

THE STATUS AND TRENDS OF VISUAL AIDS IN SCIENCE.

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"The greatest problem of our time is how we are to adjust ourselves with the necessary promptness to the rapidly changing conditions of life."

—Ernest Martin Hopkins, President of Dartmouth College.

In a larger and more accurate sense visual aids in science include the majority of the methods employed in science teaching at present. Specifically, the demonstration, laboratory, object study, observation, picturization and symbolization methods are all forms of visualization. It is not enough, however, to have these methods and the various combinations of them, together with adequate apparatus and equipment. Employment of the proper method at every point throughout the subject content for the most practical coordination of perceptions, conceptions, imagination and consecutive thinking is the desirable goal.

In the light of the rapid progress being made in visual aids for the classroom, I regret that at this time it will be possible to consider only the stereopticon slide, the film, and the more modern "film strip" or "still film." These three specific aids have individual as well as collective limitations. No one of them can completely supplant any of the others; yet, when properly utilized, each offers distinct advantages in the matter of creating the co-ordinations to which reference has just been made.

With reference to stereopticon slides, it is interesting to note that much has been written and said about the cost and storage space required, less about the selection of slides that may be utilized to advantage in more than one subject, less also about the use of slides in the place of more expensive museum mounts and exhibits, less in the way of information on sets available for loan and rental to those schools which are unable to buy at once all that is needed to carry out a visual aid program, less on the trifling cost and the comparative ease with which much slide material can be prepared, and still less on the many and effective uses to which this form of material may be adapted. Rightly used, however, the stereopticon is as indispensable as the microscope; in fact, one of its many uses includes adequate classroom

interpretation of sketches prior to individual study of the microscopical material.

When we consider films, we note that the natural phenomena, including life processes and relationships, lend themselves to this means better than to any other except methods involving the actual object; while for the clearest conceptions of invisible actions and reactions, such as the flow of electrons, the film—through such agencies as the animated cartoon diagram—may actually be superior to the piece of apparatus or the manufacturing process in operation. In such cases and through such means, the senior high school student may properly encounter the significant aspects of his environment before he encounters those of science, as Professor Morrison¹ aptly states the case.

The field of the educational film is undergoing momentous changes from every angle. Among the contributing causes is the cost of projection equipment, film rental and expressage. More general use of visual aids will reduce the cost of equipment somewhat. Rental and expressage may be eliminated by purchase, with the added convenience of continued accessibility of material.

A second cause is that film exchanges are organized and administered for a distinctly different type of service from that demanded in educational work, except in such individual cases as the Neighborhood Film Corporation and the Educational Department of Pathe, Incorporated. Chain organizations such as extension libraries of State Educational Departments, dealing directly with schools and trading films of corresponding value with accompanying manuals in specified subject content offer one possible solution in the way of eliminating "spot" and "block" booking, both of which belong to the theatrical world and involve very exacting shipping requirements. Under this plan the school of limited means could acquire its library of meritorious films at a lower rate without impairing its general program.

Lack of organized data for individual subjects as taught is another difficulty. What is technically known as "safety" or "non-inflammable" film stock is the general educational requirement, yet there is no literature available which considers such material exclusively and which is organized to correspond

¹Morrison, Henry C. "The Practice of Teaching in the Secondary Schools," p. 173.

to the individual subject needs. At present all such information depends largely upon special correspondence.

A fourth difficulty is that up to this time no organization has set forth film ratings or evaluations of classroom material, not even that which is available for transportation charges only. Much of the material to be had at present, even on the basis of rental, is sufficiently worthless from the standpoint of classroom needs to impede the use of the distinctly valuable contributions which are to be found in the loan, rental and purchase classes. Special departments of scientific magazines, or even societies having for their chief purpose the evaluation of such material and indicating whether it is adapted to the use of elementary, secondary, or college students would perform a distinct service in behalf of science. Lists of specific films and other visual aids indorsed by authors for use in connection with their texts would constitute most valuable appendices.

The trend in general educational film for strictly classroom use is rapidly changing from the 35 millimeter theatrical variety to the narrower 16 millimeter "off-standard" safety film, due to the saving in cost of equipment and materials. The rental of the latter is easily within the means of the average school. Furthermore, since the 16 millimeter educational film is used for no other purpose, except home entertainment, the organization and administration of the distribution centers can be made to serve the needs of education. The results of the Eastman research project on the use of very carefully prepared films in certain schools of some of our representative cities are being tabulated at this time. Mr. Dudley Grant Hayes, Director of Visual Aids for Cook County Schools, very recently predicted that when the results are tabulated all schools of the Cook County system will be ordered equipped with projectors for classroom work. The final favorable results may be expected to open certain new fields for educators, among them the field of educational scenario writing, which, although it is not without its special technique, has, nevertheless, certain features comparable to and seemingly almost as attractive as text book authorship.

The "film slide" or "still film," consisting of topically arranged pictures on standard width safety film, may be used to advantage where a fixed consecutive order of illustrations can be utilized or is desired. Unit or topical previews and other

presentations of subject matter, special classroom lectures where advisable, and supplementary textbook illustrations represent opportunities for its usage. Certain authors of science textbooks are now at work on the development of this type of material to supplement textual illustrations. When arranged in the same sequence as the units or topics of the texts and accompanied by the customary manuals, the film slide represents an extremely inexpensive form of visualization, one that readily permits the development of a permanent library of this kind in any school system. The development of film slides offers an opportunity to reduce to some extent the illustrative material in the textbooks, thereby lowering the cost to the publisher and the ultimate purchaser—two important factors in the sale of texts. Furthermore, they make possible supplementary material between revisions of given texts and therefore may be utilized to maintain such books on the market. They are also peculiarly adapted to the limited audience as represented by the average class.

As to the use of visual aids in the immediate future, it would seem that until educators, manufacturers and producers have arrived at somewhat more definite standards; until good materials may be obtained on relatively inexpensive terms as a rule rather than an exception; and until effective teachers' courses dealing with the care and use of visual aids, with emphasis on the fundamental technique of using pictures, are required of all teachers, until such a time it would be expedient, even in the smaller systems, to have a staff member who has been trained in the administration, supervision and organization of visual aids to take charge of the work. Such a supervisor would reinforce many of the major and minor subjects of the curriculum and would be able to perform a service to both teachers and pupils that would be second to none.

All forms of visual aids should be thought of in terms of the efficiency they may bring about. Those specifically referred to here can be adapted to all general methods of science teaching, but they are particularly adapted to the lecture-demonstration method, which with its various modifications, appears to be gaining much ground as the future way of presenting introductory courses in elementary sciences. According to Anibal's carefully compiled records this method shows a saving of 93 per cent in the cost of apparatus and materials. In the event that it should

come to predominate, there is reason to believe that the lessened margin of cost is sufficiently great to guarantee the utilization of the allied forms of visual aids at no greater expense than is customary for laboratory courses now.

The development of a valuable citizen resembles that of a motor car in that it properly involves efficiency in production for a competitive marketing. We have no reason to expect that, in either case, the future demand for efficiency in producer or product will be less. With such methods and devices as are now to be had (including those of visual aids) we may reasonably hope, with some patience, to reach the farther goal of obtaining for the student a maximum amount of training in a minimum amount of time with the least amount of expended energy, all of which seem to be a very practical attainment.

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