METRICAL *v.* IMPERIAL STANDARDS.

SIR,—It is to be regretted that the valuable space of the pages of the GEOL. MAG. are threatened by a discussion of the merits of different systems of weights and measures. The question has been threshed out in the "English Mechanic," photographic and other journals quite recently. As one of those who use metrical measurements in my communications to the three papers mentioned, would you kindly allow me to explain my own reasons, which are probably the same as those of the other culprits. As an Englishman, educated in England, I have the greatest respect for most of her institutions and systems; but I am not *Jingoist* enough (pardon the expression) to extend my patriotic feelings to the irrational system of your so-called Imperial Standards, which cost me many a caning and numerous other miseries during my school-days. When I took up my residence abroad, my mental conception of an inch and a foot was fairly good; but ells, furlongs, miles, gills, pints, gallons, pecks, bushels, grains, scruples, drachms, and many other barbarous units were always very hazy conceptions. My first initiation to metrical measurements was the picture of a decimetre in Roscoe's small chemistry book. I set myself to work for half an hour on two or three occasions, and soon gained a clear mental estimate of all metrical standards which years of patient labour and much practice had failed to give me of Imperial standards. The great point is that the measure of lengths, fluids, solids, with their relations to specific gravity, temperature, coinage, etc., can be calculated in a few seconds by an ordinary person, whilst the relationship of the Imperial standards requires lengthy intricate calculations on paper by a practised mind. So superior do I find the metrical system that I now convert the data of any problem from English to a metrical form, make my calculations, and reconvert the answer to English form.

The objections of the writer of the letter in last month's GEOL. MAG. are of the usual invalid kind. In the first place he seems to think one must be a French scholar to understand metrical measurements, whereas if any other than his own language is necessary, it is Greek and Latin, as all the names of the weights and measures are derived from them; but I would ask if the writer of the letter ever attempted to investigate the meanings of furlong, drachm, scruple, carat, and other incomprehensible and useless denominations of our Imperial standard units, whilst a most elementary knowledge is sufficient to explain a decimetre, a milligramme, or a hectolitre. The next error is to refer the use of the metrical system entirely to the French—true it originated in the minds of French philosophers and physicists, but it has long been very extensively adopted by other countries. All said about Englishmen and English journals is out of place, for the metrical system is recognized as legal Standards by Act of the British Imperial Parliament, and it is only our insular conservatism that makes us retain an old, cumbersome, and even dangerous system of Standards not much superior to those used from earliest historic times. If people wish to understand

scientific papers where the metrical system is used, it is to be inferred that they are capable of learning that system, which is not more difficult than the multiplication table of 10.

The prognostications of your correspondent I fear are of little value, for I find daily the metrical system is replacing more and more the barbarous standards. I know of some large English engineering works recently opened in Italy where all the English engineers, after a few months' absence from home, adopt the metrical system as far as the inch-calibred machinery will allow, and constantly grumble at the two-foot rule.

Lastly, allow me to state that once it was my practice to put old English equivalents by the side of the metrical measurements, but I dropped the practice because one Editor wrote to me saying that it was a presupposed fact that the readers of his journal understood the metrical system, and it might offend their dignity to be told the English equivalent of 2·5 centimetres, etc. Another Editor wrote that it was superfluous and added to the length of the paper.

Chemists and physicists have universally adopted the metrical system, mathematicians, astronomers, etc., prefer it, and I maintain that geologists—especially those who write for the future in the GEOL. MAG.—the least conservative of all scientists, should not be the last to give up an archaic if not an archean system.

NAPLES, *Oct. 14th*, 1890. H. J. JOHNSTON-LAVIS.

WIND WAVES AND TIDAL CURRENTS.

SIR,—Allow me to thank Mr. Stirrup for the invaluable information contained in his letter on "Wind Waves and Tidal Currents." It does not, however, affect the position taken up in my letter on "Tidal Action" as to the question of the action or inaction of *Tidal* currents on the floor of the English Channel. The Mediterranean being practically a tideless sea, the currents encountered by M. Fol could not possibly be Tidal, and herein lies the extreme value of the observations.

My investigation of wave-action was undertaken in order to prove the disturbing power of waves on the sea-bottom, and I proved my point up to the hilt, and indeed a little further, as the ascertained amount of disturbance exceeded what the theory of oscillating waves would allow.

In a paper submitted to the British Association in 1886, I pointed to the clean sand and shells in 100 fathoms and more at the mouth of the English Channel as evidence of the presence of wave-currents at a depth far below the reach of the heaviest oscillating waves, and said that "the presence of this deposit of clean sand and shells is at present unaccounted for, for there are no recognized agents competent to disturb and distribute such material below the depth of fifty fathoms:" at the same time I showed how a gale off Queenstown by the general disturbance of the water-level, stirred up seaweed in Torquay Harbour far beyond the radius of the atmospheric disturbance caused by the storm.

In a tidal sea it is impossible to isolate these far-reaching currents