Hence Dr. Poulton's very pretty kaleidoscope simile involves new suppositions, which are worse than gratuitous because they involve throwing overboard the very facts on which the theory was originally based. It is plain that Dr. Weismann goes very much further in admitting the changeability of the ancestral units than his disciples are willing to do; and I have shown that hypothesis A involves the conclusion that these are indefinitely changeable, not merely "not completely unchangeable," as Prof. Weismann writes.

Another point for consideration is that we can hardly doubt the monophyletic origin of Metazoa, and that, at least excepting Coelenterates and Sponges, they all originated from some one primitive form. The Protozoan ancestors of this form must have belonged to the same species with one another, and their representative ancestral units cannot have been more different than the members of a single species. Hence, without selection, the germ-plasm composed of a number of these units associated together would give an average resultant, so that the majority of individuals would be more similar than the ancestral units of their germ-plasms, and amphigony would produce uniform offspring on the whole. Divergence from the average type could only occur by the duplication or further repetition of single ancestral units of special character; and these variations would be the material for natural selection to act upon. Thus, among words of eleven letters, such a word as *abracadabra*, with its 5 *a*'s, 2 *b*'s, and 2 *r*'s, would have a marked divergence from the type as compared with groups in which no letter occurred twice over.¹ If, then, natural selection goes on to form a species according to Weismann's theory, it can only do so by eliminating certain ancestral plasmas and duplicating or further repeating others to take their place. Once an ancestral plasma eliminated in the formation of a race it can never be reintroduced, or replaced by a new one. But as soon as we repeat certain members of a group of limited number we reduce the possible number of permutations or combinations that can be formed from that group. Anyone with a fair head for the work, and a Todhunter's "Algebra," can see for himself how very rapidly the number of combinations is reduced in this way. Thus natural selection could only result in arrangements of ever-increasing simplicity and similarity instead of complexity and divergence. The ultimate product would be a limited number of well-marked species, whose individual members had lost all power of variation. This I offer as an alternative to the variable offspring of the lioness.

Mr. Trow is extremely anxious to show me a path out of my dilemma. It presents no difficulty to those biologists who consider the conception of a germ-plasm independent of the somatoplasm as more or less mythical. For those who follow Weismann, the way out of the difficulty will not lie through the ascription to natural selection of powers which it cannot possibly exert.

MARCUS HARTOG.

Cork, November 28.

The Mexican Atlatl or Spear-Thrower.

THE note in NATURE of November 19 (p. 66) recording the important discovery at Lake Patzcuaro, Mexico, of "a modern atlatl (not altatl, as misprinted) well worn and old-looking, accompanied with a gig for killing ducks," is very interesting. It may not be out of place to call attention to an exhaustive little memoir by Mrs. Zelia Nuttall on "The Atlatl or Spear-Thrower of the Ancient Mexicans," published this summer in the third number of the first volume of the "Ethnographical and Ethnological Papers of the Peabody Museum" (Cambridge, Mass., 1891). In this paper, which is illustrated with eighty figures of different kinds of atlatl, the author completely establishes the existence and practical use in warfare of the wooden spear-thrower or atlatl by the Mexicans at the time of the Spanish conquest, although some doubt had been expressed in the matter by such well-known authorities as Prof. E. B. Tylor and Mr. A. Bandelier, while Mr. H. H. Bancroft even stated that "he had not found any description of its form or the manner of using it." Mrs. Nuttall, however, reproduces numerous illustrations of the many varied forms of the atlatl from different *codices*, accompanied by several descriptions of the manner of hurling the weapon, cited from old Spanish writers. Perhaps at this moment the most *à propos* is that from the

ancient chronicles of Tezozomoc, who, in describing the drill of the soldiers, relates "how their chiefs ordered them out in canoes to practise throwing spears at flying ducks before engaging the enemy in warfare." Mrs. Nuttall was enabled to trace, by means of a careful study of a MS. edition of "Sahagun's Historia," preserved in the National Library at Florence, the complete evolution of the atlatl from the simple form used by the native hunter to launch the harpoon with two or three barbs at the fish or water-fowl of the lagoons. This had a cord attached to retrieve the game. "Minus the cord, the spear-thrower became part of the necessary equipment of every soldier of a certain grade," and was used with fatal effect, as Bernal Diaz most distinctly states, in opposing the advance of the Spanish adventurers. Elaborately decorated forms first became the emblem of chieftainship, and ultimately symbolic of the Aztec deities, and were borne aloft by the chief-priestly warrior and representative of the gods in ceremonial processions. The maximum of development was attained in the symbolic "blue atlatl" or "blue serpents," inlaid with gold and richly decorated with feather-work, described as "bishops' crosiers" by Cortes, who sent specimens presented to him by Montezuma II. to the Court of Spain. Some examples are still preserved in the Ethnographical Museums of Berlin and Vienna, and in the British Museum.

It was in the course of these researches that Mrs. Nuttall made the important identification of the atlatl "as the hitherto unrecognized weapon" grasped by the warriors sculptured on the "so-called sacrificial stone of Mexico," and also by the warriors depicted in Stephens's illustrations of the *bas-reliefs* adorning the ruins at Chichen-Itza in Yucatan. The different myths relating the invention or origin of the atlatl are collected and explained, and the following very practical philological derivation of the name *atlatl* is offered by her as a suggestion supported by a series of careful analyses:—

"The Aztec word *atlatl*, or *atlatli*, is intimately connected with the verb *tlaca* = to aim, to throw, or cast. From this verb a whole series of words is formed, as *tlatlacaliztli* = the act of throwing, &c.; *tlatlaxtli* = the object thrown; *tlatlcani* = thrower. The name *atlatl*—a synthesis of *atl*, water, *tlacatl*, men—was applied to the fishermen, the original users of the atlatl; and it is suggested that the word *atlatl* may primarily have been a synthesis formed with the verbal noun *tlatlacani* = thrower, and *atl*, water, which would give the word *atlatlacani*, meaning water-thrower, not an unfit name for the harpoon-thrower of the watermen" (p. 12).

This interpretation is certainly not weakened by the recent discovery that the primitive form of atlatl is still in use in the lake regions of Mexico. In other respects Mrs. Nuttall's paper well repays perusal by all interested in Mexican antiquities.

A word with reference to Prof. Otis Mason's remark "that the problem now is to connect Alaska with Mexico." Given hungry aboriginal man in the foreground, and fat wild ducks in what artists term "the middle distance," it does not seem wholly irrational to surmise that the *atlatl*, or spear-thrower, was independently evolved in suitable environments. Does not the average nineteenth-century boy still betray a strong innate tendency to throw or sling stones at every bird he sees? Perhaps this is but accumulated inherited instinct, not yet eradicated by civilization. It is at all events certain that the *atlatl* was widely used by the aboriginal inhabitants of the American continents, as Prof. Max Uhle's researches testify abundantly.

Brighton, November 21.

AGNES CRANE.

The Chromosphere Line Ångström 6676.9.

WITH regard to Prof. Young's observations as to the non-coincidence of the bright chromosphere line (NATURE, November 12, p. 28) with the corresponding dark line 6676.9 of Ångström's scale, it may be interesting to note that Profs. Living and Dewar have observed a barium line at 6677, which is therefore slightly less refrangible than the dark solar line. In his catalogue Prof. Young also gives a barium line at 6618.0, which is identified with Kirchhoff 933.8. In the course of the observations of sun-spot spectra taken at Stonyhurst with a twelve-prism spectroscope, no dark solar line has been noted in this position except in two uncertain instances over spots. It would be an important fact should two barium lines be found in the chromosphere without corresponding dark lines.

¹ The argument above was suggested to me by a chemical friend.

In the period of maximum solar activity the bright line 6676'9 was on several occasions seen in the spectroscope, while the height of the chromosphere was being measured at Stonyhurst on the C line of hydrogen. At these times C was always very bright, and generally displaced in the prominences in which 6676'9 was seen. The latter line was not seen in the observations taken between March 9, 1886, and September 10, 1891. Although both Young and Thollon attribute the line to iron, no iron line is given in this position by either Ångström or the catalogues of the British Association. Dunér, quoted by Thollon, considers the line variable with the state of solar activity, but Ångström seems to have made an error in drawing it as a fine thin line, as Kirchhoff, Burton, Fievez, Smyth, Thollon, and Higgs give it as a strong dark line. Finally, Young, Burton, and the Stonyhurst observers identify it with Kirchhoff's ray 654'3, and Thollon with 641, which latter is a calcium line. There would, then, appear to be some differences of opinion with regard to this important line (cf. *Monthly Notices R.A.S.*, vol. li., No. 1, p. 22.)

A. L. CORTIE.

St. Beuno's College, St. Asaph, November 19.

Peculiar Eyes.

I LABOUR under the peculiar inconvenience of having a right eye of normal power and a short-sighted left eye. The numerals on the face of a clock $\frac{1}{2}$ of an inch high are visible to the right eye at 12 feet distant; but in order to discern them as clearly with my left eye I require to bring that organ of vision as near to the figures as 8 inches. On looking at my gold chain hanging on my breast in daylight and with both eyes, the chain, coloured yellow and towards the left, is perceived by the right eye, while a steely blue chain, another, yet the same, is perceived about an inch to the right and a little higher up. By artificial light the same phenomenon presents itself, but the difference of colour is not so apparent; the yellow to the right is only dimmer. Again, when a page of NATURE is being read with the short-sighted eye, there appears, about an inch to the left, part of the same column, small, and the black, under artificial light, like weak purple. The right-hand side of this ghost-like column is lost to the right eye, being commingled with the larger, darker letters seen by the short-sighted left, which cover it like the more recent writing on a palimpsest. Middle life was reached before the discovery was made. These experiences must be gone through with intent, for objects generally being perceived altogether with the right eye, all that the left seems good for is to supply a little more light. The perception of the difference of colour is as good with the one eye as the other, and the short-sighted eye can read smaller type.

As the inferior animals, so far as I know, have no habit of peeping or looking with one eye shut and the other open, it occurred to me that this ability might be a limited one. I tried the experiment with school children, and to my surprise found that a few were quite unable to keep one eye shut and the other open at the same time, and a few did it with an effort, making in all about a fourth of the number. Adults were likewise under similar limits, but to a less extent. This may be the reason why the discovery of inequality of vision, as Sir John Herschel remarks, is often made late in life. Indeed, he mentions an elderly person who made the unpleasant discovery that he was altogether blind of an eye.

JAS. SHAW.

Tynron, Dumfriesshire.

Zoological Regions.

THE last number of the *Archiv für Naturgeschichte*, lviii., which has just appeared, contains (pp. 277-291, pl. x.) an article by Prof. Möbius, dealing with the zoological regions of the earth, chiefly with a cartographical and "museological" object, in which a set of regions is proposed differing in some respects from that most generally in use. The number of land regions is raised to twelve instead of the usual five or six, and the marine world is likewise subdivided into a number of regions. A part of what may appear innovations is in fact nothing but a reversion to the zoological subdivisions of the world proposed by Schmarda ("Geographische Verbreitung der Thiere") in 1853. It seems extraordinary that, although alluding to the works of the principal authorities who have dealt

with zoogeography since Schmarda, Prof. Möbius should not have referred to that author otherwise than in a second-hand quotation. For not only did Schmarda lay down the basis on which zoological regions have since been elaborated, but his attempt is, everything considered, in many respects superior to that of his immediate successors in the same field.

It will be seen, on comparing Schmarda's and Möbius's maps, or the table annexed to this note, that several of the regions independently proposed by these authors coincide in their limits, the principal difference being that Schmarda divided the world into a greater number of "Reiche," some of which are merely amalgamated in Möbius's "Gebiete."

G. A. BOULENGER.

SCHMARDA, 1853.

MÖBIUS, 1891.

A. Festland.

A. Landgebiete.

I. Arctisches Reich ... =

I. Nordpolar Gebiet.

II. Mittel-Europa ... =

II. Europäisch-Sibirisches G. (+ part of Schmarda's I. R.).

V. Mittelmeer Reich ... =

III. Mittelmeer G.

III. Kaspische Steppenländer ... =

IX. Wüste ... =

IV. Centralasiatische Steppen ... =

IV. Chinesisches G.

VI. China ... =

VII. Japan ... =

VIII. Nordamerika ... =

X. Nordamerikanisches G.

X. Westafrika ... =

VI. Afrikanisches G.

XI. Hochafrika ... =

XII. Madagascar ... =

VII. Madagassisches G.

XIII. Indien ... =

V. Indisches G.

XIV. Sunda-Welt ... =

XV. Australisches Reich ... =

VIII. Australisches G.

XVI. American. Mittelreich ... =

XVII. Brasilien ... =

XVIII. Ardo-peruan.-chil. R. ... =

XI. Südamerikanisches G.

XIX. Pampas ... =

XX. Patagonien ... =

XXI. Polinesien ... =

(VIII. (Part). IX. Neuseeländisches G.

B. Meere.

B. Meergebiete.

XXII. Arctisches M. ... =

I. Nordpolar M.

XXIII. Antarktisches M. ... =

XXX. Südl. Atlant. Oc. ... =

VIII. Süd-M.

XXXI. Südl. Stiller Oc. ... =

XXIV. Nördl. Atlant. Oc. ... =

II. Nordatlant. M.

XXV. S. Eur. Mittel-M. ... =

III. Mittel-M.

XXVI. Nördl. Stiller Oc. ... =

VII. Nordpazifisches M.

XXVII. Trop. Atlant. Oc. ... =

IV. Südantlantisches M.

XXVIII. Indischer Oc. ... =

V. Indisch-Polynesisches M.

XXIX. Trop. Stiller Oc. ... =

VI. Peruanisches M.

Scientific Nomenclature.

A propos of Prof. Parker's interesting article on scientific nomenclature in your issue of the 19th inst. (p. 68), I should like to call attention to the misuse of the term involucre in regard to the Anemone, &c. The so-called involucre of the Anemone is really, morphologically, a calyx, and until the flower-bud has grown to the height of an inch or two from the ground, it to a certain extent performs the ordinary functions of a calyx. Then an internode is developed between the calyx and corolla. But the presence of this internode, long as it is, should no more prevent our assigning to the calyx its proper name, than does the slight internode existing between the calyx and corolla of *Lychnis diurna*.

Great Malvern.

H. ST. A. ALDER.

"The Darwinian Society."

I WOULD call Mr. White's attention to the fact that the name of this Society is not "The Darwinian Society," but "The Edinburgh University Darwinian Society"—a name which, considering Darwin's connection with the University and with a similar Society here, I think we are quite entitled to assume.

JOHN S. FLETT,
Secretary.University of Edinburgh,
November 24.