THE HALL PHENOMENON IN LIQUIDS.

PROFESSOR ANTONIO ROITI publishes (Atti acc. lincei, xii. 397) under the above title the results of some experiments he has made. In preparing himself for his work, he repeated some of the ordinary experiments upon this phenomenon in metals: and the results, which contain nothing new, are shown in several diagrams. He devised one new experiment, however, which shows, as he thinks, that the effect he is investigating is not due to a direct action of the magnetic field upon the electric current *per se*. As the opinion thus reached by Professor Roiti must have been held two or three years by all who have given special attention to the matter, it is hardly worth while to inquire whether his new experiment is conclusive in itself.

In experimenting with liquids, Professor Roiti was unsuccessful in his main object, no effect similar to the well-known action in metals being detected.

It did appear, however, that the magnet, acting upon a solution of sulphate of zinc of given strength, was able to produce a change in the electric conductivity of the solution, the sign of which depended upon the direction of the magnetic force, the current in the liquid, and the degree of concentration of the solution. Thus, in a solution less concentrated than that which possesses the maximum electric conductivity, the effect was in a certain direction; while the opposite effect was produced, under the same conditions of current and magnetic force, in a solution having a concentration greater than that corresponding to this maximum. In a saturated solution no similar effect was observed.

Professor Roiti attributes this behavior of the non-saturated solutions to a want of homogeneity in the liquids, which become stirred up by the ponderomotive electromagnetic action. He makes several experiments tending to support this opinion. In a solution of ferric chloride (*cloruro ferrico*), of specific gravity 1.34, effects were obtained similar to those found with the dilute solution of sulphate of zinc. In a thin layer of mercury no similar effect was detected.

The examination of liquids with the view of detecting a 'rotational effect' similar to that observed in metals was probably first suggested in print by Ettingshausen.[1] The difficulties of the investigation were obviously great, however; and Professor Roiti appears to be the only experimenter who has yet undertaken it.

His account of his experiments is open to criticism in this respect: that it does not give sufficient data in regard to intensity of magnetic field, etc., to enable the reader to determine how severely the liquids were tested for the presence of the effect which gives the title to his article.

Moreover, he seems to have made a point of placing his side-connections unsymmetrically, so as to have, independently of the magnet's action, a considerable 'derived' current, — an arrangement which enabled him to discover the effect described above, but which, on that very account, should be studiously avoided in seeking for the phenomenon he was trying to detect.

Professor Roiti's ultimate object in beginning this investigation was to determine whether the transverse or 'rotational' effect would in liquids correspond to the magnetic rotation of the plane of polarization of light. Of course, no conclusion whatever upon this point can be drawn from the account given of his work and its results. And, even if his experiments had been entirely successful in revealing the effect looked for, it would be necessary to exercise caution in applying results so obtained to the case of the rotation of light. In the liquids, as here examined, the particles have time to fully adjust themselves, in position and motion, to the requirements of the magnetic force and the electric current to which they are subjected; while in the phenomenon of light, assumed to be electromagnetic in character, the mere inertia of the particles of the liquid must play an important part in the action of forces, which are reversed a countless number of times every second.

In the *Comptes rendus* of Sept. 17, 1883, Professor Righi states that he has found the Hall effect in bismuth to be of the same sense as in gold, but about five thousand times greater than in the latter metal. He obtains a very marked action in bismuth by use of an ordinary bar-magnet, and believes that he can produce a perceptible effect by the action of the earth's magnetism.

[1] *Anz. akad. wissensch. Wien*, March, 1880.

JANET'S THEORY OF MORALS.

The theory of morals. By PAUL JANET. Translated from the latest French edition [by MARY CHAPMAN]. New York, *Charles Scribner's Sons*, 1883. 10 + 490 p. 8°.

IF books on ethics are to be noticed at all in a scientific journal, they might be, as a rule, safely classified under the head of fossils. No literature deals with a subject which would seem to be more living; yet no literature is, on the whole, more desiccated and dead. Human conduct, with all its infinite variety of standards and impulses, with all its marvellous interworking of passions and emotions, with all its pressing and personal problems, conflicts, and obligations — what subject would seem to stimulate students to greater vividness, picturesqueness, or incisiveness of treatment? Every man is in his own way an ethical philosopher. No one can escape thinking about the right principles of his conduct. Books on this subject address the largest possible audience on the one unavoidable subject of reflection. And yet there seems to be some subtle influence which dries up even literary instincts when they approach this theme and which makes even brilliant writers wearisome. There