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AMERICAN ASSOCIATION OF UNIVERSITY WOMEN
1965 Biennial Convention
Portland, Oregon

SCIENCE: A CREATIVE DISCIPLINE

I

Why is This a Topic for AAUW?

Few laymen comprehend science as a creative discipline -- an inspired unfolding of human vision. The reality of the universe is not a set of facts "outside of man". It can be conceived only in terms of man's imaginative and analytical capabilities. It is a view which he creates/discovers.

The topic will engage members in considering vital areas of thinking and how they are permeating our way of life -- such as man's role as a complex organism in the evolution of the universe and the nature and influence of the infinitesimal particles that comprise man and all matter.

Comprehension of this thinking is essential to individuals concerned with forming contemporary values.

Recognition of and respect for creativity as it relates to science will strengthen relationships with the younger generation.

A Scope for the Topic:

Study of this topic is designed to explore two questions: What ought the layman to know of science? How does the scientist probe into the unknown?

The topic will be approached through three possible focuses -- keeping the above in mind:

Man's View of the Infinitesimal

to learn what is meant by "sub-atomic particles" and the revolutionary development this represents in man's understanding of the composition of matter.

Man, The Complex Organism

to gain an understanding of the intricate system composing the human body and the tools that enabled man to see himself as organized from a variety of cells.

Man's View of the Astronomical Universe

to compare the revolutionary changes in man's way of seeing the universe from one period of time to another.

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II

OUTLINE FOR A YEAR OF WORK IN A SMALL BRANCH

This outline is for the small branch whose only program is its general branch meetings. Since AAUW is essentially an educational organization, these meetings are your major opportunity to participate in the Association's study program. Some branches may have specific focused interests to explore within this topic and will want to make up their own outline. The following outline is for those branches who feel quite uninitiated to the subject.

Use the coming summer months to:

Study the April Program Planning General Director's Letter. Ask your branch president for a copy.

Make contact with a retail book outlet, perhaps at some distance. See whether they would be willing to provide you with books on consignment to sell to members in the course of the year. Put your orders in early -- two months ahead of the time you will need the books. If you wish to familiarize yourself with scientific vocabulary browse in The Intelligent Man's Guide To Science by Isaac Asimov (Basic Books, Inc., N.Y., 2 vol., 1960, \$15.00). (Pocket Book, Nos. 95004 and 95005 for 95 cents each).

Find a scientist or science teacher who agrees to serve as consultant for the year. Go over this outline of exploration and adapt it to your consultant's suggestions. Start making arrangements for the field trips suggested.

Your Implementation Committee would do well to become familiar with the books this summer and perhaps plan discussion questions related to them.

Plan the exhibit for the opening meeting and collect items gradually.

Some suggestions for meetings:

FALL Show a film (see resource page in this packet). From Atoms To Organisms or The Thread of Life would be particularly appropriate. Arrange an exhibit that would point out the changing nature of man's view of himself and his universe. Have a microscope set up with slides of bacteria, a luminous watch (in the dark), etc. to look at. Exhibit some (or all) of the books you will be encouraging the members to read in the course of the year. Allow time for members to study the exhibit. Have a short talk concerning the nature of creativity and scientific discovery. (The Creative Process by Brewster Ghiselin, New American Library of World Literature, Inc., N.Y., 1960, 60 cents, will be a help for this talk as well as the September 1958 issue of Scientific American, 415 Madison Ave., New York, N.Y. 10017). End with discussion to identify what areas of ignorance are most prevalent in the

group in relation to scientific process so that this awareness can guide your subsequent explorations. In case the group does not open up easily into discussion, have three questions ready to pose as guides for the year's study. Have available J. Bronowski's Insight (Harper and Row, Publishers, Inc., N.Y., 1964, \$5.95) and Kees Boeke's Cosmic View, The Universe in 40 Jumps (The John Day Co., N.Y., 1957, \$3.75) either for sale or for scheduled loan among the members.

Invite two people to engage with two members in a panel discussion on the topic, Science: A Creative Discipline. Give the guests copies of Herbert Fox's article in the May 1965 AAUW Journal to read before the meeting. Also loan them copies of Insight to be prepared to discuss the last chapter. At least one of the guests should be a scientist or science teacher. At the end of the meeting describe the field trip planned for the next month's meeting and the nature of a cloud chamber. Have for sale Where There Is Life by Paul B. Sears (Dell Publishing Co., Inc., N.Y., 1962, 50 cents) and Inside The Nucleus by Irving Adler (New American Library of World Literature, Inc. N.Y., 1964, 60 cents).

Visit a cloud chamber. Universities or schools may have one. In fact, you could make one yourself with a jar. Free directions are available from the U.S. Atomic Energy Commission, Washington 25, D.C. Also arrange with a university or medical research institute to look through an electron-microscope. Your consultant should guide you and discuss with you questions on Inside The Nucleus. Have for sale The Creative Process by Brewster Ghiselin.

WINTER Replace your regular meeting with a common, quiet reading session -- perhaps in the library -- where everyone can come and read the material you will have collected on a reserve shelf there. Ask members to bring their duplicate copies. Have available for sale The Atoms Within Us by Ernest Borek (Columbia University Press, N.Y., 1961, \$1.95).

Plan two meetings close together. At the first, show the film, The Life and Death of a Cell. Have a bio-chemist and a geneticist or biologist discuss the film and the Borek book with you.

At the second, continue with your discussion of the Borek book. Why is it so difficult to draw a line between life and non-life?

At your meeting devoted to emerging issues and the Legislation Opinion Poll, have for sale copies of The Nature of the Universe by Fred Hoyle (New American Library of World Literature, Inc., N.Y., 1963, 60 cents).

Arrange for a visit to an observatory, if practical, with discussion by one of the staff of the changing views man has had of the universe.

SPRING Have five members, perhaps with a guest, sit around a table, the rest of the branch members sitting in a circle behind them. Take up the three questions posed at the beginning of the fall and explore the answers as a result of study so far. Or have these people read out loud the transcript of the R. Buckminster Fuller discussion in the May 1965 Journal. Discuss and clarify it.

Arrange a film showing open to the community. See the April 1965 General Director's Letter for suggestions.

Have some members present a summary of the year's explorations and pose three questions for exploration the following year. These should focus on the interplay of social mores and scientific viewing -- historically as well as in our time.

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III

OUTLINE FOR A YEAR OF WORK IN A LARGE BRANCH

Sub-topic: Man, The Complex Organism

A weekly or bi-weekly study group might make use of some of the following suggestions: Find a scientist to serve as consultant. Arrange your study plan around one or two key questions which you then try to answer in the course of the first year. (See May 1965 Journal.) In the first year try to become familiar with and exercise your thinking in the subject matter of your chosen focus with an eye always to how scientists are presuming and finding new relationships in the field. In the second year you might turn your focus to the subject of creativity itself in science, the scientific processes that lead to new ways of seeing and relating. Try to engage members in first-hand experience of looking, experimenting, discovering.

I. The Variety of Living Things

Search and see -- study a tidepool, a bit of woodland, a pond -- under aegis of consultant -- study microorganisms under microscope -- study appropriate sections of key material on back of this sheet.

II. Evolution

Charles Darwin, Voyage of the Beagle, Doubleday and Co., Inc., N.Y., 1962, \$1.45.

T. Dobzhansky, Mankind Evolving, Yale University Press, New Haven, 1962, \$2.45.

Have everyone read same material. Assign sections of books to pairs of people who will be responsible for guiding discussion. They can formulate questions for discussion. Avoid reports or reviews. Identify pages in key material to be studied.

III. The Nature of Life and the Origin of Living Things

René Dubos, The Torch of Life, Pocket Books, Inc., N.Y., 1963, 75 cents.

J. Bronowski, Insight, Harper and Row, Publishers, N.Y., 1964, \$5.95.

Do you know how life began on earth? What are some of the theories?

Why is there so much talk about "entropy" and what does it mean?

IV. The Cell and the Human Organism

E. H. Mercer, Cells: Their Structure and Function, Doubleday and Co., Inc., N.Y., 1962, 95 cents.

Ernest Borek, The Atoms Within Us, Columbia University Press, N.Y., 1961, \$1.95.

Do our cells divide in the same way as plant cells?

What different kinds of cells are we humans made up of and what are their differing functions?

Life and Death of a Cell (film),
University of California, Edu-
cational Film Sales Division,
Los Angeles 24, Calif., 1960,
21 min., color.

V. Genetic Continuity

J. Bronowski, Insight
T. Dobzhansky, Heredity and the
Nature of Man, Harcourt, Brace
and World, N.Y., 1964, \$4.75.
The Thread of Life (film),
Bell Telephone System,
59 min., color.

Why have the studies of "Drosophila"
been so important in developing
our knowledge of the nature of the
gene and mutation?

Is the gene still considered the
indivisible unit of recombination
for new human life?

What important new role may you soon be playing in regard to determining the
nature of human organisms?

VI. Ecology -- Man and the Biosphere

Paul Sears, Where There Is Life,
Dell Publishing Co., N.Y.,
1962, 50 cents.
Eugene Odum, Ecology, Holt, Rine-
hart, and Winston, N.Y., 1963,
\$1.75.
Marston Bates, The Forest and the
Sea, New American Library of
World Literature, Inc., N.Y.,
1961, 50 cents.
May 1965 Journal, R. Buckminster
Fuller transcript.

How about opening up a meeting to the
community on this subject?

Have several specialists weave a pic-
ture of the inter-relation of
organisms and functional processes.

Key material useful throughout the year

"Creativity in the Sciences" by Herbert Fox, May 1965 AAUW Journal.

Modern Science and The Nature of Life, William S. Beck, Doubleday and Co.,
Inc., N.Y., 1961, \$1.45.

The Ideas of Biology, John Bonner, Harper and Row, Publishers, Inc., N.Y.,
1962, \$1.45.

The Origins and Growth of Biology, ed., Arthur Rook, Penguin Books, Baltimore,
1964, \$1.45.

The Intelligent Man's Guide to the Biological Sciences, Isaac Asimov,
Pocket Books, Inc., N.Y., 1964, 95 cents.

Biological Science - Molecules to Man, Blue Version, Houghton Mifflin Co.,
Boston, 1963, \$7.96.

Scientific American offprints from W. H. Freeman and Company, 660 Market
Street, San Francisco 4, California, 20 cents each.

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IV

SOME RESOURCES
TO HELP YOUR PROGRAM BUILDING

INDIVIDUALS

In enlisting help from individuals to carry out your exploration of this topic -- whether in relation to a study group or a general branch meeting -- be sure to clarify the specific nature of your need. Imaginative non-scientists can be a help to you too in stimulating and advancing your understanding of the creative processes in science.

Inquire about teachers who are giving particular thought to the creative process, the way scientists have worked, the influence of social conventions on scientific discoveries in different periods.

Faculty in universities and schools: Science
Philosophy
any of the Arts
Sociology
Psychology

Research scientists connected with industries, medical centers, government research centers.

PRINTED MATTER

The Intelligent Man's Guide to Science, Isaac Asimov, Basic Books, Inc., N.Y., 2 vol., 1960, \$15.00.

(This has recently come out in paperback as The Intelligent Man's Guide to the Physical Sciences and The Intelligent Man's Guide to the Biological Sciences, Pocket Books, Inc., 630 Fifth Ave., New York, N.Y. 10020, 95 cents each.)

The Creative Process, Brewster Ghiselin, The New American Library of World Literature, Inc., N.Y., 1960, 50 cents.

Scientific American (magazine), 415 Madison Avenue, New York, N.Y. 10017, \$7.00 per year.

Bulletin of the Atomic Scientists (magazine), Circulation Department, 935 East 60th St., Chicago, Ill., 60637, \$6.00 per year.

These items should be available in any library.

AUDIO-VISUAL
AIDS

Films may be available from state universities, schools or public libraries. Industries such as the Bell Telephone System may also be able to supply films relating to this Topic. Check with local

offices. Science museums and schools might provide photographs and other exhibit material. If film rental is an expensive drain on your budget, a school might cooperate with you in presenting the film. (See special film resource list in this packet.)

SOCIETIES AND
AGENCIES

The following institutions have particular interest in contributing to the public understanding of science:

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE
1515 Massachusetts Avenue, N.W.
Washington 5, D.C.

Mr. E. G. Sherburne, Jr., Director
Studies on the Public Understanding of Science

THE SCIENTISTS' INSTITUTE FOR PUBLIC INFORMATION
30 East 68th Street
New York, New York

Mr. Robert Light, Associate Director

Write to Mr. Light for details on committees forming in
or near your community.

AMERICAN CHEMICAL SOCIETY
1155 - 16th Street, N.W.
Washington, D.C.

Alden H. Emery, Executive Director

AMERICAN INSTITUTE OF BIOLOGICAL SCIENCES
2000 P Street, N.W.
Washington, D.C.

Dr. Robert Leisner, Director
Special Projects and Head of Publications

Lists of speakers in various parts of the country. Films.

UNITED STATES ATOMIC ENERGY COMMISSION
Germantown, Maryland

Duncan Clark, Division of Public Information

Science museums might be helpful to you too. A list of these is contained in the Museums Directory of the United States and Canada put out by the American Association of Museums, Washington, D.C. This directory may be in a nearby library.