

be bordered by escarpments of simple pattern; the escarpments will gradually be dissected by ravines and valleys, but these cannot be eroded beneath sea-level; hence the arm of the sea that takes possession of such a trough cannot have lateral branches or indentations, unless the sides of the trough as well as the trough block itself suffer depression—that is, unless regional depression takes place. Likewise, a coastal valley may be occupied and over-deepened by a glacier, and invaded by the sea after the glacier withdraws, thus producing a fiord; but a fiord can be easily distinguished from a drowned fault trough or from a ria. Evidently, then, in applying Dana's proof, it is essential to see that glacial fiords and fault troughs are not confused with normal valleys; and it still appears to me that my article of February 6 made it clear that only normal valleys were under consideration.

A few words as to terminology. Various popular terms, like "fish" and "valley," which entered our language in a pre-scientific period, have to-day two meanings; first, their original general meaning, and second, a later acquired and more precisely limited scientific meaning. "Fish" originally meant an animal living in the sea, and included whales and oysters. The latter are still known as shellfish, and a certain kind of whale is still named blackfish; but under the influence of scientific zoology whales are now classed by most persons not with fish but with mammals. So with "valley"; the original meaning of the word is simply an enclosed lowland, more or less elongated, of whatever origin, and this vague meaning is still in common use, as in naming the valley of the Wye, purely the work of normal erosion; the valley of the Ticino, greatly modified by glacial erosion; the valley of the middle Rhine, a fine example of a down-faulted trough; and the valley of California, a broad and relatively shallow down-warp. But "valley" has also been used, since the time of Hutton and Playfair, in the scientifically limited sense for forms of normal erosion under the action of rain and rivers; and when thus used it implies an origin above sea-level, as well as the systematic arrangement of certain significant features, such as slope of stream line, manner of junction of tributary and main valleys, and so on, by which the normal origin of a valley may be easily recognised. The Norwegian term "fiord" (fjord), and the Spanish term "ria," both locally used without scientific definition or implication of origin for the sea-arms that they designate, have in recent years both been given a more limited meaning in scientific geographical literature. It was only, as the context shows, in the scientific sense of a form of normal erosional origin above sea-level that the term "valley" was used in my article; and manifestly it is only to coasts which exhibit branching or indented embayments, such as were shown in the middle block of my diagram, and such as are caused by the submergence of true valleys of erosion, that Dana's proof of Darwin's theory applies.

W. M. DAVIS.

Harvard University, Cambridge, Mass., June 7.

Uniformity in Radio-active Nomenclature.

IN a letter to NATURE of June 5, Mr. W. H. Ross and Mr. H. J. Creighton point out the present want of uniformity in radio-active nomenclature, and suggest that some definite system should be adopted by all writers on this subject. Every worker in radio-activity recognises the importance of some agreement in regard to this matter. It is difficult, however, for a single individual to suggest a scheme which would be likely to gain universal support. The only international body existing at present which is in a position to deal with such a question conveniently

and expeditiously is the International Radium Standards Committee. The constitution of this committee is fortunately very suitable for the consideration of this question, as it comprises about an equal number of physicists and chemists representing five nations. As president of the International Committee, I should be glad to bring the matter to the attention of the other members, and will do so if there is no objection to this proposal. E. RUTHERFORD.

Radio-activity and the Age of the Earth.

MR. HOLMES, in his interesting letter in NATURE of June 19, brings out the embarrassments in which the superabundance of radio-activity in the accessible crust of the earth and the enormous antiquities deducible therefrom have plunged physics. His explanation is that since the earth as a whole cannot be as radio-active as the crust, without liquefying, there cannot be as much radium in it as might be inferred from the samples we can take, and that its "heavy metallic core" must be "completely destitute of radium." This, however, involves the improbability that the heaviest metal of all, uranium, has not gravitated to the "metallic core," and does not explain why this core should be destitute of radio-active substances.

It may be pointed out, therefore, that the whole reasoning rests on an assumption to which alternatives might be considered. It is assumed that the dissociation of uranium has been proceeding always and everywhere at the rate we can now observe on the earth's surface. But it is possible that under the physical conditions obtaining in the interior uranium does not dissociate, or does so much more slowly. It is even possible that it has not always proceeded at this rate in the past. Radio-activity may be an acquired habit of the substances that exhibit it.

There is no scientific objection to the suggestion that the existing "laws of nature" are not immutable but "evolving," beyond the methodological inconvenience that this would greatly complicate our calculations and detract from the exactness of our predictions. But of improbabilities, as of evils, we must always choose the least. F. C. S. SCHILLER.

Corpus Christi College, Oxford, June 23.

Pianoforte Touch.

THREE variables appear to be possible in pianoforte touch, namely:—

- (1) The energy of the blow of the hammer.
- (2) The duration of contact of hammer with wire.
- (3) The resonance of the woodwork.

Of these, (1) will be admitted by everyone; (3) should be in abeyance as much as possible, since it is brought into evidence chiefly when the key is struck too hard—beyond the capacity of the wire for harmonic response. But the mechanism of some pianos (even by first-class makers) is so resonant that a "xylophone" effect is only too easily produced. This effect evidently has its admirers, being cultivated by performers as well as ministered to by piano-makers.

(2) Is assumed by many persons; but the possibility is doubted by others, because the player cannot hold the hammer in contact with the wire. The hammer, as mentioned by Prof. Bryan, is disconnected from the key, so that at the time of striking the wire it is a projectile.

At some point in the mechanism, between the key and the hammer, is an arrangement called the "escapement," which disconnects the key from the hammer when the player's touch is so deep or firm as to cause the risk of blocking; but when his touch is shallow the escapement is scarcely brought into action.