

whether this health work is free from political restrictions and the will of the politician. Here too is the place, through the natural agency of the flowering plant, to introduce the children to the subject of sex so that real sex education may be built up in the biology course in the high school.

Let me not be misunderstood. Let us give a course in elementary science which shall have the basic principles of science. Let us not be superficial. Let us teach scientifically. Let us make our laboratory a place for experiments and for thought projects. Let us train above all, for straight thinking, but let us remember that the nation's greatest asset is the health of its citizens and that any course in elementary science should first of all interpret the environment of the pupils so that they may best prepare themselves for a life in that environment or for the bettering of that environment, if it is humanly possible; and second, that the scientist of today should act as a leader in all school projects with applications which make for human welfare and for faithful, intelligent and law-abiding citizenship.

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To teach food values to children and to combat malnutrition the American Museum of Natural History circulates a traveling exhibit which includes a set of sixteen wax models of food suitable for children between the ages of ten and thirteen and models and charts illustrating the composition of six common foods and the contributions of different foods to the body.—*School Life*.

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### NEW MATHEMATICAL PERIODICALS.

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In walking through the cemetery of mathematical periodicals one can scarcely fail to be impressed by the large infant mortality which has thus far existed in this field of endeavor. Even after the age of infancy the death rate has been very high, so that if life insurance would have existed as regards these periodicals the premiums would necessarily have been very high in order to avoid disaster to such insurance companies. Only one of these periodicals has as yet reached the good old age of a hundred years, viz., the *Journal de l'École Polytechnique*, which was started in 1795. In fact, the question might be raised whether the mathematicians have a clear right to claim this journal since it does not acknowledge complete allegiance to our subject by its title or by its subject matter.

The oldest journal which acknowledges its allegiance in such a definite manner is the *Journal für die reine und angewandte Mathematik*, which was founded in 1826 by A. L. Crelle and is often called *Crelle's Journal*. While it has not yet quite reached its hundredth birthday, it has passed its one hundred and fiftieth milestone, each volume being regarded as a milestone. The one hundred and fifty odd volumes of this journal occupy an honorable position in the mathematical periodical literature and bespeak a memorable service towards the upbuilding of our subject during almost a century of undreamed of progress.

It may be noted that the dates when the two old mathematical journals just mentioned were founded are often given as a year earlier than those given above. These are the dates, or correspond most nearly to the dates, which appear in the first volumes of these periodicals, but it must be admitted that the first numbers of a periodical frequently appear in an earlier year than the complete first volume. As the bound volumes usually do not give any evidence as regards the dates when the separate numbers appeared it seems to the present writer best to date references to journals, as a rule, with respect to volumes rather than with respect to the publication of the separate numbers to which the special references may relate.

We refer to this matter here partly to emphasize the fact, that the mathematician is in danger of going to extremes as regards accuracy relating to certain details. One of the most helpful elements in mathematical training is the cultivation of a keen appreciation of *reasonable* accuracy. Napoleon may have been correct in saying that Laplace, whom he had made minister of the interior, "did not seize a question from a true point of view, that he sought subtleties everywhere, having only problematic ideas, and that he carried the spirit of the infinitely little into administration."

It is difficult to define what reasonable accuracy is. In fact, most people probably have to study such accuracy by means of example, and hence we may be pardoned for a slight digression here for the purpose of furnishing two or three illustrations which we hope are not without interest for other reasons since they are related to well-known works. On page 404 of the 1919 edition of Cajoris *History of Mathematics* it is stated that "early in the development of the theory of point sets it was proposed to associate with them numbers that are analogous to those representing lengths, areas, volumes. On account of the great

arbitrariness of this procedure several different definitions of such numbers have been given. The earliest were given in 1882 by H. Hankel and A. Harnack."

On turning to page 423 of the same history one finds that H. Hankel died in 1873 and one is naturally interested in knowing why it is stated that he gave certain definitions about nine years after his death. On looking the matter up in the French encyclopedia of mathematics to which reference is given one finds that in treating the subject quoted above the writer of the article in this encyclopedia gave reference to a reprint of an article by Hankel. This reprint was published in 1882 in the *Mathematische Annalen*. The original article had, however, been published in 1870 in a somewhat obscure place. Presumably one would be inclined to say that the encyclopedia reference was reasonably accurate, even if it gave rise through carelessness to a somewhat amusing situation in the mathematical history noted above.

On the other hand, one would probably not regard a statement appearing on page 163 of this history as reasonably accurate. It is here stated that Roberval "broke off from the ancient definition of a tangent as a straight line having only one point in common with a curve." It is evident that the ancients might have thought that a tangent line at the point of tangency had only one point in common with the curve, and that they might have concluded that a necessary and sufficient condition that a straight line is tangent to a circle or to an ellipse is that it has one and only one point in common with such a curve but they must have noticed that such a condition is not sufficient to insure that a straight line is tangent to such a curve as the cissoid of Diocles, for instance.

In questions involving mathematical considerations the mathematician naturally demands a degree of clearness and accuracy, which cannot reasonably be demanded as regards many questions which are related to his work but do not involve any strictly mathematical considerations. For instance, it would appear to me as reasonably accurate to state that Jordan's *Traité des substitutions* was published in 1870 because this date is given in the book itself, and hence I would be inclined to overlook in this connection, the fact that Jordan himself stated on page 116 of volume 10, *Giornale di Matematiche*, that he published this book at the end of 1869.

Besides the two old mathematical periodicals mentioned above

there are several others which have passed their three score years and ten. Among these the *Journal de mathématiques pures et appliquées*, first edited by J. Liouville, is, perhaps, most favorably known. As is well-known the World War has seriously affected a number of our journals, including some of the older ones. Several of these are now in a very critical condition and it is too early to predict whether they will be restored to health or will share the fate of the many soldiers who never returned. Fortunately, periodicals can sometimes be revived even after having passed a long time in a dormant state.

The preceding references to some of our oldest periodicals may serve to create in us a feeling of greater complacency as regards the prospects of the numerous infant mathematical periodicals now in our midst, notwithstanding our earlier reference to the great mortality among such infants in the past. May we not hope that the world has grown wiser also as regards the proper care of such infants and that a relatively large number of those now in this class may attain not only their three score years and ten but may continue to grow in power and in usefulness during all the future years. It seems only reasonable to assume that our world will never again reach a stage when it has no special mathematical periodicals.

The most rapidly growing infant mathematical journal now in our midst is the *Mathematische Zeitschrift*, founded in 1918 under the editorship of L. Lichtenstein. According to the announcement only two volumes of this periodical were expected to appear annually but a considerably more rapid average growth has been maintained thus far. The high standard of its articles is a source of much satisfaction to all of us. While the publication of many other mathematical periodicals has recently been greatly delayed, even in our own country, it is interesting to note this rapid growth in a country where the economic conditions seem to be unusually adverse now as a result of the World War.

Several of the younger infants among the mathematical periodicals were mentioned by name in the "Notes" of a recent number of the *American Mathematical Monthly*, volume 28, pages 315 and 317. On the latter page it is stated that ten such periodicals were started since January, 1919. It is too early to say much about these infants. Perhaps it would be wise to follow in this case the example of the shrewd pastor whose common expression when addressing the mother of a young infant is said to have been, "Well, that is a baby."

While we give hearty welcome to these new periodicals and are especially pleased to see so many countries represented by them, it is very important to realize our responsibility towards the older ones. Many of the latter are now in need of more liberal support in view of the changed economic conditions. There is, however, plenty of room also for the new ones as most of them occupy fields which were not covered by the older periodicals. The growth of our subject and its increasing influence on other subjects need these new periodicals as well as a vigorous maintenance of those which have a long history of usefulness.

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#### COURSES IN COMMERCIAL SUBJECTS FOR THE SUMMER QUARTER AT THE UNIVERSITY OF CHICAGO.

An unusual opportunity for teachers of commercial subjects will be offered by the University of Chicago for the summer quarter beginning June 19 and ending September 1. The School of Commerce and Administration and the School of Education announce a wide range of courses of special interest to commercial teachers in secondary schools, including "Materials for a Secondary-School Course in Business Administration," "The Teaching of Secondary-School Economics," "Methods of Teaching Shorthand and Typewriting," "Teaching of Secondary-School Accounting," and "Materials for Secondary-School Course in Marketing and Salesmanship."

Other courses include: "Materials for Junior High-School Course in Social Studies," "General Technique of Instruction in High Schools," "The Psychology of Secondary Education," "Geography of Asia: Industrial and Commercial Conditions and Possibilities," "Ocean Trade and Transportation," "Business Law," and "Government Finance."

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#### MOUNTING PRINTS.

Although the effectiveness of a photograph can be very greatly increased if it is mounted neatly and with taste, an untidy or unsuitable mount is even worse than no mount at all, says a British contemporary. Many photographers appear to find it very difficult to get a print stuck down on card in such a way that it lies perfectly flat, and there is no sign of mountant oozing out at the edges. So long as mountants that contain water are used, the difficulty of mounting a print so that it will keep flat must inevitably exist; and it is, therefore, amazing that more photographers do not adopt the very simple plan of attaching the print by its two top corners only. Provided it is to be kept flat, in a portfolio or otherwise, a print mounted in this way looks quite as well as if it had been stuck down all over; and, at the same time, it looks very much better than most of such stuck-down prints can ever do. When the print is dry, it should be made as flat as possible by drawing it once or twice round the edge of a ruler, or similar object with a sharp right angle along it. It is a good plan to give it more treatment than is sufficient to flatten it, so as to leave it with a very decided curl, with the face convex. In this condition it may be shut up in a book or put under pressure for a few days, and will then come out flat and ready for trimming and mounting. The slightest touch on the two top corners with a suitable adhesive will be all that is necessary.—*Photo-Era*.