I LATELY discussed Murray's theory of coral formation with a class of boys and girls (fourteen to sixteen years of age), and *they* raised two questions which I am unable to answer. (1) If sea water dissolves the coral near the surface at such a rate as to form a lagoon, why does it not dissolve the limestone foundation even more rapidly? (2) After a reef has progressed a considerable distance from the shore, and a channel of open water is formed between, why should not the reef extend back again shorewards? How could such a channel as exists between Australia and its Great Barrier Reef ever have been kept open? These seem to be valid and serious objections: will some expert be kind enough to answer them? CHARLES R. DRYER.

Fort Wayne, Indiana, U.S.A., April 16.

Density and Specific Gravity.

THE point raised by Mr. Cumming in last week's NATURE (vol. xxxvii. p. 584), as to the use of the words density and specific gravity is, it seems to me, of some importance. For many years past I have, in my lectures, taken the law into my own hands in this matter, and, defining density as the mass of unit volume, I have defined specific gravity, in the way Mr. Cumming suggests in the last paragraph of his letter, as the weight of unit volume (or rather, lest I should cause any to offend against the examiner, I have thus defined *absolute* specific gravity, or specific gravity proper, and have pointed out that the definition commonly given was the definition of *relative* specific gravity). We thus get the parallel relations—

$$M = \rho V \text{ and } W = sV,$$

also

$$W = gM \text{ and } s = g\rho.$$

Thus regarded, specific gravity is to density just what weight is to mass. When force is expressed in absolute units of any kind, specific gravity and density must of course have different numerical values, just as weight and mass have. But in the very large number of cases in which weights are the only forces that have to be considered, and in which it is not needful to take account of the small changes of weight dependent on changes of geographical position, the local weight of the unit of mass may be conveniently taken as the practical unit of force—that is, we may take $g = 1$. In all such cases we have, *numerically*, weight = mass, and specific gravity = density, though the idea of weight is essentially different from that of mass, and the idea of specific gravity from that of density.

Of course, as Mr. Cumming points out, when specific gravity is defined as weight of unit volume, its numerical value for a given substance depends on what is taken as unit of weight and what as unit of volume. With the weight of 1 pound avoirdupois and the cubic foot as units, the specific gravity of water becomes 62·5, and that of platinum 1312·5, instead of 1 and 21 as given in the ordinary tables of (relative) specific gravities. If, on the other hand, we take as unit of weight the weight of unit volume of the standard substance, as is done when weights are expressed in grammes and volumes in cubic centimetres, or weights in kilogrammes and volumes in litres, absolute specific gravities and relative specific gravities become equal, and the ordinary specific gravity tables can be used for practical purposes, which is *one* of the great advantages to be gained by using the metrical system of weights and measures. With any other system, the numbers given in the tables require to be multiplied by the specific gravity of water—that is, they must be translated into absolute specific gravities—before they are of use for almost any real calculation, such as occurs either in experimental physics or in engineering practice. For instance, we weigh a measured length of copper wire and want to know its diameter, or we weigh the quantity of mercury that fills a glass bulb of which we require the capacity, or that fills a measured length of a tube of which we require the bore; or an engineer compares his pressure-gauge against a mercury-manometer in order to convert its indications into pounds-weight per square inch; or he has to calculate the pressure exerted by a brick wall so many feet high, or the weight of a mass of rock of so many cubic feet. In all these cases it is the absolute specific gravity that comes into account; it is no use to tell us that copper is 8·9 times as heavy as water, and mercury 13·6 times as heavy, unless we are told how heavy the unit volume of water itself is.

I maintain, in short, that the weight of unit volume of a substance is a quantity of very great practical importance, for which specific gravity is a very suitable name, whereas the ratio usually defined as specific gravity is of little or no use outside examination questions, and that if it needs a name it should be called relative density.

Further, my experience is that the definition here advocated presents considerable advantages from the point of view of systematic teaching. G. CAREY FOSTER.

University College, London, April 21.

JE crois que la notion de *specific gravity* donnée par M. Cumming dans NATURE du 19 avril (vol. xxxvii. p. 584) est de nature à puzz'er les étudiants plus encore que la *vraie* définition physique de la densité.

La densité d'un corps est le rapport de sa masse à son volume—

$$\rho = \frac{M}{V}.$$

Dans le système C.G.S. la densité doit donc être exprimée en *grammes masse par centimètre cube* (voy. Everett, "Units and Physical Constants"). Le poids spécifique est le rapport du poids d'un corps à son volume et devrait être exprimé, dans le système C.G.S. en *dynes par centimètre cube.* Mais il y aurait alors le grave inconvénient pratique à cette définition *rigoureuse* que le poids spécifique varierait avec *g*, accélération due à la pesanteur, tandis que la densité resterait constante.

La confusion provient de ce que le mot *weight*, comme le mot *poids* en français, s'applique indistinctement à la *masse* d'un corps en grammes-masse et à la force qu'exerce la pesanteur sur le corps exprimée en grammes.

La solution logique est de supprimer le mot *poids* du langage, à cause de son double sens, et de ne parler que de la *masse* ou de la *force* exercée par la pesanteur, suivant que l'un ou l'autre facteur intervient dans les calculs.

En tout cas, exprimer le poids spécifique en livres ou en grammes est aussi absurde que d'exprimer les vitesses en mètres, et la puissance (*power*) d'une machine en ergs ou en *foot-pounds*. Le respect de l'homogénéité des formules est la condition essentielle des définitions des quantités physiques, et cette homogénéité n'est pas respectée dans la définition donnée par M. Cumming. E. HOSPITALIER.

Paris, le 23 avril.

The Ignition of Platinum in Different Gases.

AN abstract appeared a few weeks ago in NATURE relating to the "Occlusion of Gases by Platinum and their Expulsion by Ignition," which induces me to mention some curious results obtained by Mr. Lowndes and myself by the ignition of platinum in different gases. We were led to the experiments by another investigation on the behaviour of carbon at high temperatures in various gases. We find that when a platinum wire is heated to nearly melting by a current in an atmosphere of chlorine, the walls of the glass vessel become covered with a yellow deposit, which is insoluble in water, but dissolves in hydrochloric acid, and then, after addition of a little nitric acid, gives all the reactions of platinic chloride. The yellow deposit is in fact platinous chloride. At the same time the thick part of the platinum wire conveying the current, and which was not heated very highly, became incrusted with very fine long crystals of platinum. Some of these were more than the sixteenth of an inch in length, and apparently considerably more were located on that end of the thick wire leading to the negative pole than on the other.

There was also a very decided but lambent flame playing around the ignited and part of the cooler wire during the passage of the current. The arrangement used was a wide-necked flask, stopped with a glass bulb, through which a delivery-tube for the chlorine, and the two No. 12 platinum wires leading the current, passed. The ignited parts of the wire are little coils of No. 24 wire separated by a 1-inch piece of No. 12. On heating the flask externally up to the softening of the glass, the appearance of a flame around the wire increased slightly.

On repeating the experiment with bromine, very nearly the same effects were observed. The amount of platinous bromide was much less than in the case of the chloride, but the flame appearance was very much more pronounced. On passing chlorine into the bromine, so as to form chloride of bromine, both the flame appearance and the action on the platinum were largely increased. With iodine in the flask, vaporized by heating externally, little chemical action on the platinum was observed, only the slightest deposit being formed of a platinum-iodine compound on the glass; but, on passing chlorine into this also, a still more vigorous action on the metal took place, the deposit containing only chlorine and platinum. The flame