

It does appear plain that the village institutes have a fine opportunity for giving encouragement to continuation rural education; they not only miss the opportunity, but, at the same time, unwittingly are the cause of there being no demand for an evening school. Opportunities for the village youth to spend aimlessly and uselessly all their spare time are to be deprecated.

In one West Riding village the influence of the opening of a new institute was shown by the total exodus of the members of the existing evening school. Even the moral obligation to complete their attendances, so as to save financial losses upon the school, failed to bring them back again. The billiard-ball was rolling, so opportunities for the making of more fit citizens were sent flying. The result was not a moral triumph for the ex-students.

May one suggest that in the future some donor of an institute, or someone who by their contribution has made it possible for trustees to lease an institute at a nominal rent to a committee of management, should insert a proviso in their deed of gift that younger members of the institute are to attend continuation educational work at the village school? Such a proviso might be open to elimination if found, after an extended trial, to be prejudicial to the institute's success.

There should be an educational side to every village institute; it might be an attached rural association or club for the further advance of rural interests. Such an association might hold meetings periodically for discussions upon general agricultural matters. Samples of manures and feeding stuffs, along with a consideration of current values and prevalent adulterants, are important matters, and should be undertaken by the suggested rural club. The leaflets of the Board of Agriculture would be suitable for elucidation and discussion; their distribution could be carried out by the club.

Village halls have been in the past the centre of the arts and crafts movement; in some parts of the country they are yet. The development of handwork in the elementary schools of the rural districts should again revive the use of the village hall. Such a revival requires funds. The Board of Education and local authorities place at the disposal of committees doing educational work of a manual nature liberal grants. Some of the wealthy trade guilds might be disposed to find funds for a village development of arts and crafts if the work had an industrial basis. In this way might be developed in the village, as in Germany, a large number of small workshops going hand in hand with agriculture.

The village institute and evening school would not become competitors by both taking up educational work; they would become helpers. Admission to the institute's higher work should preferentially be given to those who had thoroughly prepared themselves for it by a satisfactory course of preparatory work at the evening school. In short, the institute would be regarded as the technical school of the village, giving, amongst other work, practical and theoretical instruction on the greatest of all industries—agriculture.

JOHN B. COPPOCK.

(Organiser for the Rural Districts of the West Riding of Yorkshire.)

Education Department, County Hall, Wakefield.

Avogadro's Hypothesis (or Law).

IN Prof. Tilden's "Life of Mendeléeff" in the current number of the Journal of the Chemical Society, I see that he refers repeatedly to the "law" of Avogadro. Sir William Ramsay, in his "Modern Chemistry," speaks of it as a "hypothesis," and this has surely been, until recently, the practice of chemists.

I think there is a growing tendency to speak of it as a law. This, doubtless, arises from the strong confirmatory evidence provided by modern physical chemistry. It is desirable, in the interests of students and of exactitude in scientific nomenclature, that some decision should be come to as to which term should be used. This may necessitate very careful definition.

A discussion of this matter, in which teachers will give reasons for their choice, should prove of value.

S. H. WOOLHOUSE.

Parmiter's School, Approach Road, Victoria Park, N.E., January 17.

NO. 2099, VOL. 82]

"A Japanese Priest in Tibet."

WHATEVER may be the demerits of Mr. Kawaguchi's "Three Years in Tibet," reviewed in NATURE of January 13, the title of the book is, according to the Eastern habit of reckoning, quite accurate. Mr. Kawaguchi spent part of 1900, all 1901, and part of 1902 in Tibet—three years. A child in Japan, if born on December 31, begins his second year on January 1, and on the succeeding New Year's Day may be regarded as having lived for three years, although he may be only 367 days old!

C. G. KNOTT.

University of Edinburgh, January 17.

STANDARD MEASUREMENT IN WAVE-LENGTHS OF LIGHT.

THE employment of the principle of the interference of two rays of monochromatic light, derived from the same source, one retarded behind the other by having to traverse a longer path, for the production of rectilinear interference bands constituting a scale of half-wave-lengths, has now been brought to such perfection that this highly refined scale may be used for the measurement of short distances or small movements of any description whatsoever. The accuracy is absolute to the tenth part of a scale division, the twentieth part of a wave-length of light, and is actually measurable with the most ordinary micrometer to the one-hundredth of a scale division, corresponding to the two-hundredth part of a wave-length. Now a wave-length of even the grossest radiations employed, those of red light, derived from either cadmium vapour (0.0006438 mm.) or hydrogen (0.0006562 mm.), is a forty-thousandth of an inch, so that the measurable unit is an eight-millionth part of an inch.

The finest trustworthy measurement by mechanical means (such as the Whitworth machine) or micrometric devices (such as the most refined thickness measurer) is the one-thousandth of a millimetre, or the twenty-five-thousandth of an inch. Moreover, the amount of possible error with either of these mechanical methods of measurement or the interference method is from one to two units of the respective scales. Hence the interference method is only subject to a possible error of one three-hundred-and-twentieth the magnitude of that to which the mechanical mode of measurement is liable.

The interference method was first seriously employed by Fizeau, who utilised it for the determination of the thermal expansion of crystals and other small bodies. It was materially improved by Abbe and Pulfrich, and more recently both for the same crystallographic purpose and for general purposes by the writer, who has also extended its use to the measurement of the modulus of elasticity of crystals and small bodies or small quantities of substances in general.

It will be remembered also that Prof. Michelson, of Chicago, has recently adapted his entirely different mode of producing interference fringes, in this case circular, to the determination of the number of wave-lengths of red cadmium light, which he has proved to be the most homogeneous of all radiations yet known to us, in the French metre. By employing a graduated series of glass-plate *étalons* or intermediate standards, each double of the preceding one, commencing with a basal one of half a millimetre in which the actual number (1212) of half-wave-lengths was counted, the number of wave-lengths of red cadmium light in the metre was eventually found to be 1,553,163. This number has since been confirmed by the independent method of Fabry and Perot, in which circular fringes are also produced.

Three years ago the writer was invited by the Standards Department of the Board of Trade to adapt