and but three small gifts. President Schurman's report, extending to 57 pages, is followed by appendices filling 117 pages, which give reports from other executive officers, the courses and attendance, and the publications by the University officers.

DISCUSSION AND CORRESPONDENCE.

ORGANIC SELECTION.

TO THE EDITOR OF SCIENCE: It seems to me that Professor Poulton's conclusion of the very interesting discussion on 'Organic Selection,' published in SCIENCE, October 15th, involves a serious confusion of ideas. He advocates the theory that natural selection confers on organisms the power of reacting adaptively to external forces. It is easy to conceive the effect of natural selection on an organism, assuming that the power of adaptation pre-exists; but it is incomprehensible that any amount of advantageous crossing should give the power of adaptation itself to an organism that does not already have it. Professor Poulton's arguments against that power being a property of a living organism are, I think, inconclusive. He dwells on the remarkable fact that physical forces awake responses which have to do with organic relations; but what of it? This shows only how powerful the tendency is. It is clear that any substance, animate or inanimate, reacts according to its own nature. If you drop a lighted match on to a pile of shavings, or on gunpowder, or into water, or on to a dog, certain pretty definite phenomena will occur in each case; yet the stimulus is the same; the recipient only is different. In the three earlier cases the results will be physical; in the case of the dog we reach the sphere of sensation. If the experiment be performed on a man we involve the moral sphere also, as he will either swear or refrain from swearing.

THOMAS DWIGHT.
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October 20, 1897.

A GASOLINE LAUNCH FOR FIELD WORK.

TO THE EDITOR OF SCIENCE: Last winter several papers and magazines, including SCIENCE (Vol. V., No. 119), noted the fact that I was constructing a gasoline launch for facilitating the study of paleontology and stratigraphic geology at Cornell University. Feeling that the results of this undertaking have been satisfactory in every way, and may be of interest to other investigators and teachers, I take pleasure in furnishing the following notes: First, as to what has been accomplished during the summer with this launch; second, why a naptha or gasoline launch is preferable to one propelled by steam.

July and August were spent on a long voyage from Ithaca to lower Chesapeake Bay and return, going *via* Erie Canal, Hudson River, Raritan River and Canal, Delaware River, Delaware and Chesapeake Canal, Chesapeake Bay and its many inflowing rivers. The special object of this expedition was to collect large quantities of Eocene and Miocene mollusca from Maryland and Virginia. Four students and myself constituted the party. During September a shorter excursion was made along the Erie Canal to Troy, N. Y., where Archæan, Cambrian, Ordovician, Silurian and Devonian outcrops were visited, either as they were found along the canal or at no great distance to the north or south. During term time the launch is being used for taking classes to fossiliferous outcrops along Cayuga Lake.

Now, a word as to why gasoline is preferable to steam:

1. Cost.—(*a*) Any well constructed boat 30 feet long, with a 6-horse power gasoline engine will run 800 miles on two barrels of oil; cost about $9.00 on an average, *i. e.*, a little over a cent a mile; (*b*) while on government waters no licensed engineer or pilot is required. With a few days' practice, under the direction of one acquainted with the engine, one learns his engine thoroughly and can as easily go up the Potomac to Washington as navigate his own mill-pond.

2. Freedom from government inspection.

3. There being no boiler or fire, the boat is light, roomy and cool.

4. When stopping at an outcrop no gasoline is being used. The whole machine is at a standstill, dead. But to start up and get under full speed requires less than a minute.

There are many other interesting points that ought to be touched on here, but space will

scarcely permit it. Those who may be interested in the subject are at liberty to make such inquiries of the writer as they see fit. Suffice it to say that in a country like our own, well traversed by water ways, a marine laboratory capable of rapid locomotion, at an exceedingly small cost, seems a very desirable adjunct to true university work in natural history subjects.

G. D. Harris.

Cornell University.

SCIENTIFIC LITERATURE.

Ueber Verwachsungsversuche mit Amphibienlarven. Von Dr. G. Born. Leipzig, W. Engelmann. 1897. (Reprinted from Archiv für Entwickelungsmechanik, Band IV.) 8vo. Pp. 224. Pls. I.–XI.

Professor Gustow Born is distinguished among living morphologists for the novelty and thoroughness of his investigations. It is to him that we owe the section modelling which is now so much used for the anatomical reconstruction of embryos, and which he has himself applied with brilliant results to the study of the development of the thyroid and of the heart. To him we owe also the experimental demonstration of the isotropism of the egg. In the present work we encounter again striking originality of method, coupled with extraordinary patience and thoroughness in the execution of the research. The method consists in the artificial union of two amphibian larvæ; this is accomplished by making a smooth cut on each larva, adpressing the two cut surfaces and allowing them to grow together; the natural fusion begins in half an hour to express itself and is complete in a few hours; in successful cases the united pair develop in unison and remain alive for weeks. Dr. Born's patience shows itself in the number and variety of fusions accomplished and in the exhaustive anatomical study of the developed monstrosities.

The only earlier experiments on fusion of two individuals were those of Trembley on Hydra, recently repeated by G. Wetzel. On the other hand, the announcement of Born's results has already occasioned a number of similar experiments on other animals. W. Roux appears to have first discovered the extraordinary power of the eggs and young larvæ of frogs of withstanding severe mechanical injury, and others have demonstrated the wonderful regenerative faculty of Amphibia during the early stages. Born has taken advantage of these characteristics to secure the concrescence of two individuals which develop afterwards as one. The spread of the ectoderms is the first step of the union, and there is in a short time a complete sheet of this tissue, with no visible break or trace of demarcation, extending from one larvæ to the other and covering the wound. This healing over is effected by the expansion of the sheet of ectoderms, and this expansion is not due to multiplication of the cells. Most of Born's experiments were made on larvæ of four millimeters (more or less) in length and on the following species: *Rana esculenta Bombinator igneus* and *Pelobates fuscus*; the larvæ of toads and of Rana fusca proved less favorable. Pieces of almost any size can be made to unite either of the same, or of different larvæ, and even of larvæ of two species. When the experiment succeeds such united pieces will live for about three weeks, or, in other words, until the supply of yolk material for the maintenance of growth is exhausted, but, if one or both the pieces have a digestive tract with mouth and arms, the united pieces may continue to develop indefinitely, and in such cases the blood channels of both species acquire open communication with one another, so that even when there is but one heart the blood circulates through both components. During the life of the fused larvæ, their development, their differentiation proceeds, each organ continues its progress. The development essentially follows the principles of Roux's mosaic theory.

The following schedule indicates the variety of successful unions accomplished by Professor Born:

A. Experiments on single larvæ.
   1. Pieces cut off and allowed to continue their development.
   2. Larva cut through and the pieces reunited.

B. Fusion of two larvæ, or parts of two larvæ.
   1. Both larvæ of the same species.
      a. Fusion of anterior with posterior pieces.
      b. Fusion by the ventral surfaces.
      c. Fusion of the posterior piece of one larva with the ventral side of another.