author is inclined to indorse the suggestions of Packard rather than the hypotheses of Metchnikoff and Boas.

The report on the *Pteropoda gymnosomata* is in some respects disappointing. It was hoped by those interested in these animals that the extraordinary opportunities offered by the 'Challenger' voyage would result in a monographic series of illustrations, giving us satisfactory artistic representations of these exquisite 'sea-butterflies' taken from life. Instead of this, we have a series of diagrammatic plates taken from pickled specimens, and in nearly every case grossly misrepresenting the form and proportions of the living animal. M. Paul Pelseneer, who reports on the group, is evidently quite unacquainted with these animals under their normal conditions of existence, — an ignorance which is not unpardonable, but which has led him into sundry observations which future experience, should he have it, will enable him to modify in the direction of accuracy.

For the rest, considering the chaos which preceded Dr. Boas's monograph, in the *Spolia Atlantica*, in regard to the species, sometimes well figured but poorly described, sometimes unfigured, and sometimes described from immature or mutilated specimens, — considering all this confusion, and finding the characters of form and color familiar to those who know these animals in life, gone irrevocably in pickled specimens, it is not surprising that the author should be disposed to criticise sharply, if not altogether justly, the work of a past epoch. He has brought a certain order out of the confusion, and his work will be helpful to the student of museum specimens. The ideal iconography, which we might have had, of the animals as they live and move, must, however, be looked for from some other direction.

NOTES AND NEWS.

THE government of the province of Cordoba (Argentine Republic) has established a meteorological service, of which Prof. Oscar Doering will be in charge. The new institute will be independent of the national meteorological office which was founded by Mr. Gould. The officers of telegraph and telephone stations will be obliged to make observations in conformity with the instructions. The work will be begun next year on forty stations.

— The first number of the *American Journal of Psychology* will appear early in October. Among the articles which will probably appear in that or the succeeding numbers are the following: 'On Gradual Increments of Sensation,' 'New Methods and Further Results in the Study of the Knee-Jerk,' 'Psycho-Physic Methods and Star Magnitudes,' 'A Criticism of Psycho-Physic Methods and Results,' 'A New Binocular Phenomenon and its Use in Determining the Empirical Horopter,' 'A Review of Contemporary Methods and Results in the Histology of the Central Nervous System in Europe,' 'Paranoia. — A detailed study of a case extending over many years,' 'An Important Study of the Play-Instinct in Children,' 'A Further Study of Heracleitus,' 'An Extended Review of the Work of the English Society for Psychical Research.' The journal will also contain many digests and critiques of current psychological literature, both books and articles.

— The following statistics have been compiled, for the U. S. Geological Survey, by Charles A. Ashburner, principally from the direct returns of the operators of individual coal-mines, supplemented by valuable contributions from State officials. The total production of all kinds of coal in 1886, exclusive of that consumed at the mines, known as colliery consumption, was 107,682,209 short tons, valued at $147,112,755 at the mines. This may be divided into Pennsylvania anthracite, 36,696,475 short or 32,764,710 long tons, valued at $71,558,126; all other coals, including bituminous, brown coal, lignite, and small lots of anthracite produced in Arkansas and Colorado, 70,985,734 short tons, valued at $75,554,629. The colliery consumption at the individual mines varies from nothing to 8 per cent of the total product, being greatest at special Pennsylvania anthracite mines, and lowest at those bituminous mines where the bed is nearly horizontal and where no steam-power or ventilating furnaces are employed. The averages for the different States vary from 3 to 6 per cent, the latter being the average in the Pennsylvania anthracite region. The total production, including colliery consumption, was: Pennsylvania anthracite, 34,853,077 long or 39,035,446 short tons, all other coals, 73,707,957 short tons; making the total absolute production of all coals in the United States 112,743,403 short tons, valued as follows: anthracite, $76,119,120; bituminous, $78,481,056; total value, $154,600,176. The total production of Pennsylvania anthracite, including colliery consumption, was 699,473 short tons in excess of that produced in 1885, but its value was $552,828 less. The total production of bituminous coal was 1,086,408 short tons greater than in 1885, while its value was $3,866,592 less. The total production of all kinds of coal shows a net gain of 1,785,881 short tons compared with 1885, but a loss in spot value of $4,419.420.

— The *Naturwissenschaftliche Rundschau* gives an abstract of J. Coaz's observations on the planerogams first taking possession of the land at the end of retreating glaciers. The end of the Rhone glacier has been marked yearly since 1874, and therefore Coaz made his observations at this place. In the zone left by the ice in 1874, he found 39 species; in the zone following, 37 : 23 species grew in the zone left by the ice in 1876, but then the figures fall off to 12. In the zone of 1881 only 7 are found, and in that of 1881 only a single species. This is *Saxifraga aizoides. Epilobium Fletscheri and Oxyria digyna* grow in all zones except the last. Willows do not occur except in the first two zones. The observations were made in 1883.

LETTERS TO THE EDITOR.

*** The attention of scientific men is called to the advantages of the correspondence columns of* SCIENCE *for placing promptly on record brief preliminary notices of their investigations. Twenty copies of the number containing his communication will be furnished free to any correspondent on request.*

The editor will be glad to publish any queries consonant with the character of the journal.

Correspondents are requested to be as brief as possible. The writer's name is in all cases required as proof of good faith.

Scientific Ballooning.

I AGREE most heartily with Professor Waldo, in *Science* for July 15, that "no meteorological data are so much to be desired as those which are now obtained for short, irregular intervals, by balloons." Six years ago, when there was talk of a balloon-voyage from Minneapolis to the Atlantic, I wrote a note regarding the relative importance of the free and captive balloon. I was not then aware that no balloon had ever been kept afloat at a half-mile height more than twenty hours, and then only by the use of about half a ton of ballast. Probably there are now several balloons, in this country, that can be floated more than twenty-four hours by using four hundred or five hundred pounds of ballast each day. The great desideratum in ballooning is a gas-tight envelope. The best record I know of is the suspension of a balloon at about one thousand feet, for thirteen hours, with a loss of about one hundred and sixty pounds of sand. I think an approximation to a tight balloon may be made by increasing the number of coats of varnish, but this would bring about an unwieldly envelope and one likely to crack when emptied of gas.

If we had such an envelope, however, it would be impossible to keep the balloon captive, at a half-mile height, in a wind much over five miles per hour. As the chief investigations we wish to make are during the progress of storms, when the velocity of the current rises to forty and fifty miles per hour, it can hardly be considered that a captive balloon is practicable.

A captive balloon, however, can never give us what we wish; namely, the distribution of temperature, moisture, etc., in a vertical direction, nor in a horizontal stratum. Just the height to which we must go is in some doubt, some authorities placing it at 20,000 feet and over. I think that at least nine-tenths of the disturbance is below 6000 feet, so that the exploration is by no means as formidable as it might seem at first. There is nothing the aeronaut, with a few hundred pounds of ballast, has so completely under his control as an up-and-down movement, and he can satisfy the most enthusiastic observer with all he may wish of such movement. The weight of an observer, perhaps, is the least objectionable point in ballooning. In most cases at least two men are taken, together