all concerned that they should everywhere furnish good models.

Let us first take the general law of inverse square, on account of its widespread application. We find the definition of 'Newtonian Forces, the most familiar examples of which are the mutual attractions of the sun and the planets' (Webster, p. 113), followed by the general expression for potential energy in such cases (p. 114). The latter contains no indication of the factor which becomes gravitation constant, or dielectric constant, or permeability factor; yet it has been stated previously (p. 111) that "Potential energy is defined as work. The unit of energy is, therefore, the *erg.*" The medium-factors for electric and magnetic phenomena are introduced later (p. 354), but the gravitation constant is nowhere restored in the developments, so far as I am aware.

The potential function, or potential, is very commonly defined as representing so much work. Thus, "The potential at P is the work done by the electric forces when the unit charge is taken from P to an infinite distance" (Thomson, p. 27). Or we are told that the potential function is obtained as a particular value of the potential energy, when one mass-factor is unity (Webster, p. 144). This is inconsistent with the dimensions of potential as generally accepted, and as given by the authors themselves (Thomson, p. 449; Webster, p. 559). It is consistent, however, with their definition of field as a force. The negative vector-parameter of the potential function is "The strength of the field, that is, the force experienced by a unit of mass, concentrated at the point in question" (Webster, p. 144). "The electric intensity [field] is the force acting on a small body charged with unit positive charge, when placed at this point" (Thomson, p. 13). But the dimensions of field are not those of force. Electromotive force, as difference of potential, is then of course work also; we find this explicitly stated (Thomson, p. 282; Webster, p. 333). Current, again, is work as well. "$W = 4\pi i$. Thus the work [W] done on unit pole, when it travels round a closed curve, * * * is equal to $4\pi i$, if i is the strength of the current" (Thomson, p. 325). Professor Webster gives this in the form $\Omega = I\omega$ (p. 413). Here Ω is magnetic potential, I current and ω solid angle.

The clue to all these confusions (except the first) is the same elementary consideration. There is a failure to distinguish, in the context and in set terms, between a numerical equality, and a 'physical equation' in which the quantities equated are of the same dimensions. But a sense of such differences must be cultivated, as a part of correct physical thought; although they may be ignored sometimes for the immediate purposes of the mathematician or of numerical determinations in the laboratory. It is probable that repeated contact with statements like those cited dulls our first impression of the contradictions in them. In order to restore its vividness, we need only to construct parallel instances, with which custom has not familiarized us. Thus, density is mass; that is, the mass of a unit volume. In a similar (numerical) sense, force, or momentum, or kinetic energy is mass in special cases. I have pointed out elsewhere ('Principles of Mechanics,' p. 242) that the true dimensional relations for the electrical quantities can be preserved very simply by defining field and potential, respectively, as force and work *per* unit (in the body affected) of the measured quality that is subject to the influences of the particular field. There is no unclearness if the (dimensional) division is indicated by this verbal device or its equivalent.

F. SLATE.

UNIVERSITY OF CALIFORNIA.

THE BRITISH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

THERE is not much to add to the information we gave last week in regard to the Glasgow meeting of the British Association. The president of the Association was directed to write a letter to the American embassy in the name of the Association, containing expressions of regret on the death of President McKinley.

The attendance was 1,912, distributed among the different classes as follows: 310 old life members, 37 new life members, 374 old annual members, 131 new annual members, 794 associates, 246 ladies and 20 foreign members. This is a smaller attendance than at the previous

Glasgow meetings of 1855 and 1876, the Glasgow Exposition and the previous meeting of the International Engineering Congress having apparently interfered with the number of new annual members and associates.

The following grants for scientific purposes amounting to £1,000 were made:

Mathematics and Physics.—Electrical standards, £40; seismological observations, £35; investigation of the upper atmosphere by means of kites, £75; magnetic observations at Falmouth, £80.

Chemistry.—Relation between absorption spectra and constitution of organic substances, £20; wave length tables, £5; properties of metals and alloys affected by dissolved gases, £40.

Geology.—Photographs of geological interest, £5; life zones in British carboniferous rocks, £10; exploration of Irish caves, £45.

Zoology.—Table at the Zoological Station, Naples, £100; index generum et specierum animalium, £100; migration of birds, £15; structure of coral reefs of Indian region, £50; compound sascidians of the Clyde area, £25.

Geography.—Terrestrial surface waves, £15.

Economic Science and Statistics.—Legislation regulating women's labor, £30.

Mechanical Science.—Small screw-gauge, £20; resistance of road vehicles to traction, £50.

Anthropology.—Silchester excavation, £5; ethnological survey of Canada, £15; age of stone circles, £30; anthropological teaching, £3; exploration in Crete, £100; anthropometric investigations of native Egyptian soldiers, £15; excavations on the Roman site at Gelligaer, £5.

Physiology.—Changes in hæmoglobin, £15; work of mammalian heart under influence of drugs, £20.

Botany.—Investigations of the cyanophycene, £10; the respiration of plants, £15.

Educational Science.—Reciprocal influence of universities and schools, £5; conditions of health essential to carrying on work in schools, £2.

THE FRENCH ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

Information in regard to the annual meetings of the French Association for the Advancement of Science is not easy to obtain. The secretaries do not answer letters addressed to them, and the French journals contain very inadequate reports of the proceedings. The *Revue Scientifique* does indeed publish annually the address of the president and the reports of the secretary and treasurer. None of the French journals, however, gives the programs and officers, or similar information.

The meeting this year was held at Ajaccio, in the Island of Corsica—the date is not given in any of the French journals at hand—and the president was M. E. T. Hamy, whose address was on 'The Beginnings of Anthropology in France.' The report of the secretary contains practically nothing but a list of the more eminent members who have died during the year, and a list of those on whom prizes and honors have been conferred. The report of the treasurer is the only document that gives us information in regard to the workings of the Association. This bears witness to transactions of considerable magnitude. The permanent funds of the Association amount to about $270,000. They were increased last year by three legacies amounting to $6,500, and two legacies have already been received this year, one of which amounts to $6,000. It seems strange that in France, where comparatively so little is given or bequeathed for public purposes, the French Association has been given a considerable endowment which is continually increased, whereas the American Association receives practically no part of the large sums that are annually given or bequeathed for educational and scientific purposes. It seems almost certain that if those who give money understand the needs of our Association, and the fact that the French Association from the income of its invested funds is able to support over fifty researches, the American Association will soon be placed in the same condition. As regards current income from the members and its relation to the expenses, the American Association compares favorably with that of France. Though the French Association carries on its books a very large number of members, many of them apparently do not pay the annual fees, for the total receipts are only $9,000, whereas the expenses of administration and publication are over $10,000, and the cost of the meeting last year was $3,000. For this meeting the City of Paris made a special subsidy.

Among the researches for which the largest appropriations have been made are: M. Turpan, for work on Hertzian waves; M. Cheval-