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

the product with potassic hydrate. A number of substitution products of the two bodies have been prepared, and are here described. —The next paper is "On the Conversion of Acetone into Lactic Acid," by Linneman and Zotta. This is accomplished by heating dichloracetone with water to 200°, when a considerable proportion of lactic acid is obtained. Ladenburg has prepared stannic triethyl phenyl by the action of sodium on bromobenzol, and stannic triethyl iodide, mixed with ether. It is a colourless liquid, boiling at 254°, which is easily oxidised in the air; it reduces an alcoholic solution of silver nitrate, diphenyl being produced in the reaction. Hydrochloric acid forms with it, benzole and stannic triethyl chloride.—An interesting paper by Friedel and Ladenburg, "On Silico-propionic Acid," follows. By the action of absolute alcohol on silicic chloride, the chloride of triethylsilicic acid is obtained; sodium added to this compound, mixed with zinc ethyl, yields, on heating, ethyl orthosilico-propionate, $Si\,C_2H_5\,(OC_2H_5)_3$. Silico-propionic ether, on treatment with aqueous potassic hydrate, yields silico-propionic acid. It is a white powder resembling silica, from which it is easily distinguished by being combustible. It is soluble in hot potassic hydrate solution, but insoluble in boiling sodic hydrate. This acid is the first representative of a new series of acids, containing the group $Si\,O_2H$ in the place of CO_2H.—Translations of two papers by C. E. Monroe follow, the originals of which have already appeared in the American Journals.— The number concludes with a short note "On the Preparation of Creatinine hydrochloride from urine," by R. Maly. It is purified by combining it with mercuric chloride and decomposing the compound with sulphuretted hydrogen.

SOCIETIES AND ACADEMIES

LONDON

Anthropological Institute, January 1.—Sir John Lubbock, Bart, F.R.S., President, in the chair.—Messrs. J. Thallon and J. Jeremiah, jun., were elected members.—Mr. C. Staniland Wake read a paper entitled "The Adamites." The object of this paper is to show, by reference to evidence extraneous to the Hebrew Scriptures, what peoples are entitled to be classed as Adamites. The name of the primitive race from which the Chaldeans sprung—the *Akkad*—proves that they must be thus classed. Akkad would seem to mean "sons of Ad;" the first syllable of the word being the same as the Gaelic *Mach* or *Ach*. The first Babylonian dynasty of Berosus was Median; and Sir Henry Rawlinson says that the name by which the Medes are first noticed on the Assyrian monuments is *Mad*. This people, the initial letter of whose name may be treated as a prefix, was doubtless the primitive stock from which the *Akk-Ad* were derived. The Medes had also the distinctive title *Mâr;* and many of the Aryan peoples appear to have retained a remembrance of the traditional *Ad*. The first part of the Parsee work known as *The Desatir* is called "the Book of the Great *Abad*," *i.e.*, Father *Ad*. The Puranas of the Hindus refer to the legendary king, *It* or *Ait*, who is supposed to be the same as the Greek *Aetus*. The primitive Celtic race of Western Europe was called *Gaidal, i.e.*, the progeny of Gaid or Aid, who may be identified with *Dis*, the mythical ancestor, according to Cæsar, of the Gauls. Dis (the Greek *Hades*) was also "Lord of the Dead" among the Chaldeans, and may well, therefore, have been the same as the legendary ancestor Ad. Among Hamitic peoples, the original Arab stock trace their first orign to Father Ad, who is probably referred to also in the name of the Egyptian deity, *At-um*. The paper also mentions certain facts showing that the name of the legendary ancestor of the Adamites may be traced in the names of the deities of Turanian and American peoples, and also among the Polynesian Islanders, whose word for "spirit" is *atua*, or *akua*, and whose Great Ancestor is called *Ta-ata*. Dividing all the races of mankind, according to the simple classification of Retzius, into brachycephali and dolichocephali, the conclusion arrived at by the paper is, that Ad was the legendary ancestor of the former, the Adamites, therefore, embracing all the actually brachycephalic peoples, and those whose brachycephalism has been lost by intermixture with the long-headed stock. The Adamites extend through the whole of the northern hemisphere, and are found in various parts of the southern hemispheae, on both the old and the new continents. The names "Adam" and "Eve" were, however, merely expressions of the philosophical notion of the ancients that the male and female principles pervade all nature, and originated all things and personifications of the ancestral idea in relation to the human race.

Chemical Society, Dec. 21, 1871.—Prof. Williamson, F.R.S., vice-president, in the chair.—After the usual business of the society had been transacted, the chairman announced that the celebrated Italian chemist, Prof. Canizzaro, had consented to deliver the Faraday lecture. A paper was then read by Mr. H. Bassett, "On Eulyte and Dyslyte," two beautifully crystalline compounds obtained by the action of nitric acid on citraconic acid, a product of the dry distillation of citric acid. Both these substances contain nitrogen, but owing to the comparatively small quantity obtained, namely, less than two ounces from thirty pounds of citric acid, the author has, as yet, been unable thoroughly to investigate their nature.—Prof. H. E. Armstrong also read a paper "On the Nitration of the Dichloro-Sulphonic Acids," being a continuation of his researches on the isomeric nitrochloro-phenols and their derivatives; after which the meeting adjourned until January 18, 1872.

PARIS

Academy of Sciences, Dec. 18, 1871.—M. Chasles read a continuation of his theorems relating to the harmonic axes of geometrical curves, and presented a note by M. Halphen on right lines which fulfil given conditions.—M. H. Resal presented a memoir on the conditions of resistance of a fly-wheel, and M. Combes a note by M. Haton de la Goupillière on the transformation of the potential by reciprocal *radii vectores*.—Telegrams received from M. Janssen, with regard to his solar observations at Ootacamund, were communicated to the Academy. —Several members referred to the prevalence of cold during the first half of the month of December 1871.—M. Delaunay called attention to the remarkable concurrence of a change of barometric pressure with an alteration in the temperature of different parts of Europe between the 6th and 9th of December, the latter date showing the maximum of cold at Paris. The great cold of the 9th of December was also the subject of a note by M. E. Becquerel, who gives a minimum temperature of − 25°·5 C. (= − 13°·9 F.) at Montargis, and of − 27°·5 C. (= − 17°·5 F.) near Courtenay in the department of the Loiret. M. C. Sainte-Claire Deville remarked upon the concordance of this statement of M. E. Becquerel's with the minimum of − 26° C. (= − 14°·8 F.) recorded at Nemours. He also presented a table of minima obtained at various places in France from 7th to 15th December. —MM. Becquerel presented a memoir on the influence of snow on the temperature of the soil at various depths, according as it is covered with turf or denuded, founded chiefly on observations made from the 5th to the 15th December. The authors found that the temperature under the turfed soil, within two or three centimetres of the surface, was always above 0° C. (= 32° F.), and as constantly below that point in the naked soil.—M. Pasteur presented a note on a memoir by M. Liebig, relating to fermentation, in which he defended his views as to the nature of the phenomena of fermentation from certain criticisms upon them published by Prof. Liebig. Upon this subject M. Fremy also spoke at considerable length in opposition to M. Pasteur, who replied.—M. Bussy communicated a note by M. E. Bourgoin on the complex nature of cathartine, in which the author states that this substance, regarded as the active principle of senna, is in reality composed of three distinct substances, namely, chrysophanic acid, a dextrogyrous glucose, and a new principle to which he gives the name of chrysophanine.—M. Daubrée communicated a note by M. F. Gonnard, on the dolerites of the Chaux de Bergonne and the zeolites which they contain. In this paper the author ascribes very peculiar magnetic properties to the solid dolerite of this locality, and states that the cavities of its lower amygdaloidal parts contain three zeolites (christianite, phacolite, and mesole).—M. Trécul presented a note on the remarkable arrangement of the stomata in various plants, and especially in the petiole of ferns, in which he mentioned the occurrence of stomata upon the piliform appendages of the petiole in *Philodendron Lindenianum*, and noticed their existence in unusual positions in many ferns.—A note by M. P. Bert, on the influence of different colours on vegetation, was communicated by M. Milne-Edwards. His general results are as follows:—green is nearly as fatal to plants as total darkness, red is very injurious, and yellow less so than red, but more so than blue, but any colour taken isolatedly is injurious to plants.

December 26, 1871.—A note by M. Brioschi, on the equation of the fifth degree, was read.—A note was read on the tension of the vapour of mercury at low temperatures, by M. Regnault,