In general, we believe that we have extended and broadened MATH considerably and now have MATH plus EMATICS. To continue we equate the “E” with essential principles. Throughout the field of mathematics we have certain basic ideas which hold true in all cases. These essentials allow us to build a framework which supports the total structure.

The “M” we have added, or should I say annexed, would be equated with meaning. True, we still expect certain things to be memorized, but memory is a sequel to meaning.

The second “A” might be equated with articulation and adaptability. Articulation in the sense that we are attempting and achieving a program which involves the cooperation of all teachers, kindergarten through college. Adaptability in the sense that we hope to produce children who can see many, many solutions to a problem rather than the traditional “one” which appeared in the book.

Our second “T” involves thinking and logic. We all agree that learning is a thinking experience for the child and not a telling experience for the teacher. Emphasis is placed on using what we know to establish what we do not know. Certainly we know if six plus six equals twelve then six plus seven must equal thirteen.

The “I” which has been annexed implies insight and ingenuity. The child is encouraged to think differently and explain why he thinks the way he does! For many teachers this may be difficult to cope with, but experience proves that disagreement can be beneficial if viewed with an open mind.

Our “C” is suggestive of concepts. The child is expected to form concepts through discovery and experimentation such as searching for patterns. The teacher merely serves as a skillful guide in leading the children to make the generalizations on their own.

Finally, the “S” which has been annexed is equated with structure. The new program is based on the idea that a recognition of the structure of mathematics simplifies its mastery. Let us now apply this principle of structure to what we have said so far.

**TRADITIONAL**
- M—memory
- A—answer seeking
- T—trickery
- H—hard

**MODERN**
- E—essential principles
- M—meaning
- A—articulation and adaptability
- T—thinking
- I—insight and ingenuity
- C—concepts
- S—structure

Now let us turn briefly to some
of the problems confronting us in extending MATH to MATHEMATICS. If we avoid the solutions it is only because of ignorance not lack of time. In general, we usually find time to do what we want to do. People who say lack of time prevents them from making the change are rationalizing in order to delay the change. Delay, at best, can only magnify the problem and increase the urgency for change.

Most important, we must consider the teacher. Let us define a teacher as one who is knowledgeable about her job and is up to date in the execution of her duties related to the profession. If you, the reader, say none of us fit this classification then you are saying there are no teachers—only clerks.

The majority of teachers are most desirous to be brought up to date concerning the new programs in mathematics. They do face certain deterrents however. One deterrent is a rather meager background in mathematical training. Today, most colleges and universities are offering courses in mathematics designed especially for teachers who will be teaching modern programs. Teachers, as previously defined, will avail themselves to these courses. Others will require the gentle urging of their leaders.

Above all, in increasing mathematical competence we must avoid the "blind leading the blind" as so frequently occurs in the inservice workshops with local leadership from the teaching staff. True—this is valuable, but only if the leader can contribute something. Frequently these leaders readily confess their inadequacy and point out that their immediate superior had them "volunteer". A group of interested teachers working in small groups with problems of their own concern can learn a great deal about the modern programs in mathematics and in most cases the leadership changes hands readily as the discussion progresses. There are no "experts" present and learning proceeds at a rather astounding pace. Of course this latter course assumes that teachers are professional. The author believes most teachers want to be professional, but frequently organization prevents them from being so.

Mathematics Texts Vary Widely

Materials for instruction must also be considered. A "good" teacher can no more be successful with one text than a "good" cook can be successful with only one spice for seasoning. Textbooks vary greatly in their content and presentation. Selecting a "best" text is as hopeless as selecting a "best" spice. True—a basic text should be used, but the teachers should have available to them other textbooks which use different approaches thereby giving them an opportunity to supplement and change as they see necessary. Of course the selection of texts must be made by knowledgeable people who understand the modern programs.

A most perceptive statement concerning texts follows:

If one textbook is followed page by page the teacher will be one hundred per cent successful in retarding every child in the class. Parents must also be kept in mind when we make changes in the mathematics curriculum. Informing parents of change is not an easy task. Parent-teacher conferences and PTA programs can be helpful but above all we must rely upon well taught children to gain the support of parents. If parents resist, the school personnel may suffer, but it is the child who is caught between and who will be the recipient of the damage and suffer the greatest loss.

It is true that many parents may blame "modern mathematics" for their child's lack of mastery. It is also true that neither were many of these same children mastering the "traditional mathematics". Experience in other areas of the country indicates that parents are among the most enthusiastic supporters once they see the results. Parents are not unlike teachers—they resist change, but are enthusiastic about its results.

It is interesting to reflect a moment and realize that the current change in the mathematics curriculum is not at a plateau. The programs will continue to be revised and changed from year to year. For this reason current literature must be made available to teachers and they in turn must read and comprehend the literature being aware of its implications for their classroom. In our reflecting, we must also realize that what is true for mathematics is no less true for science, language arts, social studies, etc., etc. Though we may not be able to be experts in all areas, we can at least remain informed. To do less would be unprofessional as well as harmful to our effectiveness as a teacher.

In closing there are two questions which we might ask.

1. Will we have MATH or MATHEMATICS in the future?

2. Who will suffer if we do not have MATHEMATICS?

The answer to the first question can be answered only by the teachers of America. They bear the responsibility for its answer whatever it may be.

To the second question the answer probably is more definite, America and our children will suffer the greatest loss if we fail to have MATHEMATICS.
Teaching at Edge of Future—cont'd from page 11

curate and realistic in his appraisal of what is needed to perform those tasks and of his own competencies in relation to them.

Certainly these guidelines do not provide a complete answer, but they do indicate some directions in which we, as teachers, can begin to explore ways of teaching at the edge of the future rather than at the altar of the past. Perhaps part of our sense of inadequacy in meeting this challenge can be overcome if we remember that:

If a child lives with criticism he learns to condemn.

If a child lives with hostility, he learns to fight.

If a child lives with fear, he learns to be apprehensive.

If a child lives with pity, he learns to feel sorry for himself.

If a child lives with jealousy, he learns to feel guilty.

If a child lives with encouragement, he learns to be confident.

If a child lives with tolerance, he learns to be patient.

If a child lives with praise, he learns to be appreciative.

If a child lives with acceptance, he learns to love.

If a child lives with approval, he learns to like himself.

If a child lives with recognition, he learns to have a goal.

If a child lives with fairness, he learns what justice is.

If a child lives with honesty, he learns what truth is.

If a child lives with security, he learns to have faith in himself.

If a child lives with friendliness, he learns that a world is a nice place in which to live, and if he lives with inquiry—he learns to face the future with joy.

Science in Today's Schools—cont'd from page 6

for laboratories—all of these expenses may be too much to bear.

Finally, there are questions which certainly border on the philosophical—questions which take us into unknown areas. How large a portion of the population can learn to be inductive in their reasoning? Can seventy, or sixty, or even fifty percent of the population profit from the kinds of curricula which are envisioned? Or would it be better to teach a small group to be rational and to teach the others just "what they can use" by the rote methods which have prevailed for centuries?

With all of these unresolved issues hanging over us, the answer to our early question becomes clear. "Where do we go from here?" We go to find solutions to the issues raised. During the next twenty or more years, we need to extend ourselves to find ways of teaching science to all children. We need to eliminate much of the waste from our education process. But most of all, we need to find ways of educating our teachers—elementary, secondary, and college—so that they bring to their classes the searching, questing, wondering programs which will make explorers of us all.

REFERENCES


2. Ibid., p. 5.


5. This assumption is for argument only. Actually, there are not just two ways to teach chemistry or three patterns for biology but many, many logical patterns.


8. New York State Education Department, an unpublished survey carried on in 1961.


Dean's Notes—cont'd from page 2

In 1965 we shall have two 6-week terms, the first from June 21 to July 30 and the second from August 2 to September 10. The second term will offer, primarily, lower division required courses, continuations of foreign language, history, and accounting courses, and the erstwhile Postsession courses (in three weeks, August 2-20). We shall also offer pre-registration during the month of May, 1965, to resident students, teachers, and other qualified persons in the State of Hawaii, either in person or by mail. We expect to streamline registration procedures, eliminating the IBM fee-slip process, by replacing the many different laboratory and course fees (except for Applied Music, the English Language Institute and other special Institutes) with a uniform student activity and incidentals fee. A student's total fees can then be easily computed and will be payable at the same time that his registration and other cards are turned in. There will be queues, alas, but hopefully they will be short, fast-moving, and endurable.