that I may throw light upon it from another point of view. There is one widely accepted doctrine of modern physics which I confess I could never understand, that of Potential Energy. It may serve as a convenient explanation of the mysteries of falling force to say that energy may be at one time motion, and at another time the possibility of becoming motion. The rule explains the problem, but what explains the rule? Can motion become anything else than motion? Can it now convert itself into Rest, into Gravity, into Potentiality, or into anything else than simply motion? Is it not, like force and matter, an unvarying infinitude of the universe?

Motion means simply the translation of substance through space, and it possesses a fixed energy dependent upon the weight of the substance and the speed of the translation. If the portion of substance moved be a minute portion of matter, either forming an elementary constituent of a solid mass, or a separate molecule of a gas, we call its motion heat; and the result of its impact with exterior particles, temperature. If it be a mass of such particles its translation should be particularized as mass motion. In addition to these modes of motion, Electricity and Magnetism must also be considered as more special modes of motion, unless we admit the possibility of motion becoming something else, and this something else again becoming motion.

Can we admit this? What does terrestrial gravity teach us? If gravity is convertible into motion, then we have reason to conclude that the gravity should disappear as the motion increases. The law of gravitation asserts that the action of the earth and of a falling body are necessarily reciprocal. The earth must fall towards the body with the same energy that the body displays in falling towards the earth. The body, then, can not derive its energy of fall from the earth, unless we claim that the earth derives its energy of fall from the body. Such a cross-lending of force is inadmissable. The energy displayed by the body must come from itself, not from the earth. It is not a transformation of the earth's gravity into motion. Is it a transformation of its own? This we cannot admit, since the body loses no gravity. It cannot well give and keep at the same time. The body falls 16 feet in the first second, and ends with a velocity of 32 feet per second. This 32 feet per second is a positive momentum, and must continue until over-