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N.S.F. Impact on an Iowa Teacher or How I Spent My Summer Vacation

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"The Integration of Research and Teaching Science and Mathematics--a six-week (two weeks each summer) N.S.F. supported program at the State University of New York at Stony Brook. Contact Professor Max Dresden, Executive Director, Institute for Theoretical Physics"

When I read this advertisement in the January 1985 issue of the *Physics Teacher*, I thought it looked interesting so I applied. In May of 1985 I was notified of my acceptance into the program, and then I wondered what I was getting into. I could not even locate Stony Brook in the atlas. It is a small town on Long Island about 50 miles east of New York City. The travel agent suggested I land at McArthur, a small Long Island airport. On July 28, I stepped off onto Long Island concrete. What a surprise! I guess I had the typical farm boy attitude that all of New York would be like Manhattan--tall buildings everywhere. Stony Brook was nothing like that. The college consists of 12,000 students, 8,000 of whom are doing graduate work. The university is centered in a really dense forest. Our dorm was so deep in the timber that it was almost frightening to walk the narrow path to its entrance. This is New York, I thought. I guess I expected the University of Iowa with its typical campus-town environment. Boy, was I wrong!

When Monday, July 29, arrived, I realized that this experience would be really special. Max Dresden has to be one of the most outstanding scientists and teachers alive today. Hearing his personal account of projects while working with scientists ranging from Albert Einstein to Richard Feynman had me on the edge of my chair all afternoon.

At four o'clock each afternoon, our group of 50 teachers would meet with a selected research guest. With Brookhaven National Laboratory very close, we had no trouble getting top professionals to attend. We used this time, not to discuss their particular research topics, but their lives in general. What does a mathematician do all day? How did you become interested in doing scientific research? Would you want your children to do research? These were typical questions asked in a very informal atmosphere.

Meeting scientists on the edge of new research is always exciting. I had no idea how these new results were reported. We met with the editor of *Physical Review Letters* and he explained this process. I did not know what a "preprint" was. I assumed that a "referee" was only

needed at a sports event. Personally meeting Mr. C. N. Yang, a Physics Nobel Prize Winner, and hearing his lecture on symmetry was an unforgettable experience. Our group met with Mr. Robert De Zafra two weeks before he left for a long session in Antarctica. We were privileged to share his excitement and also his fears as he prepared for this adventure.

Actually observing scientists from many countries working on the high energy particle ring at Brookhaven was a remarkable experience. We had discussed particle accelerators many times in class, but I never realized I would actually see one in operation.

As a long-time Iowa science teacher (26 years), I was concerned that I was too old to try new experiences like this one. My concern was unfounded. The east coast teachers were very friendly and helpful and just as wrong about Iowa as I was about New York. Many times I was asked "How are the potatoes?" or "What about the dry powder snow?"

I ended my experience with the program last summer (it was extended one more summer) with mixed emotions, realizing that I have left many good friends, but also knowing that my knowledge and attitude about science will be forever changed.

Editor's Note

After reading the preceding article, you may be interested in knowing where you can find information about summer institutes and other types of in-service programs for teachers. Watch for notices in the Science Notes department of this journal. The *Iowa Science Teachers Journal* will soon be receiving more current information through PSInet, the new science education electronic information network. It is anticipated that more notices of institutes will be available in time for publication.

One of the referees for the preceding article pointed out that the terms "referee" and "pre-print" were not explained in the article and readers might like to know what the terms mean. A referee is a person who reads and evaluates an article and makes suggestions to the editors. Articles submitted to the *ISTJ* are read by two or more referees before being read and edited by assistant editors. Most articles are read by the chief editor before being sent to referees and again after being read by the assistant editors and copy editor. This entire process may be repeated if an article is sent back to an author for rewrite or if referees strongly disagree about the merit of printing an article.

In the *Iowa Science Teachers Journal* office the terms "proof" and "blue-line" are used for "pre-prints." A proof is a copy of an article or part of the journal which is read for errors before the final copy goes to press. The blue-line is a proof which is made from the printing plates and is the very last copy which can be checked for errors before the presses roll. The use of computers has reduced the kinds of "pre-prints" necessary. At one time "galley proofs", "page proofs" and "blue-lines" all had to be read before a journal could go to press. --*C.W.B.*

SCIENCE EDUCATION INITIATIVES FOR THE 1990s

The following article was prepared by the National Science Teachers Association (NSTA) whose president, Dr. Hans Andersen of Indiana University, and I talked about these initiatives at an NSTA convention. Dr. Andersen believes strongly in these initiatives and asked me to publish them in the *ISTJ*. He also requested that I ask you to write to your congressman in support of all or part of the initiatives. I would urge you to do so and would appreciate receiving a copy of your letter which may be published in this journal if you so indicate.

--C.W.B.

To resolve the problems inherent in science education today, four areas require immediate initiatives:

I. Teacher preparation and staff development
II. Curriculum development
III. Instructional support
IV. Research and dissemination

I. Preparation and Staff Development Initiatives

* Development of research-based preservice teacher preparation programs for elementary, middle and high school teachers that are designed cooperatively by science educators, scientists and practicing classroom teachers of science.
* Implementation of staff development programs for teachers of science who have a need to reinforce or enhance their science knowledge and science teaching skills.
* Recruitment of a greater number of highly qualified and competent individuals into science teaching (especially minority populations) and retention of these people in the science teaching profession.

II. Curriculum Development Initiatives

* Development and implementation of more unified, in-depth, hands-on science curricula for preschool, elementary, middle/junior high and high school students.
* Development and utilization of evaluation and assessment tools that measure student achievement of higher order thinking skills.
* Production of materials designed for instructional administrators and lay people (e.g. principals, superintendents, school board members and parents) that would provide better understanding of science education needs of students.

* Implementation of curricula for preparing science laboratory technicians to assist teachers.
* Development of curricula that would instruct teachers in the appropriate uses of technology in the classroom.
* Development of curriculum models that integrate science with the learning of other elementary school subject matter.

III. Instructional Support Initiatives

* Provision of appropriate electronic technologies to science teachers at all grade levels.
* Provision of funds for the construction of adequate science teaching facilities (e.g., activity centers and laboratories).
* Development of regional science centers that would make the following available to local teachers:
    A. models of effective teaching practices
    B. science updates
    C. research opportunities
    D. media
    E. science equipment and supplies

IV. Research

* Establishment of long-term funding for regional science education research centers that would conduct and disseminate research on:
    A. designs of science-teaching facilities
    B. appropriate uses of technology
    C. science curriculum for all students
    D. instruction
    E. science teaching practices that are taking place outside the United States