Action of Cutting Tools.

In the interesting letter which appeared in Nature of August 26, p. 277, Mr. Mallock objects to the use of the word cutting as incorrect when applied to tools used for metal work, and it is surprising, therefore, to find that his own paper to which he refers in support of his contention is entitled " The Action of Cutting Tools," although it is almost entirely devoted to showing that the action of such tools is that of shearing.

In a further letter in Nature, p. 603, of November 4, Mr. Mallock dismisses my paper as having no reference whatever to the action of cutting tools, apparently on the ground that it is entirely devoted to a consideration of elastic strains. So far as the tool itself is concerned, it is only useful so long as it does not become permanently deformed, and to the maker of tool steel, the stresses and strains produced within the elastic range are therefore matters of interest, so that an attempt was made in this paper to show the distribution of stress in the tool itself under these conditions.

In another section an account is given of the stress effects in the work when the tool is removing material therefrom, which are quantitative within the range for which the laws of photo-elasticity are known, and qualitative in the plastic region, as present knowledge is not sufficient to interpret fully the interference effects observed. Mr. Mallock ignores these latter effects, although they are undoubtedly of importance. They show, for example, that the action is sometimes discontinuous, and under other conditions is not so, although Mr. Mallock states quite definitely that it is always discontinuous and quasi-periodic. Mr. Mallock's letter also lays stress on the curling up of the shaving, but this does not always happen, as the discussion on my paper brought out the interesting fact that, as the speed increases, the curls of steel shavings increase in radius until at speeds of about two feet per second the shavings become practically straight and are often a danger to workmen. This effect has also been produced in nitro-cellulose at low speeds with a suitable tool, and it is then found that these straight shavings show permanent stress effects similar to those produced when a thin curved beam is flattened out.   E. G. Coker.
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A New Worship?

"Therefore no man that uttereth unrighteous things
        shall be unseen;
Neither shall Justice, when it convicteth, pass him by.
For in the midst of his counsels the ungodly shall be
        searched out;
And the sound of his words shall come unto the Lord
To bring to conviction his lawless deeds:
Because there is an ear of jealousy that listeneth to all
        things,
And the noise of murmurings is not hid.
Beware then of unprofitable murmuring."

After a period of ennobling worship in that greatest of our English Cathedrals, the Scafell massif, on my return to town I chanced to enter that strange building, Burlington House, wherein be installed many altars to the great god, Science. Visiting that which ranketh first, I found an impassive figure, seated in a chair, at the High Altar, with a brass bauble before him: he needed but the peculiar head-dress to be an Egyptian Priest-King. Moreover, the service was apparently Græco-Egyptian, if not Babylonian. The officiating young priest used many beautiful words clearly of Grecian origin,

though at times an American phrase was noticeable, as when he spoke of Arrhenius doing chores, as I understood, for the god Isos. Most remarkable, however, was the way in which, at intervals, turning towards the altar, he solemnly gave utterance to the incantation—" See, Oh, Too ! " My impression was that *Too* was the great king in the chair. The priest apparently was in fear of impending disaster, for at the close of his address he spoke much of concentration of the Hydrogen Ikons and their attack and repulse, often repeating the phrase " See, Oh, Too "—but Too seemed not to notice.

Two young acolytes then cast pictures of writing upon the wall as difficult to interpret as was that message expounded by Daniel in days long ago.

Most marvellous was the closing sermon, in which an account was given of the confusion wrought among a strange people, called " Lysodeiktics," by adding tears, nasal secretion, animal stews, turnip juice—seemingly muck of any kind—to their food : and how some of them were not killed. To one of an old faith, it seemed a strangely degenerate worship ; indeed, that such service could be held worthy of attention amazed me.

In the evening, it chanced that I was led to peruse an article, in *The Times Literary Supplement*, on " Tradition and the French Academy," wherein is given Matthew Arnold's quotation, in his well-known essay, from the Academy's statutes :—

" The Academy's principal function shall be to work with all the care and all the diligence possible at giving sure rules to our language and rendering it *pure, eloquent and capable of treating the arts and sciences.*"

The whole article is worth reading ; at the end is a quotation from a work by the late Pierre Duhem, the closing words being—

" *le respect de la tradition est une condition essentielle du progrès scientifique.*"

It is scarcely necessary to point out the application of these quotations; yet shall I ever pray : See to it, Oh, see to it, great Oh, Too !

                                   Henry E. Armstrong.

The Spectrum of Neutral Helium.

A most significant feature of the success of the quantum theory in explaining the sequence of radiation-frequencies forming the Balmer type of series in the spectra of hydrogen and ionised helium is that it also offers an intelligible explanation of the differences in the intensities of the successive lines in the sequence, and that its postulates are not inconsistent with the known facts regarding the sizes of the atoms in their normal states. The fundamental assumption in the theory is that the states of the atom represented by increasing quantum numbers depart more and more from the normal state, and the greater intensities of the earlier lines in a sequence are readily understood as due to the greater probability of transitions actually occurring between states represented by smaller quantum numbers.

Any attempt to build up a theory of spectra which ignores these fundamental considerations must be received with caution. The remark just made appears to be particularly applicable to Dr. Silberstein's attempt (Nature, August 19) to explain the spectrum of neutral helium on the assumption of the independence of the electrons. Looking over the list of frequencies given in his letter, and comparing them with the maps and tables of the helium spectrum contained in Prof. Fowler's report, it is noticed at once that the well-known intense yellow line of helium at $\lambda 5876$, which is the first member of the diffuse series of doublets, is given by Dr. Silberstein the