A PARTIAL REVISION OF ANATOMICAL NOMENCLATURE, WITH ESPECIAL REFERENCE TO THAT OF THE BRAIN.*

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I.

INTRODUCTORY.

During the preparation of a paper "On the Gross Anatomy of the Brain of the Domestic Cat (*Felis domestica*)," I have been led to believe that some advantage may be gained by certain modifications of the current anatomical nomenclature. The present article contains suggestions, chiefly of a practical nature, which I wish to submit to other anatomists in the hope that, even if the changes here indicated do not meet their approval, they will be induced to take the general subject into consideration.

That the nomenclature of a science is worthy of attention is indicated by the care bestowed upon the language of modern chemistry and mathematics, and by the following expressions of opinion:

"Everything in science ought to be real, ingenuous and open; every expression that indicates duplicity, or equivocation, reservation, wavering or inconsistency, is a reproach to it."—Barclay, A., 89†

"Questions of definition are of the very highest importance in philosophy, and they need to be watched accordingly." Duke of Argyll, 1.

"In all sciences, nomenclature is an object of importance; and each term should convey to the student a definite meaning." Dunglison, A, Preface.

"There is a necessity for perfect definiteness of language in all truly scientific work." P. G. Tait, 1.

"Technical terms are the tools of thought." ‡

"Only an inferior hand persists in toiling with a clumsy instrument, when a better one lies within his reach. . . . . A single substantive term is a better instrument of thought than a paraphrase." Owen, A, 1, Preface, pp. xii, xiv.

"As morphology deals with forms and relations of position, it demands a careful selection of terms and a methodical nomenclature." Goodsir, A, 11, 83.

These remarks apply to the general subject of anatomical nomenclature. But the terms employed by anatomists form two divisions: those which indicate the *position* or *direction* of organs, and those by which the organs themselves are designated. Since, also, writers have usually treated of them separately, it will be convenient here to consider anatomical *toponomy* and *organonomy* under distinct headings.

TERMS OF POSITION AND DIRECTION—TOPONOMY.

Dr. Barclay's volume had especial reference to this division of the subject, and its key-note is struck in the following paragraph (A, 5):

"The vague ambiguity of such terms as superior, inferior, anterior, posterior, &c., must have been felt and acknowledged by every person the least versant with anatomical description."

Dunglison admits (A, 61) that "Great confusion has prevailed with anatomists in the use of the terms before, behind, &c." Dr. Spitzka has forcibly stated (1, 75, note 1) the objections to the use of anterior, &c., and their unsuitability is tacitly conceded in the employment of other terms by several writers who do not explicitly condemn the current toponomy: Gegenbaur (A, 491), Mivart (A, 69), Cleland (1, 170), Rolleston (B, 33, note), &c.

Finally, the need of a radical change of base has been proclaimed in one of the very strongholds of anthropotomy:

"Now that the more extended study of comparative anatomy and embryonic development is largely applied to the elucidation of the human structure, it is very desirable that descriptive terms should be sought which may, without ambiguity, indicate position and relation in the organism at once in man and animals. Such terms as cephalic and caudal, dorsal and ventral, &c., are of this kind, and ought, whenever this may be done consistently with sufficient clearness of description, to take the place of those which are only applicable to the peculiar attitude of the human body."—Quain, A, I, 6.

This is certainly explicit as to the principle involved, and it is to be hoped that later editions of this standard Human Anatomy may display its practical application to the body of the work.

How slender is the justification for retaining a toponomical vocabulary based upon the relations of organisms to the surface of the earth, appears more fully when we reflect that the assumed standard, for the higher vertebrates at least, is man in his natural erect attitude; yet that both man and animals are more often examined and compared when lying upon the *back*, this being an attitude truly characteristic of only that infrequent "subject," the sloth.

As a single illustration of the logical inconsistencies into which we are led by the use of the current toponomy, let us take the series of possible designations of the direction of some vertebral spinous process which projects toward the skin of the back at, or approximately at, a right angle with the myelon. With man the direction in which it points is *posterior*, but with a cat it is *superior*, while with an ape or a bird it is somewhere between the two; with all four, when on the dissecting table, it would be usually *inferior*. Finally, with a flounder the corresponding direction would be *horizontal* or *sidewise*.

In short, to designate the locations of organs by the relation of animals to the surface of the earth, which relation differs in nearly allied forms, and varies with the same individual according to circumstances, is as far from philosophical as it would be to define the place of a house or a tree by reference to the planet Jupiter, or to assume that mankind naturally face the rising sun, and hence to designate our right and left as the south and north sides of the body.

Some practical points respecting this division of the subject will be presented farther on.

DESIGNATION OF ORGANS,—ORGANONOMY.

There are probably few investigators or teachers of comparative anatomy who have not been impressed, in some degree, with the desirability of some modification of the prevailing nomenclature of organs,—the "bizarre nomenclature of anthropotomy," (Owen, A, 11, 143)—based as it is upon the peculiar features of the human body, which has been fitly characterized, from a morphological point of view, as "not a model, but a monstrosity."

This impression may give rise to special papers, like those of Owen, (166), Maclise (1), and Pye-Smith (1, 16), or simply to more or less extended remarks upon the subject, with or without the use or presentation of new terms.

* This article is based upon two communications: the one, "A Partial Revision of the Nomenclature of the Brain," was read at the Boston meeting of the American Association for the Advancement of Science, August 28, 1880, and was reported, in part, in the *Boston Daily Advertiser*, of August 30, and in the New York Medical Record for September 18th, 1880; the other, "On some Points of Anatomical Nomenclature," was read at a meeting of the Cornell Philosophical Society, Ithaca, N. Y., January 15, 1881.

† In the List of Works and Papers at the end of this article, the names of the *authors* are placed in *alphabetical order*. The titles of *separate works* are designated by *letters*, and their order has no significance: The titles of *papers* are *numbered*. In the case of papers published between 1800 and 1873 the numbers correspond to those in the chronological "Catalogue of Scientific Papers published by the Royal Society of London." In other cases the numbers are only provisional, and are printed in italics.

The references are made as follows: the name of the author is given first, unless the author has been indicated already; then follows the letter or the number by which the title of the work or paper is designated upon the list; if a Roman numeral is given it denotes the number of the volume; and the last number is that of the page. This system of references was followed by me first in 1872, in the paper entitled Intermembral Homologies (10), and has been since adopted by others.

‡ I have mislaid the reference to the source of this aphorism. Perhaps some of my readers can supply it.

In the Preface to his "Anatomie du Chat" (A, pp. xiv—xvii), Straus-Durckheim devotes several pages to a discussion of anatomical nomenclature, and the body of the work contains many original names. Professor H. S. Williams calls attention (A, Preface), to the "crying need of a standard and uniform nomenclature of comparative anatomy."

In the preface to their recent account of the morphology of the skull (A), Parker and Bettany say: "It has been attempted to narrate the facts by means of a consistent terminology, amplifying what Prof. Huxley has so admirably developed." Several of Huxley's papers (as 70), contain new terms, most of which have been generally accepted, and in a greater or less degree the same is true of the elder Agassiz (A), Gegenbaur (59), Hæckel (A), Marsh (1), and others.

That my own consideration of the subject is not wholly of recent date may be seen from the papers numbered 10 and 2.

SCOPE AND METHODS OF THIS REVISION.

Most of the toponomical terms here discussed have a general application. But a revision of the organonomy of the entire body would extend this article beyond desirable limits.

As stated by Pye-Smith (1, 162), "the nomenclature of the brain stands more in need of revision than that of any other part," and on the present occasion I will simply endeavor to remove, in some degree, the deficiency implied in the following words of the French editors of "Huguenin" (A, Preface):

"That which is demanded of anatomy is an exact nomenclature and determination of the parts of the brain in their relative positions and contiguity, and if possible in their continuity."

Doubtless, for the entire comprehension of its functions, and even for the final determination of some of its homologies, the vertebrate brain should be fully understood in respect to the disposition of its cellular and fibrous elements,—that which the writers just mentioned term its *continuity*. But whoever is at all familiar with the literature of encephalic histology, or who has undertaken for himself the exhaustive study of even a very limited part of the brain will, if of sincere mind, admit the present impossibility of fairly discussing the microscopical terminology of the organ within the limits of a single article.

With the gross anatomy of the brain, the case is somewhat different. In the first place, some knowledge of it is requisite as a foundation for the histological enquiry, as well as for general work in human or comparative anatomy, physiology, and pathology. Secondly, the parts which are distinguishable by the naked eye are comparatively few, and while the numerous errors which may be found in even standard works sufficiently attest the difficulties of encephalotomy, its methods are comparatively simple. It is to be hoped, however, that the microscopical terminology and synonymy of the brain may shortly find due treatment.

A recent paper is entitled by its authors: "A *Reformed* System of Terminology, etc." Now the word *reform* is generally associated with questions of ethical improvement; whereas terminological reforms involve no other principle than that of expediency, taking into the account, however, the future as well as the present and the past. Such moral truisms as "do right because it is right" have no counterparts in considerations of scientific nomenclature, and he who, affected by the *cacoethes reformandi*, insists upon reform for the sake of an ideal perfection, is apt to appear as nothing better than a troublesome and useless pedant.

In the place, then, of what otherwise might be styled the principles of terminological reform, I will enumerate briefly the objects of the present revision, the considerations upon which it is based, and the methods which have been pursued:—

To facilitate the acquisition and communication of accurate anatomical knowledge, by rendering the vocabulary equally applicable to all vertebrates, and equally intelligible to all nations.

That the test of the accuracy and completeness of a description is, not that it may assist, but that it cannot mislead.

To include in this vocabulary, so far as practicable, only such terms as are brief, simple, significant, of classical origin, and capable of inflection.

To propose as few changes as possible, and to introduce new names only for parts apparently unknown or unnamed before (*e. g., crista fornicis*), or in the place of semi-descriptive appellations undesirably long or incapable of inflection, as *e.g., cimbia* for *tractus transversus pedunculi, porta* for *foramen Monroi*.

To consider *brevity* as an especially desirable characteristic of such names as are most frequently employed.

When a part is known by a descriptive phrase, to select therefrom some characteristic word as the technical designation; *e. g., iter* (*a tertio ad ventriculum quartum*).

When two or more parts are similar, or have similar relations, to distinguish them by joining to some common title already in use, prefixes indicative of their relative positions; *e.g., postgeniculatum, prægeniculatum*.

To shorten the names of several parts by omitting the word *corpus*, and using the neuter adjective as a substantive.

To keep modern usage, and the rules of classical etymology constantly in mind, but not to be hindered thereby from the employment or even the formation of terms which are eminently desirable from the practical standpoint.

To discard terms which indicate *size*, those which refer to the *natural attitude* of man or animals, most *vernacular* names, and all names of the reproductive organs which have been applied needlessly to other parts of the body.

With regard to the point last-named, while it may perhaps be urged in extenuation that the *patres anatomici* entertained a notion as to the representation of the entire organism in the brain, some of their words certainly indicate an entire freedom from apprehension that the mysteries of encephalic anatomy ever would be discussed by ordinary mortals, much less by women, or under circumstances requiring propriety of speech.

As has been stated, and as will be exemplified in the vocabulary, I have placed great stress upon *brevity* as a desirable characteristic of anatomical terms. So long as the study of anatomy was nearly confined to members of the medical profession, they being comparatively few in number, and, by ancient tradition at least, not wholly averse to clothing their discourse in a sesquipedalian garb impenetrable to the vulgar eye, it mattered little whether the statement of a given fact or idea required one minute or five. But now, thanks to the popular writings of Agassiz, Dana, Gray, Darwin, Hæckel, Huxley, Owen and others, in so far especially as they have aroused a personal interest in the problems of evolution, natural history instruction is given systematically in all schools and colleges, and the time seems to have come when, in the words of the naturalist first-named, "Scientific truth must cease to be the property of the few; it must be woven into the common life of the world." It is probable, indeed, that those who employ anatomical language to a greater or less extent at the present day are at least one hundred times as numerous as when Dr. Barclay's praiseworthy effort at reform was received with indifference or opposition.

It may be asked: In the face of this rapid popularization of anatomical knowledge is it worth while to introduce, or even to retain, any purely technical terms?

Apparently some German scientists have determined upon a negative reply to this inquiry, and their papers, even those of strictly scientific nature, teem with vernacular words, and with compounds thereof fearfully and wonderfully made.

If this kind of verbifaction be tolerable under any circumstances, it certainly would be justified by the extent and importance of the contributions to knowledge which appear first in the German scientific periodicals.

Upon this point, however, I can do no better than to quote the very recent judgment of one who is at the same time an investigator, a promoter of "the diffusion of knowledge," and an admirer of the methods and results of German science:

"Every art is full of conceptions which are peculiar to itself; and, as the use of language is to convey our conceptions to one another, language must supply signs for those conceptions. Either existing signs may be combined in loose and cumbrous paraphrases, or new signs, having a well-understood and definite signification, may be invented. Science is cosmopolitan, and the difficulties of the study of zoology would be prodigiously increased if zoologists of different nationalities used different technical terms for the same thing. They need a universal language; and it has been found convenient that the language shall be Latin in form, and Latin or Greek in derivation."—Huxley, C, 14.

Unless it can be shown that there is an essential distinction between the methods of designating entire organisms, and the parts thereof, the foregoing passages should silence the objections of those who would have us retain a vocabulary as vague as was that of chemistry in the days of lime, vitriol and copperas—a vocabulary which combines the ponderous stiffness of the cloister with the puerile vagueness of the nursery.

Tuberculum bigeminum anterius must give way to *lobi optici*, or some even shorter term; while *trachea* must take the place of *windpipe, weasand, luft-rohre* and *conduit ærien*. Life is too short to spend in digging for truth with a long-handled shovel when a trowel will serve the purpose; nor is it becoming that any nation, however wise and great, should ask all the rest to take their intellectual food with chop-sticks of its peculiar pattern.

That there is no inherent obstacle to the employment of technical terms of classical derivation is shown by the readiness with which such words as *petroleum* and *phylloxera* have become domesticated along with the objects which they represent. There are scores of animals, like the *Rhinoceros*, *Hippopotamus*, and *Ichneumon*, for which there are no English vernacular names; while the youngest student of botany accepts *Hepatica*, *Anemone*, and even *Rhododendron* without difficulty or hesitation. Homely as it sounds, *stomach* is a strictly classical word, and the use of *caul* for *omentum*, or *sweetbread* for *pancreas*, would surprise a class in elementary physiology.

Even the late Jeffries Wyman, who saw no objection to *forearm*, and used *near* rather than *proximal* for the first row of *carpalia*, accepted *intermembral* as "good," and freely employed, if indeed he did not originate, the adjective *pretibial*, which probably would have come into general use had not the bone in question proved to be the homologue of the *intermedium*.—(Morse, 18, 13).

THE LIMITS OF TERMINOLOGICAL CHANGE.

As has been stated already, the modifications here proposed are intended to provide for what seem to be actual necessities, irrespective of purely theoretical considerations, and of any desire for a perfectly uniform and consistent terminology. It may be well, however, to specify certain general limitations to changes of anatomical nomenclature.

Priority is practically of little moment in respect to the names of organs, since it is usually difficult to ascertain when and by whom they were first applied. An example of this is afforded by the phrase *foramen of Monro*, (Wilder, 3). Nor, indeed, has priority always been held sacred in systematic zoology. Owen's "Deinosaurians" was proposed nine years later than von Meyer's "Pachypoda;" yet, as stated by Huxley (108, 33), it has been retained, notwithstanding the small size of some members of the group.

Etymological appropriateness is sometimes disregarded, as in the case just mentioned, and in the more familiar names *Reptiles*, *Vertebrates*, *Edentates*, &c. Prof. Huxley has recently expressed the common sense view of the matter as follows:

"If well understood terms which have acquired a definite scientific connotation are to be changed whenever advancing knowledge renders them etymologically inappropriate, the nomenclature of taxonomy will before long become hopelessly burdened." (B, 751.)

So, too, the names of organs have sometimes been given in reference to some variable or unessential character, or have even represented an erroneous idea; yet no one now thinks of discarding either *rectum*, *arteria*, or *carotid*.

Sometimes even brevity and etymological accuracy yield to established usage. The word *cubitum*, proposed by me in 1872 (10, 21) as the technical equivalent of *forearm*, is both shorter than *antebrachium*, and more in accordance with its classical employment; but the latter word seems to be more generally preferred, and I am ready to accept it.

In another case, even though a new term has not yet come into general use, a special vitality may be imparted to it by the authority of those who may have adopted it. No marked or persistent disfavor is likely to be shown to terms which, like *myelon*, can claim Prof. Owen as father, and find a god-father in Prof. Huxley.

MESON, ITS DERIVATIVES AND CORRELATIVES.

The present tendency of accurate anatomical description is to refer the position or direction of all parts and organs to an imaginary plane dividing the body into approximately equal right and left halves; hence it is desirable to designate this middle plane, or any line contained therein, by a word which is at once significant, short, and capable of inflection. Dr. Barclay proposed *mesion*, and *mesial* has been generally used; but would it not be better to adopt the very term employed by the Greeks to signify the middle, *meson*, τό μέσον, equivalent to the more ponderous Latin *meditullium*? The corresponding adjective is *mesal*, and the adverb *mesad*, while in combination it becomes *meso*.

The following general terms were also proposed by Barclay, and have been more or less systematically employed by Owen, Huxley and others: *Dorsal*, *ventral*, *dextral sinistral*, *lateral*, with the corresponding adverbial forms *dorsad*, etc. Should the alleged correspondence of the ventral region of the vertebrate with the tergal region of the arthropod prove to be one of true homology, it may be desirable in time to discard *dorsal* and *ventral* for more suitable terms, but for the present, if on practical grounds alone, it seems well to retain them.

CEPHALIC AND CAUDAL.

Barclay proposed *atlantal* and *sacral* for the designation of the position of parts lying toward the head or the tail in reference to an imaginary plane dividing the trunk at the middle of its length. But these terms were not applicable to parts beyond the atlas and the sacrum, so that new words were applied to the regions of the head. Perhaps this needless complication has hindered the general adoption of Barclay's nomenclature notwithstanding its many admirable features. At any rate, *cephalic* and *caudal* are much more acceptable terms, and are practically unobjectionable, although certain theoretical difficulties readily suggest themselves.

Proximal and *distal*, *central* and *peripheral* are in common use, and the general employment of their inflections and derivatives is only a question of time.

Ental, and *ectal* are here first proposed as substitutes for the more or less ambiguous words *inner* and *outer, interior* and *exterior, deep* and *superficial, profound* and *sublime.* Derived respectively from ἐντός and ἐκτός their significance is obvious, while their brevity and capacity for inflection will probably commend them to accurate working anatomists.

DESIGNATION OF THE REGIONS OF THE LIMBS.

Barclay's terms *ulnar, radial, tibial* and *fibular* refer to only two of the four aspects of each limb. Prof. Huxley has made the very important suggestion that, for comparison, all vertebrate limbs be regarded as placed in a *uniform normal position;* they are then extended laterad at right angles with the meson, with the convexities of the knee and elbow directed dorsad. Each limb then presents not only a proximal and a distal portion, but four general aspects, *dorsal, ventral, cephalic,* and *caudal.* Hence there appears to be no need for the introduction of the new terms employed to some extent by Huxley and other English anatomists, *epaxial, hypaxial, preaxial,* and *postaxial.* These words are also liable to misconception because *axial* has been used already in reference to not only the axis vertebra, but also the entire skeleton of the trunk as contradistinguished from that of the limbs.

DESIGNATION OF CURVATURES.

Ordinary descriptions of the directions of curvatures are apt to be ambiguous, and Huxley resorts to the phrase "arcuated outwards" to indicate the form of the mandibular rami of the Balænoidea. Since the Latins designated the two malformations of the legs, "knock-knee" and "bow-legs," by the words *varus* and *valgus* respectively, we may find it convenient to speak of parts whose convexities look mesiad as *varate,* and of those whose convexities look laterad as *valgate?* In other cases, however, and perhaps even in these, so long as there is any opportunity for misapprehension, it will be well to describe curvatures as *presenting a convexity* in one or another direction. For instance, the mandibular rami of the Balænoidea present a *laterad convexity,* while those of the Physeteridæ are convex toward the *meson.*

HYPOCAMPA.

This is employed by Vicq D'Azyr in the descriptions of the plates of his Traité D'Anatomie, published in 1786. The more common form *hippocampus* occurs in the list of anatomical terms in the same volume, but this may have been compiled partly by others, while the descriptions are obviously the work of the anatomist himself. Vicq D'Azyr does not discuss the etymology of the term, but says the "grande hypocampe" was first mentioned by Arantius and Varolius, whose works are not now accessible to me. Even Hyrtl does not seem aware of the use of the word by Vicq D'Azyr, and all other writers, so far as I know, make it *hippocampus.*

If the original orthography cannot be ascertained, *hypocampa* is to be preferred on etymological grounds; the ridges known as *hippocampus major* and *h. minor* bear no obvious resemblance to the fish known to the ancients as ἱππόκαμπος and *hippocampus,* but the larger of the two, which probably first received the name, does certainly present a most notable *downward curvature,* such as the Greeks might have designated by ὑποκαμπή.

DESIGNATION OF THE ENCEPHALIC CAVITIES.

As based upon the condition of things in man the current nomenclature of the ventricles had some slight foundation. But, in the light of better methods and more accurate knowledge, it appears incongruous and needlessly perplexing.

Let the learned anatomist lay aside his familiar acquaintance with the parts and their names, and put himself in the place of the beginner who, after gaining a general idea of the arrangement of the vertebrate brain from a frog or menobranchus, is trying to master the complexities of the mammalian organ from the brain of the cat, dog or sheep.

Leaving the myelon, he finds the *canalis centralis* expanding into a cavity which, although the first of the series, is called the *fourth* ventricle. The more or less distinct cavities corresponding to the cerebellum and the *lobi optici* are not called ventricles at all, and the *third* is between the thalami. The two "lateral" ventricles are rarely mentioned as the *first* and *second,* but since the numbers must be understood in order to account for the *third* and *fourth,* the student desires, in vain, to know which is the first and which the second. In point of fact, if the enumeration is begun at the cephalic end of the series, the lateral ventricles are the third and fourth, since there are well-developed ventricles in the *lobi olfactorii.* Finally, a "*fifth* ventricle" is mentioned, which is not only at the greatest distance from the fourth, but has no normal connection with the other ventricles, and is, in fact, no part of the series.

In view of all this, the task of describing to students the highways and by-ways of the brain,—which should be most attractive because therein is most clearly manifested the ideal arrangement of the organ,—is one from which I shrink as from any other kind of solemn nonsense. To my mind, indeed, rather than go on as we have been going, it would be at once more philosophical and more intelligible to adopt the simple vocal device employed by Straus-Durckheim for the designation of the metatarsalia—"padion, pedion, pidion, podion, pudion"—and to re-christen the ventricles by, for instance, the names *pran, pren, prin, pron,* and *prun.*

Fortunately, however, another alternative is presented. Whatever objections may be urged against them on theoretical grounds, a real practical advantage is gained by the use of the terms *rhinencephalon, prosencephalon, diencephalon, mesencephalon, epencephalon,* and *metencephalon,* and their German or English equivalents are likewise often employed for the designation of the general regions of the brain. Assuming that these terms are to be retained, and that they are to be learned by successive generations of students, why should we not transfer the distinctive prefixes to the Greek word for ventricle, *cœlia,* κοιλία? This would give us *rhinocœlia, procœlia, dicœlia, mesocœlia, epicœlia,* and *metacœlia.*

These terms are capable of inflection, and the longest of them is no longer than the Latin *ventriculus,* which requires a prefix or qualifying word. Lastly, but by no means of least importance, they correspond with the names of the encephalic segments. As will be seen in the list of names of the parts of the brain, these prefixes are employed for the designation of the membraneous roofs of the "third" and "fourth" ventricles, and the plexuses of these and the lateral ventricles. After a somewhat prolonged consideration of the matter, it seems to me that the practical usefulness and logical consistency of these new terms outweigh any objections that may be urged, and that these latter are less numerous and serious than could be brought against any other substitutes for the present heterogeneous and ill-applied nomenclature.

Two or more ventricles may be spoken of as *cœliæ,* while the "fifth" may be called *pseudo cœlia.* I hope, before long, to justify more fully the proposition already made* to consider the cephalic portion of the "third" between the *portæ* (foramina Monroi), as a morphologically independent cavity under the name of *aula.*

RHINEN, ETC.

May not *rhinen., prosen., dien., mesen.* and *epen.* be written, for the sake of brevity, for the full titles of the general divisions of the brain, *rhinencephalon, prosencephalon,* etc?

* Proceedings of the Am. Assoc. for Adv. of Science, Aug. 25, 1880 reported in "New York Medical Record."

The following abbreviations are printed in Webster's Dictionary without the period: *etym(on)*, *demirep(utation)*, *grog(ram)*, *hyp*, and *hypo(chondria)*, *noncon(tent)*, *hyper(critic)*, *navvy* for *navigator*; but the abbreviations above suggested should probably be followed by the period.

PRÆCOMMISSURA, ETC.

The single words *præcommissura*, *medicommisura*, and *postcommissura* are proposed as substitutes for the compound terms *commissura anterior*, *medius*, and *posterior*, and for their English equivalents. A similar change is desirable in the case of the three cerebellar peduncles, which may be more conveniently termed *præmeso-* and *postpedunculus*. So, too, the *corpora geniculata* (*external and internal*) may be called *prægeniculatum* and *postgeniculatum*; the *brachia* of the mesencephalon become *præbrachium* and *postbrachium*, and the two "perforated spaces," *præperforatus* and *postperforatus*. The "anterior pyramids" have been called by Owen "prepyramids," but more exact designations of these and of the "posterior pyramids" would be *ventripyramides* and *dorsipyramides*.

The prefixes are usually employed when the object referred to lies before, between, or behind other objects of a different kind; *e. g. præcordia*, *mediterraneus*, and *posterganeus*. The use here proposed is as if three dogs in line were designated by *præcanis*, *medicanis* and *postcanis*. If the terms are objectionable, what can be substituted for them? They are certainly as legitimate as are the well-established terms *prosencephalon*, *mesencephalon* and *metencephalon*. Do not the English words *preposition* and *postposition* offer some analogy?

The following points are mainly etymological and orthographical rather than anatomical.

THE CONNECTING VOWEL.

With derivative words the connecting vowel is commonly *i*; *e.g. alipes*, *claviger*, *fatifer*, *fidicen*, *fluctigena*, *decimanus*, *neurilemma*, and *xiphisternum*. But classical exceptions are *mulomedicus*, *quadrupedus*, *noctuvigilus*, and *decumanus*. In common English and scientific terms of Latin or Greek origin the *o* is common; *e. g. ambodexter*, *burgomaster*, *gastrotomy*, *termonology*, *ventrotnguinal*, *lateroflexion*, *mucopurolent*, *vasomotor*, *curvograph*, *neuroglia*, *oculospinal*, *pleuroperitoneal*, *xiphosura*, *septopyra*, *hemoglobin*, *cephalotribe*, etc. Rarely is it *e* as in *venesection*.

Should the *i* or the *o* be used in the following terms: *Dorsimeson*, *ventrimeson*, *dorsicumbent*, *latericumbent*, *dextriflexion*, *sinistriversion*, *cephaloduction*, *caudiduction*, etc.? Both analogy and euphony lead one to use the *i* when the first part of the word is of Latin origin, and the *o* with the Greek.

Should any of these terms be written as compound words?

COMPOUND WORDS.

The two Latin compounds known to me are *venerivagus* and *vesti-contubernium*. The following common or technical English compound words are selected from Webster's English Dictionary, or the Medical Dictionaries of Dunglison, or Littré et Robin, or from the writings of Barclay, Humphrey, and Straus-Durckheim: *Anglo-Saxon*, *concavo-convex*, *dextro-gyrate*, *ventro-appendicular*, *costo-vertebral*, *costo-alaris*, *caudo-pedal*, *osseo-cutaneous*, *occipito-scapularis*, *dorso-lateral*, *sterno-clavicular*, *clavo-cucullaire*, *clavi-sternal*, *clavio-humeralis*. By analogy with the foregoing, compound terms of direction should read *dorso-ventral*, *caudo-cephalic*, *meso-lateral*, *sinistro-cephalic*, etc.

HYBRID WORDS.

Some of the terms already mentioned are formed by the union of Latin with Greek words; *e. g.*, *dorsimeson*, *meso-lateral*, and *caudo-cephalic*; several others are likely to be employed; *e. g. clavo-mastoideus*, and *felitomy*.

Beyond the occasional intimation, in the dictionaries, that a term is hybrid, the subject seems to be ignored, and it might fairly be inferred that literary authorities entertain one or the other of two opposite convictions: either mongrel words are verbal monstrosities which will be shunned instinctively by all well-regulated minds, or there is no more serious objection to their use, or even their creation, than to the employment, or even the production, of mules, or the mixed varieties of grapes and roses.

However this may be, the fact is that the Latin and the Greek tongues have united to form the following nine hybrids which may be found in Latin writings: *anticato*, *biclinium*, *cryptoporticus*, *dentarpaga*, *epitogium*, *monosolis*, *monoloris*, *pseudo-flavus*, and *pseudo-urbanus*. Of these, the third only occurs with any degree of frequency.

Whoever will spend the time to look through an unabridged dictionary of the English language—and the interest as well as the instructiveness of such a search can hardly be realized by those who use the volume only for occasional reference—will find that, after excluding the twenty-five or more words ending with *meter*, which may perhaps be derived directly from the Latin form *metrum*, there are more than *one hundred hybrid* words, many of them in good standing. Many more are to be gleaned from the dictionaries of medicine and the other arts and sciences.

Nevertheless, it is probable that a due regard for the feelings of the classical purists in whose eyes language was not made for man, but rather man for language, will lead scientists to refrain from the introduction of mongrel terms when others will serve the purpose, and the present writer will be pleased to receive suggestions leading to the substitution of wholly unobjectionable words for any of the hybrids which have been mentioned.

(*To be continued in our next.*)

ON CHICKEN CHOLERA: STUDY OF THE CONDITIONS OF NON-RECIDIVATION AND OF SOME OTHER CHARACTERISTICS OF THIS DISEASE.*

By M. L. Pasteur.

II.

Concerning the properties of the extracts of the artificial cultivation of the germ of chicken cholera, an inquiry presents itself. We have shown that these extracts contain no substances capable of preventing the cultivation of the germs of this disease. They might, however, contain elements adapted to the vaccination of chickens. To investigate this point I have prepared cultivations where volume was not less than 120 c.c. After filtration and evaporation at a low temperature, while infinite care has been taken that its purity should not be affected, this liquid has given a dry extract, which was re-dissolved in 2 c.c. of water, and the totality of this was injected under the skin of a chicken which had never had chicken cholera. A few days afterwards the chicken, after being inoculated with a virus of the greatest virulence, died with the usual symptoms of *unvaccinated* chickens.

This class of experiments led to the following obsertion, which is of the greatest importance in physiology. When the extract from the cultivation of the germ of this disease, corresponding to an abundant development of the parasite, is injected under the skin of a fresh chicken in perfect health, the following phenomena take place: At first the chicken seems to suffer from a nervous dis-

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