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appointment is made from civil life, it is likely that the men of great and acknowledged ability then named, while devoting their attention to the many troublesome details incident to the management of a large body of men,—would deprive science of the benefits to be derived from minds which have been engaged for a lifetime upon one branch of research.

The best interests, both of the people, who pay for the bureau, of the army, to which it is a school of instruction, and of science, which looks to it for a thorough reorganization of its old methods (which were often clumsy and antiquated) and for a decided step in the direction of investigation and research,—would probably be most surely advanced by the appointment of one of the accomplished Officers of Engineers named above. Each of these gentlemen is entirely competent to administer the complicated business of the office, as each of them commanded, during the war, a brigade, division, corps, or even army, and as each of them since the war has been engaged in work where strictly scientific ability is required. Each of them has shown in both capacities marked strength, and the appointment could not go wrong if made from their number.

It is not the purpose of this article to advance the personal claims of any one, but to point out the direction in which, after careful thought, it seems the signal service may be led to the maximum of usefulness and efficiency, both to the people and to science.

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#### TO ASTRONOMERS.

The value of the work performed by the astronomers of the United States is now fully recognized, and has become an important factor in the progress of astronomy. They have at their command some of the finest instruments that have been produced, while their power to make good use of them is testified by the brilliant discoveries which they have recently made, forming most important records in the annals of the science.

We are glad to find that the publication of this journal meets an important want which is admitted to exist by astronomers, viz., a ready means of communication. We have received letters from Mr. Burnham, of Chicago, and from others, on this subject, and to-day Mr. Swift, of Rochester, makes the following statement, in a letter to us, enclosing a valuable astronomical paper:

“Of course you are aware that there is not, in this country, a single journal devoted exclusively to

astronomy; and for ephemerides of comets we have to depend on the *Astr. Nachr.*, but as it is printed in German no amateur takes it. Now if you would give a prompt ephemeris of all comets so that amateurs can ascertain where they are, or if on the discovery of every new comet a special circular be sent immediately to each subscriber announcing it and giving position, direction and rate of motion, and if everybody knew they could and would be thus informed, hundreds would take it [“SCIENCE”]. It would be a great satisfaction for them to know that they are to be kept weekly posted on a subject not mentioned by a single weekly publication on this continent.”

“It is a great consolation to know that there is no comet in the sky, for it relieves him of all suspense, and it is equally so to be told, at so cheap a rate, where it is and all about it. I could immediately notify you of all discovered by me, or telegraphed to me, from the Smithsonian Institution. I shall be pleased to call the attention of my friends, both here and elsewhere, to your JOURNAL, to increase its circulation that it may be liberally sustained.”

In regard to the above letter, we beg to announce that it will be our aim in the future to comply with the suggestions so ably expressed, and indeed have partially anticipated them.

We have, by courtesy of a distinguished member of the Naval Observatory at Washington, arranged for a weekly report compiled from their library by a gentleman perfectly familiar with practical astronomy, and in connection with the Smithsonian Institution and all astronomers at Washington. This will embrace a *resume* of both foreign and home literature, and especially will give immediate notice of astronomical information received at that establishment.

Professor Asaph Hall has recently furnished us with two communications, and we trust will in the future continue to favor us with notes. Professor Edward S. Holden will also occasionally give us the benefit of information coming within his knowledge. Professor Stone, of the Cincinnati Observatory, has already placed us under many obligations for constant communications, and up to date is one of our most esteemed correspondents. Professor Burnham, of Chicago, has also engaged to give us astronomical information in his special department, and is now only delayed, by the condition of the atmosphere, from making some important observations with the great Dearborn Equatorial, to be published in “SCIENCE.” Professor Swift, of Rochester, as his letter states, will communicate to us immediate notice of results obtained with his new and

magnificent instrument by Alvan Clark, and lastly, Mr. Sawyer, of Cambridgeport, undertakes to report on his interesting systematic observations of meteoric phenomena.

As "SCIENCE" is published weekly this information will be mailed to astronomers every Friday evening, and should important astronomical information reach us early in the week, we undertake to mail a special despatch, giving the information mentioned by Professor Swift. We think this programme will be a prompt compliance on our part, with the request made in Professor Swift's letter, and we trust will be acceptable to astronomers; we further ask the co-operation of all possessing, or in charge of, observatories to put themselves in communication with us and make suggestions, as it is our desire to make the most perfect arrangements, and to offer in "SCIENCE" a medium for universal intercourse for those engaged in astronomical studies.

In regard to other branches of science, equally important arrangements are being made and will be shortly announced.

CONTRIBUTIONS TO ENCEPHALIC ANATOMY.  
—THE OBJECTS AND METHODS OF A  
STUDY OF THE ICHTHYOPSIDEAN BRAIN.

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II.

Inasmuch as Huxley's class of the Ichthyopsida contains the lowest of the living vertebrate forms, it would appear one of the most important undertakings for the cerebral anatomist to determine the structural relations of the brain, spinal chord and principal nerves in that class. In fact, *a priori*, the student might conclude that the anatomy of a simple brain like that of a fish would represent a sort of rough and rudimentary sketch of the fundamental features of the higher mammalian brain, and that for this reason alone, its study would be essential to the human anatomist.

Nothing could be more erroneous!

Any one familiar with the visceral and osteological anatomy of the fish tribes will bear me out in the statement, that however convenient it may be to pigeon-hole the Amphibia, Elasmobranchi, Teliosts, Ganoids, Dipnoi and Marsipobranchi in one great class, on the strength of the formal common character, that they have no amnion at the embryonic period, and always have gills at some time of or throughout life,\* that there are actually

\* These are the only constant characters separating them from other groups, and it is even doubtful whether we are justified in denying the existence of the morphological representative of the amnion in all the anna.

more fundamental diversities between the different primary groups of this class than between at least one group of this class and the Sauropsida.

As it would be difficult to find an archetype of the vertebral skeleton in any ichthyopsidean, so it is a task requiring far more discrimination and careful study than is generally devoted to this subject to determine the cerebro-spinal archetype in any member of this group, aside from the protean amphibians. For there are greater differences between the architecture of a shark's and a pike's, a herring's and a sturgeon's, an electric eel's and a lamprey's, than between an amphibian and a mammalian brain. While the differences between the brain of a frog and of a man can almost all be referred to quantitative variations in the relative proportions of similar and homologous parts, the differences between the brains of the other animals named are of a qualitative character. It actually becomes a question whether a homology between the parts of an amphibian and of a shark's brain can be established.

Notwithstanding the difficulties enshrouding this subject, both writers on human and on comparative cerebral anatomy skim over the subject with a remarkable *nonchalance*. The latest compilation on the human brain\* neglects any mention of the fact that the cerebral lobes of fishes are commonly solid, informs the student that there are symmetrical halves in these animals constituting a cerebellum, and repeats the statements of as old an author as Cuvier without the slightest reference to the recent controversy on the homology of the fish's brain, in which Gegenbaur, Fritch, Stieda and Maclay have taken part.

The text book on Zoology used at most of our colleges, Packard's work, on passing through the ordeal of criticism at the hands of Wilder, is shorn of nearly every statement it makes regarding the fish's brain, since scarcely a reliable one is contained in the volume.

The question of the true homology of the fish's brain being still *sub judice*, the human cerebral anatomist can only lose time, and writers on the human brain only confuse their students by devoting attention to this problematical subject.

It is a legitimate field of study for the zootomist alone, and in its morphological respects the subject bids fair to prove rich in surprising and suggestive results, which, when once established on the basis of observation, may be utilized by the human anatomist and physiologist in generalization.

The questions to be determined will appear from the following; their answer is as yet a desideratum.

1st. A careful surface study of the brain of at least one representative of each great group should be made. Careful and enlarged representations of each such brain as projected in the five cardinal views, namely, the dorsal, ventral, lateral, anterior and posterior should be drawn, and the brains preserved for reference, in the manner to be detailed.

2d. A median section of each such brain should be made, and delineated, in order to expose the axis contours of the ventricular cavities.

\* "The Brain as an Organ of the Mind," by H. Charlton Bastian, 1880.