the hypothesis is too apt to be capable of endless contractions and modifications to meet individual cases. I sometimes think that we are substituting for the philosophy of observation a philosophy of definitions.

I have, therefore, attempted to show:

1. That the plant is not a simple autonomy in the sense in which the animal is.

2. That its parts are virtually independent in respect to (a) propagation (equally either when detached or still persisting upon the parent plant), (b) struggle for existence amongst themselves, (c) variation, (d) transmission of their characters, either by means of seeds or buds.

3. That there is no essential difference between bud-varieties and seed-varieties, apart from the mere fact of their unlike derivation; and the causes of variation in the one case are the same as those in the other.

4. That all these parts are at first sexless, but finally may or may not develop sex.

5. That much of the evolution of the vegetable kingdom is accomplished by wholly sexless means.

There is, then, a fundamental unlikeness in the ultimate evolution of animals and plants. A plant, as we ordinarily know it, is a colony of potential individuals, each one of which, save the very first, is derived from an asexual parent, yet each one may, and usually does, develop sex. Each individual is capable also of receiving a distinct or peculiar influence of the environment and struggle for existence, and is capable, therefore, of independent permanent modification. It is not possible, therefore, that there is any localization or continuity of a germplasm in the sense in which these conceptions are applied to animals; nor is it possible for the plant as a whole to make a simple functional adaptation to environment. If there is a continuity of germplasm in plants this element must of necessity be intimately associated with every particle of the plant body, even to its very periphery, and it must directly receive external impressions; and this concept of Weismann —the continuity of the germ-plasm—becomes one of the readiest means of explaining the transmission of acquired characters. All these conclusions prove the unwisdom of endeavoring to account for the evolution of all the forms of life upon any single hypothesis; and they illustrate with great emphasis the complexity of even the fundamental forces in the progression of organic nature.

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Current Notes on Physiography (III.).

Woodward's Smithsonian Geographical Tables.

'The average geographer,' to whose needs Professor Woodward has attempted to suit the recent volume of Geographical Tables issued by the Smithsonian Institution, should certainly feel highly complimented by this tribute to his quality. The volume contains, among many other matters, tables of coördinates for the projection of polyconic maps, lengths of a degree on parallels and meridians at different latitudes, areas of latitude-and-longitude, quadrilaterals of different dimensions and at different latitudes, adopted dimensions of the earth's spheroid, value of gravity at the earth's surface, and salient facts of physical geodesy. The latter heading includes the area of the earth, of oceans and continents, and the average heights of continents and depths of oceans, taken from Helmert's Geodäsie. For areas the continents are given 51,886,000, and the oceans 145,054,000 square miles. The mean depth of the oceans is placed at 3,440 meters. The mean heights of the continents are given as follows: The earlier results of Humboldt's, still often quoted, and the later ones of Penck (Morphologie der Erdoberfläche, 1894) being added for comparison.

	Humboldt.	Helmert.	Penck.
Europe,	205	300	330 m.
Asia,	351	500	1010
Africa,	—	500	660
Australia,	—	250	310
America, North,	228	285 410	650 650
America, South,	346		
All Continents,	308	440	735

The increase in the values of the latter measures is probably an approach to the truth, for early explorations frequently gave too much emphasis to narrow mountain ranges, and too little to broad plateaus.

A. AGASSIZ ON THE BAHAMAS.

A RECONNOISSANCE of the Bahamas and of the elevated reefs of Cuba, made by A. Agassiz in the winter of 1893, affords material for a Bulletin of 200 pages with 47 plates and many figures in the text, lately issued by the Museum of Comparative Zoology at Harvard College. The author is emphatic in rejecting the sufficiency of the Darwin-Dana theory of submergence in explaining the features of great limestone banks. The Bahamas consist of low hills of æolian limestone, "formed during a period of rest, during which the great beach of the then existing reef constantly supplied fresh material to be changed by the surf and the winds into sand for the heaping up of sand dunes. They could not be formed in a district of subsidence unless the subsidence was slower than the rate of growth of the corals, which is not the case in the Bahamas, as the reefs of to-day, even when they come to the surface, are not the sources from which the material for the great dunes of the Bahama Islands is derived" (p. 184, 185). At present the dunes are disappearing before the action of the sea. The conclusion of the reconnoissance seems to be that the great limestone banks are chiefly formed as 'marine limestones,' accumulating 'at great depths by accretion;' and that in the West Indies "wherever coral reefs occur, and of whatever shape, they form only a comparatively thin growth upon the underlying base" (p. 177). The text, with its figures, supplemented by maps and plates, gives an excellent idea of the geographical features of the region and of their evolution.

SPENCER'S RECONSTRUCTION OF THE ANTILLEAN CONTINENT.

PROF. MARCEL BERTRAND, of the École des Mines and the Geological Survey of France, has published an account of certain faint deformations of northwestern France, in which he interprets the inequalities in the floor of the English channel as the result of faint anticlinal and synclinal movements (Bull. Soc. Géol. France, xx., 1892, 118); thus implying that neither erosion nor deposition has been of significant measure in shaping the channel floor. Prof. J. W. Spencer takes almost the other extreme, and interprets certain inequalities of the ocean floor of the Antillean region, even to depths of twelve or fifteen thousand feet, as the results of river erosion during a not remote time when the entire region is supposed to have had a much greater altitude than at present (Bull. Geol. Soc. Amer., vi., 1895, 103–140); thus implying that no other processes than river erosion can account for the inequalities that he has traced. It must be concluded from these contrasted arguments that the forms of the sea floor are not yet so well understood as those of the land; because the facts are much less accurately known under than over sea level, because only form and not structure can be determined by soundings, and because the forms of the sea floor have received relatively little study. Where two specialists reach conclusions so unlike, it is difficult for others to choose between them; and for the present there will probably be some hesitation in adopting the teachings of the one or the other. With much interest aroused in the facts brought forward, and

with all willingness to look on the continents as unstable, it is difficult to believe that they have suffered changes so great as Spencer announces, not only in the uplift of the Antillean region, but in the deep depression of the axis of Central America, and in the denudation of the (inferred) great banks or continental shelf along the Windward Islands. The strongest proof will be demanded before vertical movements of two miles and a half can be accepted; and we fear that most readers will take refuge in a verdict of 'not proved.'

HISTORY OF THE ST. JOHN RIVER, NEW BRUNSWICK.

An article on the 'Outlets of the St. John river,' by G. F. Matthew (Bull. Nat. Hist. Soc., New Brunswick, xii., 1894, 43–62), concludes that this river has been built up by contributions from three other systems, whose lower parts are now to be seen in the Restigouche, Miramichi and Petitcodiac. The evidence of this conclusion is derived from the geological structure of the country, beginning as far back as the Huronian time; the three rivers whose upper basins now belong to the St. John having been defined as basins of deposition in more or less remote geological periods. Thus the St. John river has attained its present magnitude by the breaking of mountain or hill barriers which once separated its three river systems, and is not a simple valley of continuous growth like the Mississippi (p. 55). The difficulty of accepting Dr. Matthews' conclusion as the only solution of the history of the St. John does not lie in any objection to the geological history of the region and its several basins of deposition, as far as stated, but in the omission of sufficient consideration of what has happened in the region since it became a land area. It has long been subject to subaërial erosion. During this time it has in all probability been variously warped and otherwise moved with respect to its base-level. Its rocks are of diverse resistance, and hence there may have been repeated opportunities for diversion and rearrangement of river courses during the long life of the region as a land area. While admitting that several geological basins of great antiquity are now drained by a single river, it does not necessarily follow that this river is an immediate descendant of the rivers which at one time or another drained the separate basins. The actual St. John river may once have been larger than now; its neighbors may have gained drainage area from it instead of losing drainage area to it; but these possibilities are not considered.

THE ORIGIN OF THE MISSISSIPPI.

The reference to the Mississippi in the previous paragraph brings up an oft-encountered implication of simple history in the development of this great river, against which there is much evidence. A similar implication is found in a recent State Survey Report, where it is stated that, as a result of continental evolution at the close of the Carboniferous period, the drainage of the Ohio region was turned southward "into the great Mississippian bay, which then washed the shores of the new-born continent as far north as the mouth of the Ohio river" (Geol. Coastal plain of Alabama, 1894, 11). It is found again in the 'Story of the Mississippi-Missouri,' where the Mississippi at the close of the Appalachian revolution is described as heading somewhere in the Minnesota-Wisconsin region, and flowing southward to its mouth somewhere near the present city of St. Louis, whence a deep gulf extended southward to the present Gulf of Mexico (Amer. Geol. iii., 1889, 368). While the southward-flowing streams of the Wisconsin-Minnesota highlands are probably of ancient origin, the southward course of the Mississippi between Tennessee and Arkansas seems to

have been initiated not at the close of the Appalachian revolution, but long afterwards in Cretaceous time. The Appalachian revolution formed the mountains of Arkansas, as well as those of the Alleghany belt. The similarity of structure is so great that a trans-Mississippian extension of Appalachian growth may be reasonably assumed, as has been pointed out by Winslow (Bull. G. S. A., ii., 1891, 231). The existence of a bay, from the Gulf of Mexico northward towards St. Louis, is very improbable as a result of the Appalachian revolution; an east and west constructional mountain belt is a more likely product; and not until this mountain belt was well denuded to a peneplain did a later deformation depress it transversely, admitting the Cretaceous waters northward across it, and thus first forming the Mississippi embayment. Probably in part at the same time, and to a greater extent in later time, the denuded peneplains to the east and west were raised towards their present upland altitude, and as a result of this elevation the existing valleys and lowlands were opened in them during some part of Tertiary time. With these later elevations we may associate the uplift of the filled embayment and the southward growth of the Mississippi as a river. This view of the origin of the Mississippi embayment and of the date of the southward discharge of Mississippi drainage was first published by L. G. Westgate (Amer. Geol. xi., 1893, 251), as a result of conference with L. S. Griswold, who had then recently completed his investigation of the novaculite region of Arkansas.

THE CHUNNENUGGA RIDGE AND THE BLACK PRAIRIES OF ALABAMA.

IT is, perhaps, too much to expect that the origin of the physiographic features of a region should always receive due attention in a geological report along with the origin of its strata; yet there is no other place so appropriate for the official publication of physiographical discussions. It therefore occasions regret to find so little account of the origin and meaning of the Chunnenugga ridge and the Black prairies of Alabama in the elaborate report on the Geology of the Coastal Plain lately published by the Survey of that State. "The Chunnenugga ridge is made in great part by alterations of hard limestone ledges and bands of indurated sands of the Ripley. . . . . It overlooks the low trough of the black prairies of the Rotten limestone towards the north with somewhat precipitous slopes in that direction, while its descent towards the south is much more gentle" (p. 356). It is manifest that the ridge with its inland-facing escarpment and the denuded inner lowland are typical features of a certain stage in the denudation of a coastal plain that consists of more and less resistant strata; the drainage of the lowland being chiefly gathered by subsequent streams that have been developed along the strike of the beds, and discharged by consequent streams which maintain transverse valleys through the enclosing ridge or upland. This general relation of form and drainage is so often repeated on coastal plains that its occurrence in Alabama deserves mention as a local example of a general physiographic feature; just as the Cretaceous strata on which it is developed deserve mention as local examples of a widespread geological formation.

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THE NEW YORK MEETING OF THE ASSOCIATION OF AMERICAN ANATOMISTS.

THE Seventh Annual Session of the American Anatomists was held in the Medical Department of Columbia College, 437 West 59th Street, New York City, December 28 and 29, 1894.

The Association was called to order Friday, December 28th, by the President, Dr.