during that period by reference to the silver voltameter.

The result of this preliminary investigation showed that the silver value of the *true* ampere was so nearly equal to the reputed value, viz., 1.118 milligram per second, as to require the use of an apparatus still more perfectly constructed, and, therefore, of a much more expensive character to enable the error, if any, in this value to be ascertained with accuracy.

We, therefore, started on the design of the instrument, of which we now submit the working drawings, and for the future construction of which we would ask for a grant of £300, including the unexpended grant of £75 voted last year.* And we anticipate that this new piece of apparatus may prove worthy of constituting a national Ampere Balance, the counterpoise weight for which will be determined purely by calculation based on the dimensions of the instrument, the number of convolutions of wire in the three coils, and the value of the acceleration of gravity at the place where the instrument may be permanently set up. In this particular it will differ entirely from the 'Board of Trade Ampere Standard Verified 1794,' which has had its counterpoise weight adjusted so that the beam is horizontal when a current passes through the instrument, which will deposit *exactly* 1.118 milligram of silver per second under specified conditions. In fact, the proposed Ampere Balance and the existing Ampere Standard will differ exactly in the same way as do a Lorenz apparatus and the 'Board of Trade Ohm Standard Verified, 1894.'

We have to express our thanks to Mr. Mather for taking charge of the construction and use of the preliminary apparatus, for checking all the calculations in connection with the determination of the electro-chemical equivalent of silver that was made with it, as well as for superintending the making of the working drawings of the new Ampere Balance.

We have also to thank Messrs. W. H. Derriman and W. N. Wilson, two of the students of the City and Guilds Central Technical College for their cordial assistance in carrying out the work.

W. E. AYRTON,
J. VIRIAMU JONES.

* This grant of £300 has since been made.

NOTES ON PHYSICS.

ELECTRICAL VIBRATIONS.

IN *Wied. Ann.*, 1898, No. 11, M. Abraham gives a solution for the electrical oscillation of an ellipsoidal conductor (ellipsoid of revolution) and an approximate solution for the electrical oscillation of a straight rod. Perhaps the most interesting feature of the paper is the detailed analysis of the reflection of an electrical wire-wave from the free end of the wire.

The wave-length of the Hertz waves sent out from a vibrating rod are shown to be the double length of the rod, a fact which has been known experimentally for some time, and the overtones are harmonic.

It may be remembered that Tesla, a few years ago, suggested (and perhaps tried!) the use of electrical oscillations of the earth as a means of telegraphy. The solution of the problem of the electrical oscillation of a sphere was well known (?) at the time, and this solution indicates that to maintain the electrical oscillations of a sphere only a few inches in diameter would require *millions of horse-power*, and, of course, to stir up the earth electrically would require an enormously greater amount. Tesla did not succeed.

MANOMETRIC FLAMES.

PROFESSORS NICHOLS and Merritt publish, in the August number of the *Physical Review*, an interesting series of manometric-flame photographs. The reproductions are as good, perhaps, as is possible, but the original

negatives, which the writer has had the good fortune to see, are very fine, indeed, and show an amazing amount of detail in case of both consonant and vowel sounds. The photographs were taken by using acetylene burning in oxygen, an image of the flame being thrown upon a moving sensitive film.

ETHERION.

Nature, in acknowledging the receipt of a paper by Mr. Charles F. Brusch (*sic*) on the new gas *Etherion*, promises to "refer to the paper later when we receive a spectroscopic demonstration of the existence of the new gas." It seems to the writer that Mr. Brush has demonstrated the existence of a gas—or something thin like air—which has a thermal conductivity one hundred times as great as that of hydrogen. If such is the case, the gas is certainly a new gas, and perhaps the spectroscope cannot be expected even to *verify* its existence; for Mr. Brush's speculation as to its molecular weight (1/10,000) is to a certain extent legitimate, and perhaps a gas of this molecular weight might not have any spectrum at all. One does, however, feel like demanding the demonstration of the existence of this substance by some of the methods heretofore employed in this field of discovery, but the fact remains that its thermal conductivity is sufficient to establish its existence. The only question in the matter is the accuracy of Mr. Brush's experimental results, and everyone who heard his paper at Boston was convinced of the adequacy of the experimentation. It may interest the readers of SCIENCE to learn that Professor E. W. Morley has joined Mr. Brush in continuing the investigation of the new gas.

THE GRAVITATION CONSTANT.

RICHARZ and Krigar-Menzel* have finished their elaborate and painstaking determination of the gravitation constant by means of the balance. A preliminary determination of the decrease of gravity with height, begun in '89, was reported to the Berlin Academy in '93.

The resulting value of the gravitation constant is

$$(6.685 \pm 0.011) \cdot 10^{-8} \frac{cm^2}{g \cdot sec^2},$$

and of the density of the earth

$$(5.505 \pm 0.009) \frac{g}{cm^3}.$$

This result lies between the results of Poynting and of Boys, and is, no doubt, the best result hitherto obtained; although the estimated probable error of Boys' result is only ± 0.002.

W. S. F.

* *Wied. Ann.*, Vol. 66, p. 177.

ZOOLOGICAL NOTES.

THE BRAIN OF THE CHIMPANZEE.

THE last number of the *Journal* of the Boston Society of Medical Sciences contains an article by E. W. Taylor on the Minute Anatomy of the Oblongata and Pons of the Chimpanzee. The author calls attention to the fact that, while the gross anatomy of the anthropoid apes has received much attention, comparatively little has been done in the way of minute study, and says that particular study should be given the cortex, in which the final secret of the differentiation of brain types must lie. The methods of preparation of the sections are given, and then follows a detailed description and comparison with similar sections of the oblongata and pons of man.

The points of special interest in the oblongata are the great development of the motor tracts; the peculiar conformation of the gray matter; the irregular character of the sensory crossing, and the smallness of the fillet; the fewness of the external ventral arcuate fibers, and the absence of the nucleus arciformis; the large size of the descending root of the fifth nerve and the imperfect development of the restiform body.