

# A Biology Workshop Program

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*A critical link in the chain between the research scientist and the high school student is the biology teacher. A workshop program involving new laboratory techniques and research scientist contacts can help bridge the gap created by the knowledge explosion.*

Within the past five years, there have been developments in several areas of biological science which have had tremendous impact on the scientific world. The advances in molecular genetics and the unraveling of the basic features of the genetic code, the isolation and identification of the primary reactants in photosynthesis, and the concepts of the origin and evolution of our planet and its life will continue to activate biological thinking and research for many years to come. The more recent biology programs are including these topics in their syllabi.

It is obvious that the critical link in the chain leading from the research laboratory to the student is the high school biology teacher. If there is now a gap between experimental science and the high school laboratory, the bridge between the two cannot be built merely by readings, seminars or lectures, no matter how well presented or conscientiously attended. Biological science is learned to a large extent by doing, and the information gap must be closed by personal contact between the teacher and the experimental scientist. In order to develop a personal contact program, the Catholic Science Council of the Archdiocese of New York inaugurated a Teacher's Workshop in Biology Program during the academic year 1966/67. The procedure followed may be of interest to school districts contemplating such a program.

The Science Council arranged a series of eight sessions with one meeting each month from October through May. Meetings were held in a biological science laboratory room of Cardinal Hayes High School which was centrally located within the archdiocese. The third Thursday evening of each month

was selected, although a Saturday meeting might be more convenient for districts embracing a large area.

In order to facilitate direct personal contacts between instructors and the teacher participants, the group was held to twenty-six. Selection of teacher-participants was an administrative function of the Science Council and the individual schools; where departments are large, a single participant was selected from each school.

Selection of instructors was, in the New York area, an easy task. The topics were chosen first and appropriate scientists were invited to serve as instructors for particular topics. Universities, research institutes, federal, state and local agencies and health science professionals form a pool of talent which can be tapped with surprising ease. The topics and instructors for 1966/67 included:

Effects of Visible Radiation on Growth of Plants (Richard M. Klein, New York Botanical Garden)

Virology (Karl Maramorosch, Boyce Thompson Institute)

Induction of Mutation by Ultraviolet Radiation (Deana T. Klein, Hunter College, CUNY)

Exobiology (Sanford Siegel, Union Carbide Research Institute)

Microbiology (John J. McLaughlin, Fordham University)

Animal Tissue Cultures (Philip Marcus, Einstein College of Medicine)

Plant Tissue Cultures (Jacques Lipetz, Manhattan College)

Taxonomy and Classification of Plants (Howard Irwin, New York Botanical Garden)

The Program for 1967/68 included:

- Phytochrome Control of Seed Germination (Alberto Mancilelli, Columbia University)
- Ecology (Gily Bard, Hunter College)
- Effects of Ultraviolet Radiation on Organisms (Sr. Dorothy Marie, St. Helena High School)
- Antibody-Antigen Reactions (Barry Bloom, Einstein College of Medicine)
- Ionizing Radiations on Plants (Arnold Sparrow, Brookhaven National Laboratory)
- Effects of Air Pollutants on Plants (Jay Jacobson, Boyce Thompson Institute)

The program for each session was designed to present a reasonably rounded picture of the topic under consideration. To facilitate this, the program was divided into three 45-minute blocks of time: a) *lecture portion* in which the instructor stressed the relation of the topic to the whole of biology, and attempted to integrate the subject area with an approved curriculum unit; b) *demonstration portion* in which the instructor demonstrated one or more laboratory techniques appropriate to the subject area using supplies and equipment likely to be immediately available to the teacher; c) *workshop portion* in which the teacher-participant did the manipulations under the personal and direct supervision of the instructor. In brief, the participating teachers heard about a subject area in modern biology, saw how to utilize the techniques and then personally learned the techniques.

Wherever feasible, each teacher-participant was given a basic kit of equipment which was needed for each of the techniques and which was to be taken back to the schools. References, sheets of instructions, etc., were usually supplied as copy for the instructor and duplicated by the organizing committee. Different lamps and filters for radiation biology, cultures of microorganisms, appropriate books, hand lenses, etc., were purchased from a fund granted by the Archdiocese and from a fee of \$25 assessed each of the participants and furnished by the schools. The total cost for the first year was about \$700. Federal, state and local financial aid can be considered. Since no compensation was made to instructors (although this might be desirable), a program without supplies can be operated without cost beyond postage. As a general rule,

most scientists supplied much more than was purchased.

The advantages of this program can readily be seen. Teachers were informed of recent, significant advances directly related to their course of studies. Then there was the actual contact with the tools and techniques used in the considered areas of biological science. Not only did the program serve as a means of facilitating the effectiveness of the teacher as the primary agent for the transmission of information and ideas to the student, but it fostered the spirit of inquiry in both the teacher (directly) and the student (indirectly).

An additional and immediate benefit provided by the program must be mentioned. The level of sophistication in students is rising rapidly as the result of the proliferation of television and radio programs in science, the availability of splendid films in science education, and the increasing number of inexpensive, paperbound books in biology, physics, chemistry, and the earth sciences. The better student is maturing scientifically at an earlier age and is capable of semi-independent study and scientific research. This is frequently of high caliber and sometimes of scientific importance. Enrichment of the technical background of the teacher will be directly translated into original student research in science fairs, class projects, and independent investigations.

At the concluding session in May, a certificate indicating successful completion of the program was awarded to each participant. Needless to say, there was a great feeling of achievement by the teachers. In-service credit usually can be obtained; and if the program is conducted by a college, course credit may be granted.

Direct student-scientist contact at the research or laboratory level is more difficult, and the Council initiated a series of once-a-month, Saturday lectures to the students by prominent scientists. Again, it was found that the professional scientist is usually eager to address groups of interested students. Indeed, the number that responded was most gratifying. Even in a sprawling district such as the Archdiocese of New York, students came to the central location from the entire district and there was no evidence of a comprehension gap.

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### OLD GOOSE

A female Canada goose caught recently in a trap set by a beaver trapper along Pymatuning Lake may be the oldest banded bird ever recorded in Pennsylvania. The bird had one badly injured leg but was nursed back to health and released on the Pymatuning Goose Management Area by the

Pennsylvania Game Commission. On the bird's good leg was a band affixed by the Jack Miner Migratory Bird Foundation of Kingsville, Ontario, bearing the inscription "The truth shall set you free." Word from Ontario is that the "honker" was originally banded in the fall of 1944, thus making her at least 21 years old.