In a paper by F. H. MacDougall and R. G. Green in the *Journal of Infectious Diseases* (1924, xxxiv, 195), the formula for the resistance is:

$$\frac{1}{R} = \frac{1\text{-}a}{M} + \frac{a}{S}$$

after translating one term into the conventions of MacDougall's paper. In a paper by Karl Lichtenecker on the resistance of certain composite conductors in the *Physikalische Zeitschrift*, 1918, xvii, 381, is given a formula which when translated into MacDougall's terms is:

$$R = \frac{SM}{(1-a)\ S + aM}$$

If we reduce MacDougall's equation to a common denominator we obtain

$$\frac{1}{R} = \frac{(1-a)\ S + aM}{SM}$$

and by taking the reciprocals of each side of this equation we obtain the equation used by Lichtenecker.

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HOW MANY FIGURES ARE SIGNIFICANT?

THE readers of SCIENCE are aware that varying practices are followed by the workers in the natural and social sciences regarding the number of decimal places kept and reported in their investigations. A definite and uniform practice would conduce to general understanding. Discussions with my colleagues regarding certain quantitative studies of my own which promised to be serious and worth-while have become mired around the decimal point. As a result of this I have determined upon a rule for my personal guidance which I believe may be of general utility.

Determine the probable error of the measure involved, by statistical means if possible, otherwise estimate it. *Keep to the place indicated by the first figure of ½ the probable error.*

As an illustration, suppose we calculate the mean and standard deviation of a certain series and find:

Mean = 81.7433
Standard deviation = 12.8294
Population = 100
The probable error of the mean according to the usual formula = .865
The probable error of the standard deviation according to the usual formula = .612
½ the probable error of the mean = .432
½ the probable error of the standard deviation = .306

Following the rule, we would publish: Mean = 81.7 and the standard deviation = 12.8.

As a second illustration: Suppose we have a correlation coefficient of .75248 from a population of 400. Its probable error, according to the usual formula, is .0146. One half the probable error equals .0073. Accordingly, the correlation coefficient should be published as equal of .752.

The argument underlying this rule is that one should not throw away data that are likely to influence judgment. A difference of 1 probable error indicates that the chances are 3 to 1 that the difference is of the sign indicated. This is scant evidence of significance but not entirely meaningless. A difference of one half of the probable error indicates that the chances are about 5 to 3 that the difference is of the sign indicated. For ordinary purposes this is of insignificant moment. Failure to keep more figures introduces a slight error, but keeping them introduces a much greater error in interpretation by suggesting an accuracy which does not exist. It is necessary to strike a balance and the rule suggested is offered as a reasonable compromise.

It is intended that it be applied to raw or original measures or observations as well as to derived constants such as averages, measures of variability, etc. It is to be expected that computation work preceding publication will be carried to at least one figure further than the final published result.

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OPPORTUNITIES FOR SCIENCE TEACHERS IN NEW YORK HIGH SCHOOLS

A LETTER requesting information regarding opportunities for science teachers in the high schools of New York City was received by the writer some months ago from an associate professor in a large collegiate institution east of the Mississippi. The information furnished may be of interest to others and is outlined below. There is a real opportunity for important work, both in science education and in supplementary graduate work in science.

(1) There has been for some years a shortage of well-qualified teachers, especially of men for the boys' high schools. Three successive examinations in biology netted not more than three or four successful candidates, who were immediately appointed.

(2) The population of the New York City high schools stands at present at one hundred and ten thousand, and increases by thousands every year. All these ought to have several courses in science, and it appears that recognition of this fact is growing on the part of the administrative officials, and science work is entering a floodtide. At present between four and five hundred specially selected science teachers are required to offer the courses now given.

(3) The salary of the regular high school teacher,

called "assistant teacher," ranges from nineteen hundred to thirty-seven hundred dollars. Credit is given in the initial salary for recognized outside teaching experience and graduate work. By a further examination for the license of "first assistant," a progression to forty-two hundred dollars is possible, with administrative duties as chairman of department. Such departments range in size from two or three to forty teachers. High schools range from one to eight thousand pupils. At the last count there were thirty-five secondary schools ranked as high schools, with more new ones in prospect.

(4) Opportunities for continued graduate work and research are probably not equalled or even approached elsewhere in the country. The educational problems constitute an intensely interesting and important field of work in themselves, and New York is headquarters for more kinds of pure and applied scientific research than anywhere else. The universities, professional schools, libraries, science foundations, botanic gardens, museums, industrial establishments, et al., all offer problems by the score, with facilities for the qualified investigator. For those who have not finished graduate study toward a degree, the universities offer important graduate courses on Saturdays.

(5) Full details regarding the stated examinations, etc., may be obtained by addressing the Board of Examiners, 500 Park Ave., New York City. Following are paragraphs taken from their circular of information, and giving some of the facts a prospective candidate for the examination would be interested to know.

(a) Teaching positions in New York City are secured by competitive examination, a part of which is written. These examinations usually held twice a year, in November or December, and in March or April, usually at a time when the New York City public schools are not in session.

College graduation and one year's teaching experience, or, in lieu of teaching experience, one year of post-graduate work which must include 60 hours in the methods of teaching the subject.

(b) It takes nearly a year for examiners to make proper evaluation of the candidates' references, scholarship and records of service so that persons applying for New York City positions who take the examination should not look for appointment any earlier than one year from the date of the written examination.

Copies of the last written examination question paper may be obtained, while they last, from the Board of Examiners, 500 Park Avenue, New York, upon request, enclosing a stamped and self-addressed envelope.

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SUGGESTED MODIFICATIONS OF THE CELLOIDIN METHOD

UNDER the caption "A shorter celloidin method" there recently appeared in SCIENCE (No. 1542, July 18, 1924, p. 67) a description, signed by J. E. Lodewick, of a tank made of an iron pipe, for use in imbedding tissues with celloidin under pressure. The present writer wishes to suggest some modifications which have been found advantageous.

Instead of using a piece of iron pipe for the tank a heavy glass jar can be used, provided the pressure is not run too high. In an apparatus of this kind, described in detail by the writer in the April, 1914, issue of the Proceedings of the Society of American Foresters, a pressure of 30 pounds per square inch can safely be used.

The great advantage of the glass jar is, of course, that the material can be observed without opening the chamber. Hence, certain obvious precautions can be taken against too rapid release of pressure and attendant bubbling over of the celloidin or the celloidin becoming too low on account of an insufficient original supply.

The writer has also found that woody material can be satisfactorily imbedded by the pressure method by using only a 10 per cent. solution of celloidin, provided a liberal supply is used to begin with. Thus, one avoids the necessity of any transfer of material to a higher concentration. Another way of hastening the process with tissues that can endure higher temperatures is to heat and cool the chamber alternately at intervals of several hours. The increased pressure should be applied particularly while the celloidin is cooling, so as to secure penetration into the cell cavities while the gases are contracting and condensing within.

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A CURIOUS SURGICAL CASE

I HAVE received from Mr. Nisuke Takahasi, a teacher in a high school in Kumamoto, Japan, a specimen of a fish somewhat noted in Japanese surgery.

It is a fish two and four fifth inches (7.0 cm) long taken from a man's throat, in which it had become lodged. The specimen concerned is a common fresh water fish of the clear streams of Southern Japan, locally known as Oyarami or Kawamebaru, very closely related in fact as well as in appearance to some of our American freshwater sun-fishes (*Centrarchidae*). Its scientific name is *Bryttosus kawamebari* (Schlegel).