The present results, although still of a preliminary nature, are of an accuracy comparable with present published values. Observations have been taken at two frequencies since constancy of results with change in frequency is of primary importance. With a change in frequency of about 30 percent two frequency runs made up of about 90 observations each gave results differing by only two parts in 10,000. The weighted value of e/m obtained from these two groups of observations with the calculated probable error is $e/m_0 = (1.7592 \pm 0.0006) \times 10^7$ *em* units. The major part of this probable error is due to allowance for possible errors in the magnetic field measurement. However, to allow for still other possible errors in the experiment the present result may be stated as $e/m_0 = (1.7592 \pm 0.0015) \times 10^7$ *em* units. This result is somewhat lower but not in disagreement with the accepted spectroscopic value. It is in good agreement with Kirchner's results.[3] A more detailed description of the method and results will be published soon.

The writer is indebted to Professor Ernest O. Lawrence not only for the method, as mentioned above, but also for many helpful discussions during the development of the method.

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University of California,
November 12, 1932.

The Value of e/m

During the past two years there have appeared four direct determinations of e/m, each of high accuracy. These results are:[1] (1) C. T. Perry and E. L. Chaffee,[2] $e/m = 1.761 \pm 0.001$, from electrostatic acceleration of free electrons. (2) F. Kirchner,[3] $e/m = 1.7585 \pm 0.0012$ and 1.7590 ± 0.0015, from two different investigations, by the same method as (1). The weighted average is 1.7587 ± 0.0009, with the probable error based on internal consistency. The probable error from external consistency is, by chance, only ± 0.00016. (3) J. S. Campbell and W. V. Houston,[4] $e/m = 1.7579 \pm 0.0025$, from Zeeman effect measurements. (4) F. G. Dunnington,[5] $e/m = 1.7592 \pm 0.0015$, from magnetic deflection of free electrons.

The weighted average of these four results, based on three radically different methods, is $e/m = 1.75953 \pm 0.00043$, from external consistency, or ± 0.00059 from internal consistency. This is a very satisfactory agreement and tends to indicate that the probable error assumed by each investigator is a reasonable estimate. In each case, however, this assumed error is essentially a personal estimate by the investigator, and includes an arbitrary allowance for possible systematic errors of various kinds. Each of the four investigations seems, from superficial examination, to be of essentially the same accuracy. With this new assumption one obtains for the (unweighted) average, $e/m = 1.75920 \pm 0.00044$. This happens to be identical with Dunnington's value. I think that $(1.759 \pm 0.001) \times 10^7$ *em* units may be taken as a conservative estimate of the present most probable direct evaluation of e/m.

I should like to take this occasion to call attention to a numerical error in my recent paper[6] on certain general constants. On page 257 the correct value of $e_{3/4}$, resulting from $h_{4/3} = 6.5431 \pm 0.0042$, is 4.7721 ± 0.0023, and not 4.7738 ± 0.0041 as given. This makes the results of solutions k and l incorrect. The correct results of solution k are $h = 6.5432 \pm 0.0083$, $e = 4.7683 \pm 0.0038$, $e/m = 1.7611 \pm 0.0011$, $1/\alpha = 137.310 \pm 0.048$. Solution l is based on $e/m = 1.759 \pm 0.001$, as now adopted for the best direct value. The resulting values of e, h, etc., in solution l, corrected for the above error, may accordingly be considered the present most probable values. These corrected results are,

$$-h = (6.5420 \pm 0.0083) \times 10^{-27} \text{ erg} \cdot \text{sec.},$$
$$e = (4.7668 \pm 0.0038) \times 10^{-10} \; es \text{ units},$$
$$e/m = (1.7592 \pm 0.0011) \times 10^{7} \; em \text{ units},$$
$$1/\alpha = 137.374 \pm 0.048.$$

RAYMOND T. BIRGE
University of California,
November 12, 1932.

[1] This list does not include a very recent value by G. G. Kretschmar (Chicago, November, 1932 meeting of the American Physical Society) of 1.7555 ± 0.0026, since his method requires a knowledge of other fundamental constants.

[2] C. T. Perry and E. L. Chaffee, Phys. Rev. **36**, 904 (1930).

[3] F. Kirchner, Ann. d. Physik **12**, 503 (1932).

[4] J. S. Campbell and W. V. Houston, Phys. Rev. **38**, 581 (1931).

[5] F. G. Dunnington, Phys. Rev. **42**, 739 (1932).

[6] R. T. Birge, Phys. Rev. **40**, 228 and 319 (1932).