The Convolutions of the Brain.—*Die Hirnwindungen des Menschen.* By Alex. Ecker, Professor of Anatomy in the University of Freiburg. (Brunswick, 1869. London: Williams and Norgate.)

A SUCCINCT but detailed description of the various Convolutions of the Brain, intended chiefly for the use of physicians. It is illustrated by half-a-dozen outline sketches. The references to the development of the convolutions are not very full, but the author promises a more complete account elsewhere.

The Absolute Value of Knowledge.—*Der Sebstandige Werth des Wissens.* By Prof. K. Rokitansky. (London: Williams and Norgate.)

THE Materialist school of philosophy are just now getting very badly treated by men of science, much to the astonishment, it appears, of the general public. Mr. Huxley has startled the world by proclaiming himself in a way a disciple of Berkeley and Kant, and here is Rokitansky, the great master of modern pathological anatomy, walking in a similar path. To many minds pathological anatomy would seem to be intensely materialistic. It is not so, however, to the Viennese professor. This little lecture is chiefly devoted to a development of idealism: of that kind of idealism, moreover, which "makes the objective wholly and in every way dependent on the subjective, for the former is but the projection of the latter."

Tables of Pomona.—*Tafeln der Pomona, mit Berucksichtigung der Storungen durch Jupiter, Saturn, und Mars.* By Dr. Otto Lesser. Publication der Astronomischen Gesellschaft. (Leipzig: Engelmann.)

THESE tables of Pomona are founded on the disturbance of the planets Jupiter, Saturn, and Mars, calculated according to Hansen's method, and published by the author in Nos. 1596–7 of the *Astronomische Nachrichten*. The preface gives a full account of the character of the tables, illustrated in the usual manner by the calculation of the place of the planet Pomona for a given time.

Although it might seem that the construction of a series of tables as full and as elaborate as Bouvard's Tables of Jupiter and Saturn, would be a waste of labour in the case of a minute planet like Pomona, not merely invisible to the naked eye, but not appreciably affecting by its influence any of the great planets of our scheme, yet this is not in reality the case. Though Pomona cannot affect the other planets, yet these affect Pomona. Her sister orb, Themis, has lately been made the means of affording a useful estimate of Jupiter's mass, through the careful consideration of the perturbations which that planet exerts upon the tiny asteroid. Long since Nicolai applied the perturbations of Juno, Encke those of Vesta, Gauss those of Pallas, and Brünnon those of Iris, to the same end. The more such researches are multiplied, the more exact will be our estimate of the mass of the principal planets of the solar system. Therefore, the present tables, by means of which it will be rendered an easy matter to estimate the disturbing action of Jupiter, will have a high value. In a less exact but not unsatisfactory manner, the mass of Mars may be estimated from the same tables, since in certain positions the disturbances of Pomona caused by Mars' attraction can be readily separated from those of Jupiter. R. A. P.

*SCIENCE-TEACHING IN SCHOOLS**

THE claims of Physical Science, on *à priori* grounds, to a fair place in the course of school work, have been abundantly vindicated, and are, I suppose, established. But the method and details of its teaching, the books and apparatus which it requires, and the amount of time which must be given to it, are points which can be decided only by experiment, and have not yet been decided at all. I cannot premise too distinctly that the aim of this paper is practical. Of the necessity for teaching science to their boys many good schoolmasters are convinced; as regards the machinery by which it is to be taught, they mostly confess their ignorance, and cry aloud for guidance. In my own school it has been taught systematically for the last five years, and I offer the fruit of this experience, very humbly, to all who are interested in Education.

The subjects to be taught—the time to be spent upon them—the books and apparatus necessary—and the mode of obtaining teachers—are the points on which information seems to be required. I will take them in order.

The subjects which naturally suggest themselves as most essential are Experimental Mechanics, Chemistry, and Physiology. But it has been urged by high authority, familiar to the members of this Association, that between Chemistry and Physiology Systematic Botany should be interposed, as well because of the charm this science lends to daily life, as from its cultivating peculiarly the habit of observation, and illustrating a class of natural objects which are touched indirectly or not at all by the other sciences named. Whether all these four subjects can be taught depends upon the period to which school education is protracted; but at any rate, let these, and none but these, employ the hours assigned especially to Physical Science, in the scheme of actual work in school. Abundant opportunity will remain for less direct instruction in many other branches of science. The Geographical lectures, if properly treated, will include the formation of the earth's crust, with the classification and distribution of its inhabitants, both animal and vegetable, both extinct and recent. The possession of meteorological instruments, whose observations are regularly taken, and their computations worked by the boys, will almost insensibly teach the principles of atmospheric phenomena; while such books as Maury's "Physical Geography of the Sea," Airy's "Popular Astronomy," and Herschel's "Meteorology," may be given as special matter for annual scientific prizes. The laws of light and heat will be taught as prefatory to chemistry. Electricity attracts boys so readily that with very little help they will make great progress in it by themselves. The mathematical master, whose best boys are well advanced, will not be satisfied till he has obtained a transit instrument and a mural circle. And the wise teacher, living in the country, will not disdain to encourage a knowledge of natural history. He will know that it is not only ancillary to severer scientific study, but in itself a priceless and inexhaustible resource. By country walks, by well-chosen holiday tasks, by frequent exhibitions of his microscope, he will not only add to the intellectual stock of his boys, but will build up safeguards to their moral purity. Indeed, even without such encouragement, boys who are trained thoroughly in certain sciences will of their own accord seek to become acquainted with other and collateral ones. Cases multiply in my own experience where pupils of a chemistry class have taken up electricity, pupils of a geography class mineralogy, pupils of a physiology class microscopy, and I need hardly say that boys make nothing their own so thoroughly as that which they select themselves.

The time to be given to science should not be less than three hours a week. At this rate two years may be given to mechanics, two years to chemistry, one year to botany; while the rest, if any remain, will be free for physiology. We need not be afraid of beginning early. A boy of eleven years old, fresh from an intelligent home, where his love of observation has been fostered, and his inquiries have been carefully answered, is far more fit to appreciate natural laws than a much older boy, round whose intellect, at an old-fashioned school, the shades of the prison house have steadily begun to close. Most schools are now divided into lower, middle, and upper. I would commence the study of mechanics with the junior class in the middle

* A Paper read before the British Association at Exeter, by the Rev. W. Tuckwell. Communicated by the Author.