Prof. Wolf's law refers to the connection between A and B, while our remark refers to B and C. We consider two successive minima as the beginning and end of a single period, while M. Wolf, at least in this particular research, places the minimum within the period, and compares the descent from the preceding maximum with the ascent to the next one.

We have considered the connection thus indicated of sufficient importance to apply to it the following test. If, using the previous notation, a definite relation exists between A and B, the *ratio* of the times which the events occupy in every epoch ought to be approximately constant; similarly with respect to B and C; and this ratio should not be influenced by the *absolute* duration of the two successive events. It is clear that the greater uniformity of these ratios will be a test of their interdependence. The following is the result of the comparison:—

a. Prof. Wolf's law: comparison of A and B.

	Periods.	Duration of descent (A).	Periods.	Duration of ascent (B).
I.	1829·5 to 1833·8	4·3 years	1833·8 to 1837·2	3·4 years.
II.	1837·2 to 1844·0	6·8 ,,	1844·0 to 1846·6	2·6 ,,
III.	1846·6 to 1856·2	9·6 ,,	1856·2 to 1860·2	4·0 ,,

	Ratio $\frac{A}{B}$.		Difference from mean.
I.	1·265	Mean 2·093	−0·728
II.	2·615		+0·522
III.	2·400		+0·307

These differences from the mean are so considerable that in the present state of the inquiry a connection between any descent and the immediately *succeeding* ascent appears highly improbable. A very new and apparently important relation seems, however, to result from a similar comparison of any ascent and the immediately succeeding descent, or between B and C.

b. Comparison of B and C.

	Periods.	Duration of ascent (B).	Periods.	Duration of descent (C).
I.	1833·92 to 1836·98	3·06 years	1836·98 to 1843·75	6·77 years
II.	1843·75 to 1847·87	4·12 ,,	1847·87 to 1856·31	8·44 ,,
III.	1856·31 to 1859·69	3·38 ,,	1859·69 to 1867·12	7·43 ,,

	Ratio $\frac{C}{B}$.		Difference from mean.
I.	2·212	Mean 2·151	+0·061
II.	2·044		−0·107
III.	2·198		+0·047

PROF. AGASSIZ'S EXPLORING EXPEDITION *

WE have already announced the departure of the United States Coast Survey exploring steamer, *Hassler*, upon that scientific mission which, under the direction of Prof. Agassiz, will doubtless be productive of very important results. Just before starting on the expedition, Prof. Agassiz addressed a communication to the Superintendent of the Coast Survey, in which he ventured to assume the character of a prophet by stating in advance what it was probable would crown their efforts in the way of discovery.

The Professor makes this communication in the hope of showing within what limits natural history has advanced toward that point of maturity when science may anticipate the discovery of facts. Basing his expectations upon the ascertained principles of science, and taking into consideration the relationshlps between different forms of animal life, and the succession of geological epochs, and in view of the very interesting results of later deep-sea dredging expeditions in the North Atlantic, he anticipates the discovery, "from the greater depth of the ocean, of representatives resembling those types of animals which were prominent in earlier geological periods, or bear a closer resemblance to younger stages of the higher members of the same types, or to the lower forms which take their place nowadays."

Making no suggestion in regard to mammals, he remarks that if reptiles exist in the deep waters, they must be only such as are related to the extinct types of the Jurassic periods, such as the ichthyosauri, plesiosauri, and pterodactyles; but even of these he thinks there is very little probability that any representatives are still alive.

Among the fishes he expects to discover some marine representatives of the order of ganoids of the principal types known from the secondary zoological period. Among the sharks he thinks he shall find new forms allied to *Cestracion*, or *Hybodon*, or *Odontaspis*, as also new genera of chimæroids; and among ordinary fishes the allies of *Beryx*, *Elops*, &c. It is among the molluscs and radiates that objects of the greatest interest will probably be met with: and chief among these will be nautiloid cephalopods—perhaps even ammonites—and forms only known hitherto in the fossil state. Among *Acephala* he anticipates the discovery of a variety of forms resembling those from the Jurassic and Cretaceous deposits; while *Rudistes* will take the place of oysters, and brachiopods be found very abundant.

Among *Crustacea* it is not at all impossible that forms may be found resembling trilobites; while among echinoderms he confidently expects to meet with spatangoids approaching *Holaster*, and others akin to *Dysaster*, &c.

A careful comparison of the members of the deep-sea faunæ of the northern and southern hemispheres will probably prove of the greatest interest, and, judging from the peculiarities of the land and shore fauna of Australia, it is likely that the adjacent deep-sea animals will be equally divergent, and will represent remarkable forms, and especially of an extremely antique type.

The Professor also hopes that much light will be thrown upon the subject of the geology of the southern hemisphere, and upon the general features of the drift, since all the phenomena related to the glacial period must be found in the southern hemisphere with the same essential characteristics as in the northern, yet with this difference, that everything must be reversed; that is, the trend of the glacial abrasion must be from the south northward; the lee side of the abraded rocks must be on the north side of hills and mountain ranges, and the boulders must have been derived from rocky exposures lying to the south of their present position. This point, however, must be established by observation. The Professor thinks this will be found to be the case, with the exception, perhaps, of the present glaciers of Tierra del Fuego and Patagonia.

In reply to the possible inquiry as to what the question of drift has to do with deep-sea dredging, he remarks that the connection is closer than may at first appear. If drift is not of glacial origin, but the product of marine currents, its formation at once becomes a matter for the Coast Survey to investigate; but he expresses the belief that it will be found that, so far from being accumulated by the sea, the drift of the lowlands of Patagonia has been worn away to its present extent by the continued encroachment of the ocean, in the same manner as the northern shores of South America and of Brazil have been.

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SCIENTIFIC SERIALS

Annalen der Chemie und Pharmacie, clix., August 1871. Fittig and Remsen communicate a second paper "On the Constitution of Piperine and its decomposition products, Piperic Acid and Piperidine;" in the former paper two oxidation products were described, piperonal and piperonylic acid, which stand to each other in the relation of aldehyde and acetic acid. In the present communication several new reactions of these substances are described.—The second note, "A Reaction of free Phenol-hydroxyls," shows that the benzene derivatives, containing hydroxyl associated with this nucleus, give colours with a neutral solution of ferric chloride; the intensity of the colour produced seems to bear some proportion to the number of free hydroxyl atoms, the more intense colours being produced by bodies containing more than one hydroxyl.—A paper "On the relations between the Glycerin and Allyl compounds," by Huebner and Mueller follows. They show that the dichlorhydrin prepared by Berthelot's method is a mixture of two isomeric bodies, one of which boils at 174° and can be obtained in a pure state by the action of hydrochloric acid on epichlorhydrin, the other boils at 182° and is identical with dichlorallyl alcohol. Both of these compounds yield allyl alcohol when acted on by sodium in the presence of ether. Kraut and Popp have found that if sodium amalgam containing 3 per cent. sodium is placed in potassic hydrate solution, hard cubes are formed, which, however, possess no definite composition; by the action of sodic hydrate solution long needles are obtained, having the composition $Na_2\ Hg_{12}$.—A lengthy paper by Hoffmeister follows "On Phenyl Ether and Diphenyloxide." The former is prepared by the action of nitrous acid on aniline sulphate, the product from which is mixed with phenol when nitrogen is evolved and phenyl ether formed. It can also be produced by the dry distillation of cupric benzoate. Diphenyl oxide is produced by acting on phenol with phosphoric chloride, and again acting on