generation; and to such a functional unit of the innate constitution only, and to no part of it alone, and to no other fact or feature of the organic world, can, I submit, the name instinct be properly applied."

II.—*Are Secondary Qualities Independent of Perception?*

Dr. T. Percy Nunn maintained in his paper "(1) that both primary and secondary qualities of material bodies 'are really in them, whether anyone's senses perceive them or no'; (2) that they exist as they are perceived; and (3) that sensations, as mental entities exercising a representative function, need not, therefore, be postulated." He attacked the view that there are elements in experience (*e.g.* tooth-ache) whose being consists "only in being experienced," and these are therefore psychical in nature, showing how the (false) belief in their psychical nature arose. In place of this view he advocated a form of the theory of realism which he considered to be more consonant with the facts of science and immediate experience, and which involved the theses above-mentioned. He devoted much space to the consideration of the problems of error and illusion as they appeared from this point of view.

Dr. F. C. S. Schiller criticised Dr. Nunn's theory of realism from the point of view of pragmatism, and endeavoured to show that all his arguments were based upon pragmatical postulates. He also considered critically the senses in which the words *independent, extramental, reality*, had been used in the paper, and to what extent the theory advocated could be regarded as a metaphysical one.

III.—*Psychological Papers.*

Prof. G. Dawes Hicks criticised the views of attention which made it either, on the one hand, "a unique faculty" or "mode of mental energy" having presentations for its objects, or, on the other hand, a property of the presentations themselves regarded as independent and interacting with one another. He advocated the treatment of the problem of attention from the genetic point of view, and urged that the attempt should be made to form some conception of the conditions under which attention became possible in the primitive mind. After a consideration of the various factors influencing the attention process, such as feeling-tone, intensity of stimulus, &c., he traced the gradual growth of voluntary attention and indicated the relation of attention to willing and to the consciousness of self.

Mr. W. H. Winch discussed the value of the "faculty doctrine" in the light of experimental results obtained in the investigation of different forms of memory, accuracy, &c. The results of investigations into the transfer of practice effects, in which the method of "equal groups" was employed, were given, and were shown to prove slight transfer in the domain of memory, but none in that of accuracy, the improvement in the allied function being so small, even in the former case, compared with the improvement in the medium of training itself, as to make the balance of evidence against the "faculty doctrine."

Mr. E. Bullough described a series of observations made on a large number of individuals as to their preferences for colours, when seen in pairs, and the reasons given by the subjects themselves for such preferences. The two methods of (A) appreciation and (B) production were employed, and the material used was coloured silks. The subjects were found to belong to the following "perceptive types":—(*a*) objective type; (*b*) "physiological" type; (*c*) "character" type; (*d*) associative type. Definite relations were shown to exist between these perceptive types and the various criteria of preference or rejection of pairs of colours, such as "balance," "unification and dissociation," "consonance and dissonance," &c.

The societies dined together at the Criterion Restaurant on Friday evening, Prof. W. R. Sorley being in the chair. In the course of the after-dinner speeches the important suggestion was made by Prof. S. Alexander, and accepted with acclamation by the company, that the Aristotelian Society should strive to become the representative society of English philosophers, much as the Chemical Society, the Physical Society, &c., represent English science in those subjects.

WILLIAM BROWN.

THE MOTION OF THE MOON.

THE *American Journal of Science* for June contains an interesting article in which Prof. E. W. Brown discusses possible causes for the want of agreement between the moon's observed motion and theory. In his second section Prof. Brown gives a summary of these outstanding discordances:—(1) a secular acceleration 2″ greater than that due to the change of the eccentricity of the earth's orbit round the sun; (2) a term of 300 years' period and coefficient 15″; (3) a term of 60 years' period and coefficient 2″.

The secular acceleration is usually ascribed to tidal friction. Prof. Brown considers certain hypotheses as to the origin of the three-hundred-year term. He takes no further notice of the sixty-year term. It is quite possible, however, that the secret will be ultimately revealed by the term of shorter period, for if we assume that the forces required for the two terms vary as the coefficients and inversely as the square of the periods, it appears that the force required for the smaller term is the larger; moreover, the period of the sixty-year term is already known with a smaller percentage of error, and the next few years' observations will accentuate this consideration in its favour.

The fourth section of the paper lays down the fundamental rule which controls this detective problem. Any hypothetical cause must be dismissed from consideration that would produce a motion in either perigee or node above thirty seconds of arc in a century. Here Prof. Brown is at least as cautious as there is any need to be; he might have said fifteen seconds instead of thirty.

The sixth section dismisses from consideration the figure of Jupiter, the cumulative effect of the asteroids, and light pressure. Imperfections in the calculated theory seem to Prof. Brown inconceivable, and those who have followed his work will agree with him.

The seventh section raises the hypothesis of an equatorial ellipticity in the sun's figure. There is no direct evidence of such an ellipticity, and, moreover, it becomes necessary to assume that the period of rotation of the sun must be of a length that can be specified to its hundred-thousandth part. It is true that this period lies between the extreme values that have been determined from observation of the photosphere, and these values differ by six parts in a thousand but it is clearly a large assumption to take 1·00000 (five zeroes) as the true value of a quantity of which all we are entitled to say is that it probably lies between $1 \pm 0{\cdot}003$.

The eighth section deals with magnetic hypotheses. The discordance between theory and observation in the moon's motion is not due to the secular motion of the magnetic axis of the earth, but it is possible to frame hypotheses as to the moon's magnetism that cannot be dismissed as impossible.

The conclusions of the ninth section, dealing with the moon's libration, are very similar in character to those of the preceding section. Some hypotheses can be ruled out, for they involve librations that would have been already detected by observation, but other hypotheses remain tenable for the present, in particular a long-period libration of fifty seconds.

THE TRAINING OF ENGINEERS IN FRANCE.[1]

IN a lecture published in the *Revue générale des Sciences* for April, M. André Pelletan compares the training of engineers in France with the similar training given in the United States, England, and Germany. He devotes himself more particularly to the courses of study provided for those intended to occupy the highest engineering posts.

In so far as the lecture deals with the courses elsewhere than in France, there is, naturally, little that is new in his paper, but his statement in regard to the training given in the Ecole polytechnique will cause surprise to those not well acquainted with the work of that important institution.

It appears that students enter about the age of seventeen, as soon as they have passed the French equivalent for an English matriculation examination (the *baccalauréat*).

1 "La Formation des Ingénieurs en France et à l'Etranger." By André Pelletan.