enthielt nur einige Copepoden und ein Exemplar einer mikroskopischen Meduse mit acht Fangarmen.

Die Probe von der Westküste von Candia ergab kein Resultat bezüglich thierischer Organismen.

Von Alexandrien erhielt ich einige Dinoflagellaten, und zwar ist hervorzuheben, daß die hier gefundenen Arten vollkommen mit denen aus den Lagunen von Venedig übereinstimmen. Besonders zahlreich waren *Peridinium Michaelis* Ehrbg., *Ceratium furca* (Stein, Taf. XV, Fig. 7—9), *C. furca* var. *contorta* Pouchet = *C. dilatatum* Gourret und eine langhörnige *Ceratium*-Species vom Typus *tripos*.

Zürich, den 24. Januar 1886.

7. Über Stein's Cilioflagellatengattung Cenchridium.

Notiz von Dr. Aug. Gruber, außerordentl. Prof. der Zool. in Freiburg i/Br.

eingeg. 28. Januar 1886.

In No. 213 dieses Anzeigers erschien ein Artikel von v. Daday, in welchem der Verfasser nachweist, daß Stein sich im Irrthum befand, als er »die von Ehrenberg und Williamson als Rhizopoden beschriebenen *Cenchridium*- und resp. *Entosolenia*-Gattungen für Cilioflagellaten erklärte«; dieselben seien vielmehr Rhizopoden. Es möge mir erlaubt sein, hier zu bemerken, daß ich in meiner Arbeit »Die Protozoen des Hafens von Genua« (Nova acta Leop. Carol. etc. 46. Bd. No. 4. 1884), worin ich einige der betreffenden Formen genauer beschrieb, bereits auf den Stein'schen Irrthum aufmerksam gemacht habe. Die betreffende Anmerkung (p. 503) lautet: »Das Manuscript zu dieser Arbeit war bereits dem Drucke übergeben, als mir von Stein ' ‚Organismus der Infusionsthiere' die neu erschienene zweite Hälfte des dritten Theiles zu Gesicht kam, worin Stein die Gattung *Entosolenia* unter dem Namen *Cenchridium* (Ehrbg.) zu den Flagellaten zieht. Stein's *Cenchridium sphaerula* gleicht sehr meiner *Lagena siphoniata* und ist wie die übrigen Formen dieser Gattung als Schale eines Rhizopoden und nicht eines Cilioflagellaten zu betrachten.«

8. Observations upon the presence of the Corpus Callosum in the brains of the Amphibians and Reptiles.

By Dr. Henry J. Osborn, of Princeton.

eingeg. 29. Januar 1886.

The Anterior Commissure of the cerebral hemispheres in the Mammals, as described by Sander[1] and later authors, consists of two

[1] Über Faserverlauf und Bedeutung der Comm. Ant. b. d. Säugethieren. Berlin, 1866.

parts which, after their distribution, are known as Pars olfactoria and Pars temporalis. In the median line and for some distance laterally they form a single, compact bundle arching forwards, but at the base of the Nucleus lenticularis (Hoffmann and Rauber), they divide, and respectively bend forwards to the olfactory lobes and backwards to the temporal lobes. The position of this commissural system, it will be observed, is in the brainstem and not in the mantel, to use an embryological distinction.

In Stieda's[2] article upon the Frog's brain he described the anterior commissure as follows, the words in brackets are my own:

»Außerdem existiren zwei bedeutende Querfaserzüge. Der eine (lower bundle), liegt gerade an der Verschmelzungsstelle der Lobi hemisphaerici mit der Lamina terminalis. Er stellt sich auf Querschnitten dar als ein nach unten etwas gekrümmter Bogen, dessen seitlich gerichtete Schenkel in die Basis der Hemisphären ausstrahlen. Ferner existirt ein anderes etwas kleineres Bündel (upper bundle), welches auch eine Bogenform hat und über dem oben beschriebenen dicht am Boden des Ventriculus communis liegt. Das Bündel kehrt seine concave Krümmung nach vorn und oben, seine Enden liegen in der medialen Wand des Lobus hemisphaericus und lassen sich etwa bis zur Furche an der medialen Wand begleiten. Ich betrachte beide Bündel gewissermaßen als zu einem System gehörig und nenne sie Commissura anterior. . . . . Ein ganz kleiner Theil der Längsfasern an der medialen Wand jedes Lobus hemisphaericus läßt sich bis nach vorn in die Gegend des Tuberculum begleiten; wie es scheint, entstammen dieselben den oberen Bündeln der Commissura anterior. . . . . Das am Boden dieser »Grube« erscheinende in die Lobi hemisphaerici vorn austretende Querbündel deutet Reißner als corpus callosum. Das darunter liegende Querbündel erhält weiter keine Bezeichnung. Ich fasse das obere Bündel nicht als Corpus callosum, weil die Lagerung desselben am Boden der gemeinschaftlichen vorderen Hirnhöhle mir zur sonstigen Lage des Corpus callosum nicht recht passen will. Mir vielmehr scheint es, als ob beide Querbündel der Commissura anterior der Säuger nach Lage und Aussehen sehr bequem zu vergleichen sind; das untere Bündel (Pars temporalis) würde dann dem in die Corpora striata, das obere Bündel dem nach vorn in die Tubercula olfactoria (Pars olfactoria) hineinziehenden Theil entsprechen.«

In course of my recent study of the Amphibian Brain[3] I at first adopted Stieda's interpretation of these commissures, but with every

[2] Zeitschr. f. wiss. Zool. 20. Bd.

[3] Brain of *Amphiuma*, *Menopoma* and *Rana*. Proc. Phil. Acad. Nat. Sc. 1883 and 1884.

new form studied it became clearer that Stieda's upper bundle is not homologous with the Pars olfactoria of the anterior commissure. This and other observations led me to the following hypothesis: that the lower bundle corresponds to the anterior commissure of the mammalian brain including its two parts, while the upper bundle is homologous with the Corpus callosum. This view of these commissures in the amphibian brain seems to have been held by Leuret and more distinctly by Reißner; and in the reptilian brain by Stieda[4], who wrote as follows of *Testudo* and *Emys*: »Der untere quere Theil der Commissur dürfte der sogenannten Commissura anterior, der obere gekrümmte dem Corpus callosum im Gehirn der Säugethiere zu vergleichen sein.«

The material at my disposal for the solution of this interesting question consisted of series of consecutive brain sections, cut in three planes, of the following animals: an embryo Guinea Pig (*Cavia*); Turtle (*Testudo graeca*, *Emys europaea*); Amphibians (*Menopoma*, *Amphiuma*, *Menobranchus*, *Proteus*, *Salamandra*, *Rana*); Fish (*Trutta fario*).

In the following outline of the results already reached, to avoid confusion, I will continue to use the terms lower and upper bundles and refer the reader to the foregoing description of their position, as quoted from Stieda.

1. Lower Bundle. A very close examination of the brain of the Frog (*Rana mugiens*), in vertical section, shows that the transversely cut lower bundle consists of two parts, an upper larger part making up $^4/_5$ of the bundle, a lower smaller part making up $^1/_5$ of the bundle. As the sections pass from the centre, the fibres composing the (a) larger part turn forwards and traverse a mass of scattered cells; from the latter they emerge and pass forwards and downwards into the lower outer wall of the hemispheres towards the olfactory lobes. This is a large, somewhat diffuse, tract whose fibres seem to supply not only the olfactory lobes but the cells of lower ventricular gray substance of the hemispheres. The fibres of the smaller part (b) follow the transverse direction of the above for some distance and then turn backwards and outwards into the floor of the posterior horn of the lateral ventricle.

The course of these larger and smaller divisions at once suggests that they may be compared to the Pars olfactoria and Pars temporalis of the anterior commissure of the higher order of brain, and that the disparity in size is owing to the feeble development of the temporal lobe region in the amphibia.

In the turtle the lower bundle arches strongly forward and un-

[4] Über den Bau des centralen Nervensystems der Schildkröte. Zeitschr. f. wiss. Zool. 25. Bd.

doubtedly represents the Pars olfactoria; whether a division of this bundle is present has not as yet been observed.

2. Upper Bundle. In the Amphibia, the upper bundle is sometimes widely separated from the lower (*Menobranchus*, *Proteus*), and passes across from one hemisphere to the other, completely surrounded by the ventricle (thus resembling the commissura mollis). In other forms it is separated from the lower bundle by the molecular subtance of the lamina terminalis (*Rana* etc.). In all cases its fibres rise compactly upon either side of the ventriculus communis and then turn sharply forwards over the foramen of Monro. A part of its fibres are given off directly to the inner hemisphere wall, but the greater part form a longitudinal bundle in the inner half of the roof of the ventricle, which rapidly gives off its fibres to the cells of the central gray; these fibres supply the entire upper medial cell area of the hemispheres; the bundle thus rapidly diminishes forwards and in the region of the olfactory lobes is no longer distinguishable. In the Reptilian (Turtle) brain is found an important step towards the mammalian brain, in that the upper and lower bundles lie below but somewhat in front instead of behind the foramina of Monro. It follows that the upper bundle does not decribe the circuitous course to its distribution which is observed in the Amphibia, but ascends obliquely forwards in the inner hemisphere wall and divides into two branches, the one spreading upwards and backwards above the foramen of Monro, the other upwards and forwards in the inner hemisphere wall.

3. The Fish brain has not yet been thoroughly studied. I can at present only confirm the observations of Fritsch[5], Miklucho-Maclay[6] and others that besides the lower bundle, which undoubtedly is in relation with the olfactory lobes, there is an upper bundle, the direction of whose fibres is distinct from that of the lower since they pass upwards and backwards. It seems highly probable that the upper bundle will prove identical with the same in the Amphibia and Reptiles and confirm Miklucho-Maclay's views of its homology.

4. The size of the two bundles in most of the Amphibia is about the same. In *Menobranchus* and *Menopoma*, however, also in the Turtle, the upper bundle is somewhat larger. Bearing upon this proportion, is the observation of Flower[7], on the brains of the Monotremes and Marsupials, »that the want of upper (corpus callosum) fibres is compensated for by the immense size of the anterior commissure«. Also of Sander[8] that in the Marsupials the anterior commissure sup-

[5] Untersuchungen über den feineren Bau des Fischgehirns. Berlin, 1878.
[6] Beiträge zu vergl. Neurol. Leipzig, 1870.
[7] Philosophical Transactions of the Royal Society 1865.
[8] Arch. f. Anat., Phys. u. wiss. Med. 1868.

plies a large part of the ventro-lateral region of the hemispheres, which in the higher Mammals is supplied by the corpus callosum.

The position of the earliest fibres of the corpus callosum in the Mammalian Embryonic brain is directly above the anterior commissure although separated by a considerable interval of the lamina terminalis, in which descend the fibres of the fornix. The corpus callosum has the same position permanently in the adult Monotremes and Marsupials.

There is no ground for comparing the upper bundle with the fornix as the distribution of its fibres is altogether different. The conclusions at present drawn from the above observations are therefore the following:

1. That the lower bundle in the Reptiles, Amphibia and Fishes represents the Anterior Commissure. This commissure consists primitively of the, *a*) Pars olfactoria, with extensive commissural fibres of the ventro-lateral moiety of the hemispheres superadded, *b*) Pars temporalis, which, feebly developed in the Amphibia, increases with the progressive development of the temporal lobe.

2. That the upper bundle in the Amphibian and Reptilian Brain is the Corpus Callosum and contains the fibres of the dorso-medial moiety of the hemispheres.

Histologisch-anatomisches Laboratorium, München, 28. Januar 1886.

Postscript. (16. Februar.)

There is considerable discrepancy in the description of the cerebral commissures in various Teleosteans by Mayser, Fritsch and Rabl-Rückhard. After a careful study of these commissures in the brain of the carp it strikes me that this may be due to a high degree of generic specialization in the Teleostean brain rather than to imperfect observation. For example I find the commissures in the carp differ very widely from those in the Trout. From this fact it seems somewhat hazardous to homologize these bundles in the Teleostean brain with the upper and lower bundles which are so distinct in the Amphibian and Reptilian brain. Yet, omitting the fornix, the generalization of Miklucho-Maclay is probably correct that the extensive commissures in the fish brain present the anterior commissure and corpus callosum in their primitive form.

The Pars temporalis of anterior commissure is very well developed in the brain of the Turtle, and from its horizontal course is more readily demonstrated than the Pars olfactoria. The distribution of the upper bundle (corpus callosum), over the entire inner wall of the hemispheres can be beautifully shown in vertical sections. Opposite the upper part of the foramen of Monro, the upper bundle gives off a large branch which passes above the foramen along the inner fold

of the hemispheres, overlapping the optic thalami. This tract resembles so nearly that of the posterior pillars of the Fornix that I think we have here the elements of this organ, althoug I have not yet found distinct descending tracts. — The suggestion of Rabl-Rückhard (Zool. Anz. 1882) that a commissure, bridging the ventriculus communis, which he observed in the Reptilian brain and exists in all the Amphibia, is a rudiment of the fornix seems to me very improbable.

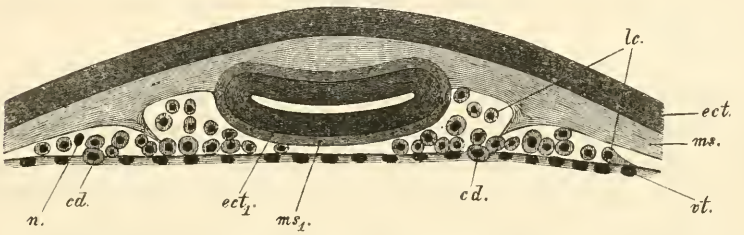
9. Note sur le développement des Céphalopodes [1].

Par Wladimir Schimkewitsch.

I. eingeg. 1. Februar 1886.

Bobretzky a signalé l'augmentation des cellules de la membrane vitelline (yolk epithelium de Ray-Lankester) dans la partie postérieure du sac vitellin [2]. Mais en effet cette augmentation a lieu dans les stades plus précoces. Ainsi, pendant la formation de la bursa radulæ on observe sur les coupes transversales de la partie antérieure de l'embryon à côté de l'intestin antérieur deux lacunes sanguines, dont

Fig. 1.



Coupe transversale de l'embryon de *Sepia*, pendant la formation de la bursa radulae (comp. Fig. 18 de la pl. II de Bobretzky). *ect* ectoderme; *ms* mesoderme; ect_1 ectoderme de l'intestin antérieur; ms_1 mesoderme de l'intestin antérieur; *vt* membrane vitelline; *lc* lacunes sanguines; *cd* cellules de la membrane vitelline en voie de division; *n* noyau libre.

la paroi supérieure (dorsale) est formée par le mesoderme et la paroi inférieure (ventrale) par la membrane vitelline (Fig. 1 *lc*). Parfois on voit, que les cellules de cette dernière prennent la forme arrondie et se divisent en deux, dont la supérieure est placée dans la lacune (*cd*). Dans la lacune ces cellules subissent la division, pendant laquelle leurs corps et noyaux deviennent plus en plus petits. Enfin, elles prennent la forme de »blasige Zellen«, dont le plasme presque ne se co-

[1] Les observations sont faites sur les œufs de *Sepia* sp.? des collections du Musée Zoologique de l'Université de Moscou, prêtés à ma disposition par Mr. le professeur Bogdanoff.

[2] Recherches sur le développement des Céphalopodes. Mém. de la Soc. Imp. des Amis des Sc. Nat. t. XXIV. 1. edition p. 42.