If we should be asked our opinion as to what the origin of these ice-meteorites may have been, we should be inclined to answer that they are very probably a small part of the collections of water (oceans?) which, we know, must have existed on the disintegrated planet to which our stone and iron-meteorites once belonged.

The various theories which have been held to explain certain well-known facts about meteoric bodies, notably Schiaparelli's ingenious hypothesis connecting comets with meteorites, the fact that most comets give a spectrum, closely resembling that of carbon, and many others will have to be revised in the light of this discovery, and it may be safely claimed that Dr. Hahn's book will prove to be one of the most important contributions to natural science of the present time.

ASTRONOMY.

Prof. Mark W. Harrington, of Ann Arbor Observatory, announces, in a private letter to the editor, the variability of star D. M. + 0° .2910, the position of which for 1855.0 is

A. R. 12h. 6m. 28.4s. Decl. + 0° 23.5′

It reached its minimum on May 22 or 23, when it was of the magnitude of D. M. + 0° .2914, which is given by Argelander as 8.7. It is now increasing in brightness at the rate of a tenth of a magnitude a day. The star, in the same right ascension and in 15′ south of the variable (D. M. + 0° .2911), is of a fine orange color, and should be put in the list of red stars.

Observers desiring information, charts, or comparison stars, for use in observing the variable, will be cheerfully assisted by Prof. Harrington or the editor.

M. Eugene Bleck, of the Observatory of Odessa, Russia, has communicated the following observations and elements of Comet (*a*), 1881, Swift:

Odessa M. T.	App. α.	App. δ.
1881 *d. h. m. s.*	*h. m. s.*	° ′ ″
May 4 14 50 15	0 15 26.53	+ 33 25 3.7
5 14 28 12	0 19 1.00	+ 32 24 36.7
7 14 36 2	0 26 35.05	+ 30 15 5.9

ELEMENTS.

T = 1881, May 20.8294.

π = 299° 47′ 53″
Ω = 123 59 25
i = 79 33 0
log. q = 9.76570.

The comparison with the middle place gives

Obs. − *c*, $\delta\lambda \cos\beta = -27''$
$\delta\beta = +3''$

Careful search has been made at Boston, at Cambridge by Mr. Wendell, at Clinton, N. Y., by Prof. Peters, and by others, for Barnard's Comet, but without success.

SCIENCE OBSERVER,
Special Circular No. 13.

BOSTON, *June* 2, 1881.

UNDERGROUND WIRES IN PARIS.—The Municipal Council of this city are contemplating adding to their funds by taxing wires placed in the sewers. The proposed tax will be 20fr. per kilometre up to 500, 30fr. from 500 to 1,000, 40fr. from 1,000 to 1,500, and so on, with an increase of 10fr. for each 500 kilometres. *L'Electricité* says that the number of kilometres of wire placed in the sewers being about 7,000, the Compagnie des Téléphones will have to pay something like 59,500fr. It adds that the company make no objection to this tax.

BOOKS RECEIVED.

SECOND REPORT OF THE UNITED STATES ENTOMOLOGICAL COMMISSION, for the years 1878 and 1879, relating to the Rocky Mountain Locust, and the Western Cricket, etc., with illustrations, Washington 1880.

This volume will be read with interest by naturalists, and the facts and statistics relating to the ravages of locusts, and the laws and characteristics governing their migrations are very complete.

The interesting chapter entitled "The Brain of the Locust" opens with these lines. "In order to appreciate the habits, migratory, reproductive, etc., of the locust, and to learn something of its general intelligence as an insect, and as compared with other insects, it is necessary for us to study with a good deal of care the organ of the locust's *mind, i. e.*, its nervous system, comprising its nervous centres and the nerves arising from them. The present chapter will be devoted to a study of the brain."

It may be confidently affirmed that with methods far subtler and reasoning much more profound, than any employed by the author of this chapter, we shall always fail to find in the structure of the nervous system any explanation of the migratory and reproductive or of any other habits *as habits* in any animal. A large wing-ganglion means a flying insect—of course, a large optic ganglion means that vision is a powerful sense in the animal in which it is found; an atropic olfactory bulb, in man the monkeys and seals, means that the sense of smell does not play so important a role in these animals as in the fox, dog, lion, camel and opossum, where the bulb is large. The preponderance of the brachial enlargement of the cord in the mole and bat is related to the preponderance of the anterior extremities over the posterior in these animals, but it no more serves to explain the difference in psychical habits existing between the two, nay it does so to a less degree even than the external structure. There are species of locusts which are not migratory and a study of their brains should be made if Mr. Packard wishes to draw inferences as to habits from the cerebral structure; in other words, if he would trace out the line of demarcation between a "migratory" and a "non-migratory" brain.

We believe that the clause in question has been inserted with the purpose of indicating that there *is* a connection between the chapter it opens and the general purposes of the Report. If so, if it was the writer's object to lead the lay mind to look upon his paper as pointing out methods by which, through a careful pursuit of the logical lines and the ratiocination passing through the cells or nerve-tracts of the locust's nervous system, we should in course of time be enabled to overreach and anticipate him by our superior reasoning power, in a manner comparable to that followed by a detective shadowing a forger, we can only say that it might have been omitted. Science needs no apology and the excellent plates accompanying this part of the Report alone justify the expense incurred by Government in getting them up.

We consider it unfortunate that in a chapter not likely to be perused by the lay reader at all, so much matter of a semi-popular character should have been included. It is the attempt to popularize the distinction between the brain of insects and of vertebrates (p. 224) that has led Mr. Packard to the commission of actual errors. Thus speaking of the nervous system of vertebrates, he says: "The gray matter is situated in the centre and consists largely of nerve or so-called 'ganglion cells,' while the external white matter of the brain or cord is composed of a mass of nerve fibres." This is correct only as applying to the very lowest vertebrates; in man, the mammalia and reptilia, the gray matter is more or less near the surface, in some centers altogether *cortical*, while the white matter is internal. Mr. Packard adds, as another

discrimination: "moreover the entire brain of an insect is white, as are all the ganglia."

On page 226, he says that the outer part of the brain is made up of a "slightly darker, usually pale grayish, white portion"—, where the tissue consists of small ganglion cells, it is naturally . . . . rather darker than in those regions where the tissue consists of the more loosely disposed, large ganglion cells."

So that we have a fundamental contradiction in reference to an alleged fundamental distinction, quite aside from the notorious fact that in the lowest vertebrates the nervous system is as "white" as in insects, and that the convoluted "mushroom" body or "cerebrum" of the ant contains sharply demarcated gray and white substances.

The chapter is accompanied, as stated, by plates of great value, most of these being fac similes of sections prepared by Mr. Norman J. Mason. On the whole, nothing new is added to our knowledge of the adult insectean brain in general, or the locust's in particular, that has not been carefully reported by Floegel, Newton and Michels. But through the great patience and skill of Mr. Mason, Professor Packard has been enabled to study sections from the embryo brain, a subject not yet worked up, owing to the difficulty of preparing the specimens. The most important results obtained is that the nerve-fibres develop from an originally finely granular substance, thus confirming the observations of Schmidt and Hensen for the mammalian embryo.

In view of the loudly trumpeted theory recently revived by Dr. J. J. Mason, after having repeatedly received the *coup de grace* at the hands of Stieda, Meynert and others, that large cells are motor, it is interesting to note that those of the optic ganglion in the locust are among the largest cells in its nervous system. R. C. S.

CORRESPONDENCE.

The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

To the Editor of "SCIENCE."

Limax maximas L. A specimen of this slug was brought me May 16. It came through a faucet connected with the water works. Being an introduced species and not frequently found, this fact may be of interest.

Polygala pancifolia, wild. Specimens with pure white flowers have been sent from Lunenburg, Mass., two years in succession. J. H. PILLSBURY.

SPRINGFIELD, *May* 27, 1881.

SPECTRUM ANALYSIS.

At a meeting of the Royal Astronomical Society held on the 13th of May, Mr. Norman Lockyer asked permission to offer the following address. He said:

"The chemical constitution of the heavenly bodies is one that demands some attention from astronomers. Twenty years ago the observations of Kirchoff and Stokes enabled us to get some glimpses into the chemical constitution of the sun. Kirchoff's view was that substances with which we are acquainted exist in the atmosphere of the sun, and that their presence was demonstrated by an exact matching both with respect to wave-length and intensity of the lines of certain chemical elements. Before his time Frauenhofer had noted the coincidence of the bright yellow line of sodium with the D line in the solar spectrum, but Kirchoff showed that also in the case of iron, magnesium, cobalt and several other substances there were coincidences between lines, which went to show that what was true with respect to sodium was true with respect to these other bodies. Nine years ago, we had not merely the opportunity of comparing these bright lines in the spectrum of the sun's atmosphere, as revealed to Frauenhofer, but we had the opportunity of studying the spectra obtained from very small portions of the sun's atmosphere, in regions where we should expect an exceedingly high temperature—namely, in the regions of spots and in the regions of prominences. When we began to examine these spectra, we found that the lines were thickened, and the question appeared much less clear than it did before. Of 460 iron lines recorded by Kirchoff, only three were observed in the prominences, and these were not the lines that were seen thickened in spots; so that a great many fresh questions were raised, and the idea of the decomposition of the iron by the high temperature was forced upon us. I wish to bring before you to night the results of some purely astronomical inquiries, lately undertaken by the Solar Physics Committee with respect to the behavior of the lines in the spectra of spots and prominences. We had before us the admirable work undertaken by Prof. Young in 1872, on the spectra of the prominences; but his observations only lasted for a month, and we felt that we wanted more facts, so what we have been doing at Kensington during the last two and a half years, has been to obtain and tabulate the spectra of a hundred sunspots, and these we have compared with the Italian observations of prominence lines. It was impossible to note and map down the behavior of all the lines in the spot spectra. The Committee, therefore, attempted something which was more modest, and contented themselves with observing twelve lines in the most easily visible part of the spectrum, between F and D (pinned to the blackboard was a diagram with the spectra observed placed one beneath the other, at the top were the iron lines of the Frauenhofer spectrum stated by Angstrom to be coincident with the bright lines of iron). The first point which strikes one on examining this diagram is the enormous number of iron lines, both in the solar spectrum and in the iron spectrum, as mapped by Angstrom, who used an electric arc of thirty or more Bunsen cells. They remind one of a great piano, only a few notes of which are played over and over again in the spot spectra, but always producing a different tune. If you examine the lines individually, you will find that every line has been seen with every other line. One is struck by the marvellous individuality, so to speak, of each. The lines do not go in battalions, or companies, or corporal's files, but in single units. The great importance of obtaining these observations is not so much for the observations themselves, as for the comparison they enable us to make with the observations of the lines in prominences, because the prominences are hotter than the spots. The spots are caused by down-currents where the solar atmosphere is brought down from cooler regions. They are opposed to prominences, which are ejections of heated matter from the interior of the sun. Here (pointing to the diagram) we have arranged the observations of prominences by Tacchini since 1872. What is the result? First of all, you will note a very great simplification; the brightest part of the sun has given the fewest lines. Next, there is not a single line common to the two series. In passing from the iron lines in the spots to the iron lines in the flames we pass from one spectrum to another, and the two spectra are as distinct from one another as the spectrum of magnesium is distinct from the spectrum of chlorine, or any other substance you please. These phenomena are the last we should expect. We can understand that a difference in the quantity of iron vapor present, might make a certain difference in the spectrum; but we are driven to something quite independent of any change corresponding to quantity. We see that as the temperature is increased the simplicity of the spectrum is increased; just as a chemist finds with regard to the substances which he has under his control, the function of temperature is to simplify. Why, then, if this is the result of working with increased temperature here, should not the simplification be due to the breaking