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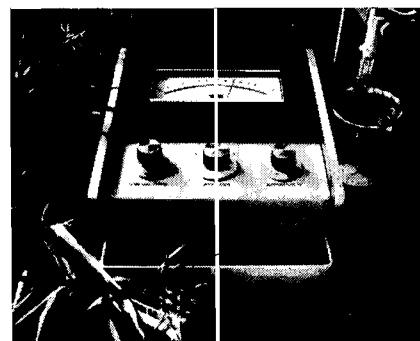
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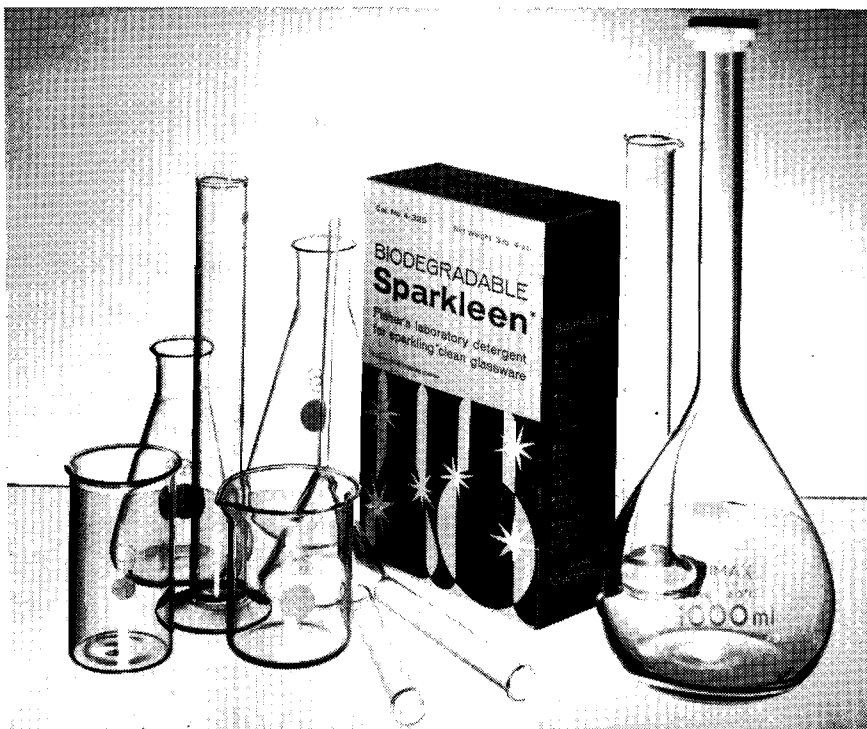
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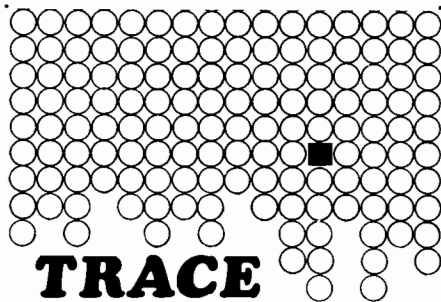
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Saraceno, Dr. Anthony Joseph moved to
Chillicothe, O.
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THE **Chemical Record**

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BULLETIN OF THE COLUMBUS SECTION OF THE AMERICAN CHEMICAL SOCIETY

VOLUME XI

MARCH, 1968

NUMBER 3

MEETING NOTICE

American Chemical Society
Columbus Section

MONDAY, MARCH 18, 1968
Four Hundred Ninety Seventh Meeting

THE RED OX STEAK HOUSE
3330 East Broad Street (corner of Broad and James)

5:30 P.M. - Cash Bar

6:30 P.M. - Dinner

8:00 P.M. - Program

Speaker - Dr. Henry A. Bent

Subject - Pauli Mechanics: A New Look at Some Old Concepts
in Structural Chemistry

Cost of Dinner - \$3.50 if paid in advance, \$4.00 at the door.

Persons other than CAS and Battelle send advance payments to Mrs. Harriett Proctor,
Chemistry Department, 115 McPherson Laboratory, Ohio State University 43210.

Reservation Deadline - Thursday Noon, March 14, 1968.
Battelle Employees may call Mrs. Betty Brunton, Ext. 653.
Chemical Abstracts employees may call Miss Linda Aumack, Kellogg Ext. 411.
Others may call Mrs. Harriett Proctor, 293-6009.

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Deadline for April issue is March 11, 1968.

Attendance at the February meeting was 40.

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- Stolfo, John Joseph, 250 W. Norwich Ave., Columbus, Ohio 43201
- Thomson, Francis Dean, 366 Sherwood Dr. W., Newark, Ohio 43055



HENRY A. BENT

Dr. Henry A. Bent was born in Cambridge, Massachusetts, in 1926. He received the A.B. degree from Oberlin College in 1949 and the Ph.D. in physical chemistry from the University of California, Berkeley, in 1952.

Dr. Bent was an instructor of physical chemistry at the University of Connecticut from 1952 until 1955, when he became a research fellow at the University of Minnesota. He assumed his present post in the division of inorganic chemistry at Minnesota in 1957.

Author of *The Second Law: An Introduction to Classical and Statistical Thermodynamics*, Dr. Bent's current research interests are the electronic structure of covalent, ionic, and metallic compounds, forces at the surface of molecules, and inter- and intramolecular interactions.

PAULI MECHANICS:

A NEW LOOK AT SOME OLD CONCEPTS IN STRUCTURAL CHEMISTRY

For over a century chemists have been articulating, slowly, but surely, in the classical structural model of homopolar compounds, in the ionic model of heteropolar compounds, in the doctrine of coordination, and in such concepts as

electron sharing, hybrid orbitals, localized molecular orbitals, and anti-coincidence, a mechanics of the Exclusion Principle. Unlike other kinds of mechanics, this mechanics has the peculiar, but to chemists, familiar, feature that it produces *stable structures*. The salient features of these structures can be usefully, if not yet perfectly, described by simple packing models. Illustrations will be given of the use of these models to describe the saturation and directional character of chemical affinity, the transferability of structural parameters, multi-center bonding, steric effects, the nature of unsaturation and small-ring strain, the effects of unsaturation and electronegative groups on bond properties, curly-arrow chemistry, intermolecular interactions, reaction mechanisms, and the structure of metals.

NATIONAL MEETING SAN FRANCISCO, CALIFORNIA March 31 to April 5, 1968

How can ACS local sections produce television programs? This question will be discussed in a TV workshop at the Society's San Francisco national meeting. Larry Smith, director of educational services of KQED-TV, San Francisco, will talk about practicalities and costs, and Dr. Larry Powell of the ACS Northeastern Section and Dr. Robert Lindquist of the California Section will report on successful TV series their sections have produced. Film clips of programs done by local sections will be shown. The workshop will be held on Wednesday, April 3, from 2:30 to 4:30 p.m. in room 315 of the Civic Auditorium. All interested persons are invited.

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"... Our Society should continue to improve channels of communication among the different sectors of chemistry and chemical engineering -- academic, governmental, and industrial; between our members and the public; between chemists and chemical engineers and the corporations or institutions where they work."

-- Dr. Robert W. Cairns

THE OHIO STATE UNIVERSITY
DEPARTMENT OF CHEMICAL ENGINEERING

The 1968 Thomas Alvin Boyd Lectures will be presented by the Department of Chemical Engineering of the Ohio State University. The general topic is Air Pollution.

The Boyd Lecturers for 1968 are:

1. MR. JAMES L. PARSONS, Consultant Manager, Environmental Engineering Group, E. I. duPont de Nemours, Wilmington, Delaware. "The Relationship of Source to Air Pollution" Thursday, March 28, 1968.
2. DR. SEYMOUR CALVERT, Dean, College of Engineering, University of California, Riverside, California. "Air Pollution Control Equipment" Thursday, April 25, 1968.
3. DR. BRIAN KAYE, Physicist, Illinois Institute of Technology, Chicago, Illinois. "Statistics, Semantics, and Size Analysis" Wednesday, May 1, 1968.
4. MR. MARVIN E. MILLER, ESSA Weather Bureau, State Climatologist, Columbus, Ohio. "Selected Meteorological Aspects of Air Pollution" Thursday, May 16, 1968.

All lectures will be at 4:00 p.m. in the Chemical Engineering Building.

The lectures will be made available in paperback form. For further information call Professor Thomas L. Sweeney, Department of Chemical Engineering, Ohio State University, Columbus, Ohio 43210.

♦ ♦ ♦ ♦

"Within my earthly temple there's a crowd.
There's one of us that's humble, one that's proud.

There's one that's broken-hearted for his sins,
And one who, unrepentant, sits and grins.
There's one who loves his neighbor as himself,

And one who cares for naught but fame and pelf.

From much corroding care would I be free
If once I could determine which is Me."

Edward S. Martin

♦ ♦ ♦ ♦

"And I honor the man who is willing to sink
Half his present repute for the freedom to think,

And, when he has thought, be his cause strong or weak,

Will risk t'other half for the freedom to speak."

James Russell Lowell

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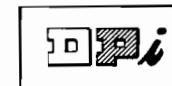
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WHAT ARE YOU BREATHING TODAY?

H. H. Fawcett*

The current controversy over safety of breathing pure oxygen in contrast with breathing mixtures of gases, such as air, has a very real and practical significance to anyone concerned with industrial, medical, or fire safety. Nearly a hundred years ago, German chemists undertook development of breathing devices in which a small quantity of oxygen could be used to fortify exhaled breath (from which the carbon dioxide and moisture had been removed), and hence permit the wearer to remain in a hazardous atmosphere for considerable time. British refinements on these devices, followed by additional American developments, led to the McCaa and Gibbs 2-hour self-contained breathing apparatus, which were originally intended as mine rescue devices, and hence were approved by the U.S. Bureau of Mines -- a system of approvals which is applied to gas masks and other breathing devices today.

To illustrate the progress even in this specific field, recently a 4-hour self-contained breathing apparatus applying the same principles, was introduced on the American market. Meanwhile, life-support systems using liquid air to supply breathing gas, have been developed and are finding considerable application where liquid air is available.

Between the extremes of a moist cloth (or sponge) for dusts, and the rigorous demands of life-support systems in space or in deep-sea diving (the Swede Zetterstrom breathed successfully a mixture of 4% oxygen-96% hydrogen at his record free dive of 450 feet), are a host of devices for less spectacular but equally important purposes--all are designed to protect man from irrespirable or hazardous atmosphere. Some are relatively worthless, while others have given excellent protection within the limits of their designed capacity. Each has specific applications, and advantages.

Unfortunately, each also has definite

built-in limitations (often overlooked by the buyer and wearer), and require specific knowledge if serious or tragic effects are to be avoided. The fireman who died wearing a canister-type gasmask which was inadequate for his fire-gas exposure, the utility man who died apparently because he was inadequately trained in the use of the oxygen-generating breathing apparatus, and the fire chief who removed the face piece of his demand air mask to shout messages to rescuers on the surface 30 feet above, but who was immediately overcome by hydrogen sulfide--these are but a few of the improperly-attired or poorly trained users who have paid with their lives by overconfidence in the application of breathing apparatus.

For a more detailed description of breathing devices and their limitations, the reader may refer to chapter 23 (pages 373-426 in *Safety and Accident Prevention in Chemical Operations*, edited by Fawcett & Wood, Interscience, Wiley, 1965, or write to the Industrial Department, National Safety Council, 425 N. Michigan Ave., Chicago, Ill. 60611, or the U.S. Bureau of Mines, 4800 Forbes St., Pittsburgh, Pa., 15213.

*National Academy of Sciences-National Research Council Member, Committee on Chemical Safety, ACS

(Continued from pg. 10)

ning, organizing, persuading and dealing with people.

Growth in the area of human relations skills is virtually a must for the present-day chemist--especially for the person who aspires to management. With a planned approach to this sort of personal development, reasonable and often surprising progress can be achieved.

-- From Chemical Bulletin.

◆ ◆ ◆ ◆

Psychiatrist to office nurse: "Just say, 'We're terribly busy.' Don't say, 'It's a mad-house.'"

OHIO WESLEYAN UNIVERSITY

Ohio Wesleyan University's Chemistry Department held a High School Teacher's Day on Saturday, February 3. About 20 high school chemistry teachers from Delaware and surrounding counties participated. There were tours of the facilities, and a group discussion of the mutual problems faced by both high school and college teachers of chemistry. Each participant received a used but serviceable two pan analytical balance and a choice of a variety of other used equipment.

An unrestricted grant of one thousand dollars was awarded by the Gulf Oil Corporation to the Ohio Wesleyan Chemistry Department. The presentation was made by J. C. Pate and John H. Hamilton of the Gulf Columbus Office on November 30, 1967. This grant was one of 95 given by Gulf in 1967 under its Aid to Education Program.

Professor Harold Wilcox of this department recently attended a two day program on the fine fields of science. It was held at Malone College, Canton, Ohio, as a part of its Science Lecture Series.

THE OHIO STATE UNIVERSITY

The Ohio State University Board of Trustees approved establishment of a School of Natural Resources at the university, effective next July 1.

The new school will be a part of the College of Agriculture and Home Economics. It will bring together various campus groups interested in the formulation of professionally oriented programs of instruction, research, and extension in natural resources.

President Novice G. Fawcett told the trustees that there is a national trend to emphasize natural resources in the mission of colleges and universities.

"The conservation of natural resources has emerged in present years as an area of widespread human concern, of academic learning, and of professional employment," he said . . . "Demand for professional personnel in all areas of resource management remains strong as a

result of new programs developed in response to public demand for better management of air, soil, water, wildlife, and aesthetic resources."

The new school will have responsibility for coordinating faculty members in various disciplines and colleges and initially will have only a small staff of its own. An all-university coordinating committee is expected to be set up to represent various disciplines interested in natural resources management.

A BRIEF HISTORY OF SCHOLARLY PUBLISHING (NEWLY REVISED)

- 50,000 B.C. Stone Age publisher demands that all manuscripts be double-spaced, and hacked on one side of stone only.
- 1455 Johann Gutenberg applies to Ford Foundation for money to buy umlauts. First subsidized publishing venture.
- 1897 Famous old university press in England announces that its Urdu dictionary has been in print 400 years. Entire edition, accidentally misplaced by a shipping clerk in 1497, is found during quadricentennial inventory.
- 1916 First successful divorce case based on failure of author to thank his wife, in the foreword of his book, for typing the manuscript.
- 1927 Minor official in publishing house, who suggests that his firm issue books in gay paper covers and market them through drug stores, is passed over for promotion.
- 1962 Copy editors' anthem, "Revise or Delete," is first sung at national convention. Quarrel over hyphen in second stanza delays official acceptance.

--Jackson, D.: Boards and Buckram, *Scholarly Books in America* 4:2 (Sept) 1962.

PH.D.'S AND WITCH DOCTORS

D. M. Wetstone

The following is the talk by Dr. Wetstone presented at American Chemical Society's Connecticut Valley Section - Connecticut Patent Law Association Symposium on Employer-Employee Relations, Hartford, November 28, 1967.

For some years I have been disturbed about the socio-economic status of the so-called scientific professional in American society, but have made only passing references to it in discussions with colleagues. I think this is a good opportunity for me at last to state and examine the problem explicitly.

The reason why one wishes to examine the status of the scientific professional in a panel discussion such as this is to determine whether such people are principally professional in their association with the public or principally employee. Before one can fruitfully discuss the ethics of a scientist's relationship to the source of his income, one must define the relationship. I will tell you my conclusion first; it is that scientists on the average are employees rather than professionals.

Now, I said that I was disturbed about the socio-economic status of scientists. What disturbs me is the degree to which my scientific colleagues are disturbed about it. And this is nowhere more the case than within the American Chemical Society which for years has had a standing committee of the Council to deal with these problems. This committee has dealt effectively with a number of important questions, among them group life insurance, portable pensions, and the employment of elder chemists.

But there has been an underlying theme throughout the Society's professional activities, particularly in relation to Ph.D. members, and the lyrics go like this:

"Why can't we be like the doctors? We're as good as they." Well, I've got news for you. Provided we define "good" correctly, we're not as "good" as they, and we are unlikely ever to be in American society.

The problem lies with the fact that we are all subject to what I call the witch

doctor syndrome. In America, where respect for learning is no greater than for many other endeavors, including getting rich, (and is often a good deal less), we emulate to some extent the primitive tribes that gave their greatest wealth and respect to the witch doctor. Now the ancient witch doctor cured your ills; more specifically, he removed pain and fear. People will pay anything to be rid of pain and fear and they will accord great respect to anyone who can accomplish the task reliably. Of course, the respect will be enhanced if the methods employed are derived from a body of highly restricted and difficult knowledge. Moreover, your pain and fear need not be a physiologic origin. It can be mental, spiritual, or financial.

Notice the necessary ingredients: restricted knowledge, removal of pain and fear, and direct contact with the public which is ill-equipped to judge the witch doctor objectively. Now who in modern society fulfills these qualifications? Financial ills? The attorney and the accountant. Emotional and spiritual ills? The cleric and the psychiatrist. Physiologic ills? Our old friend, with the biggest income of them all, the physician.

A special word must be injected concerning the cleric, who has always commanded a great deal more of our respect than our purse. I think this is simply because when his professional branch evolved from the early witch doctor he adopted the position that his rewards were not of this world and we have believed him ever since.

Now, where does this leave the scientist? Does he use restricted knowledge? Yes, that is certainly true, but he does not, except in a few instances, sell this knowledge directly to the uninformed public. He either presents it to his colleagues via publications or to his industrial employer, or both, and they are generally well equipped to judge the work. Indeed, for them this is not derived from restricted knowledge at all. Furthermore, the scientist does not remove pain and fear. He is useful, even necessary, to the university and to industry, but so is the Bursar in one and the production manager in the other. And therein lies

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"If it seems inevitable that a sizable number of graduate students must be inducted in 1968, we urge that serious consideration be given to amending the rule that the oldest eligible men be drafted first," Dr. Overberger stated, offering still another alternative for the Security Council's consideration.

"From the viewpoint of military needs, as well as graduate school requirements," he said, "it would be advisable to develop induction procedures involving an age mixture of younger and older men."

Under the present law and regulations, Dr. Overberger pointed out, "men graduating from a four-year course of study or completing their first year of graduate work next June will be included in the draft-eligible group, and selections from this group will be made with the oldest being drafted first." Because of this, there is expected to be a drastic reduction in the number of students who enter graduate school in the fall of 1968 and in subsequent years, the letter continued, and there will be a marked

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increase in the proportion of college graduates inducted into the armed forces.

"Such a policy," Dr. Overberger said, "is not in the national interest and will be damaging both our national defense effort and to our hopes of successfully attacking the many urgent and complex social problems which confront us. The ills which society faces demand highly educated and trained 'practitioners' just as badly as do individual human ills."

Until the Universal Military Training and Service Act was passed by Congress last summer, graduate students in good standing were eligible for student deferment until the completion of their studies. Despite this, there has still been keen competition for people trained to an advanced level in the natural sciences, particularly in the science-based industries where many of the occupations are classed as essential.

"The proposals to eliminate graduate student deferments next year will have an immediate impact on the educational system," Dr. Overberger asserted. Graduate students are used widely for undergraduate teaching, he pointed out, and it is not clear at this time how the universities could compensate for a sudden decrease in the number of people available for these assignments. In addition, the ACS president noted, many highly qualified students, if inducted into the armed forces for two years, would doubtless change their career plans, forgoing graduate school, and the nation would lose forever their potential contribution to society.

Noting that there may be no completely acceptable alternatives to the present regulations, Dr. Overberger appeals to the National Security Council "to seek solutions which might result in greater 'selectivity', thereby deferring those who in the best judgment of the nation can make a unique and specialized contribution to the well-being of the country."

♦♦♦♦♦

Courage - A woman pedestrian bluffing a woman driver.

the key; the scientist is no more unique than any other employee. He does not hold that special position in society of awe and respect which the uninformed public accords the practitioners of the mysterious black arts that cure their ills and comfort them. That is what the public, rightly or wrongly, understands to be a professional.

In our present society, the scientist cannot be as "good" as the doctor, neither in respect nor in money. We gain nothing by drawing up codes of ethics or enunciating professional behavior. Even writing Ph.D. after our names gains us little. It must be recognized after all that the medical profession has long ago preempted what was an academic degree, and a lower rank degree at that, and transformed it into an exclusive professional title. We scientists are mostly employees, just as physicians, or attorneys, or accountants are employees when on the payrolls of universities or industry. It is certainly true that we sell singular skills and knowledge just as they do. It is also true that this information is of profound importance to our employer and we have every right to demand commensurate rewards for our highly specialized services. Those of us who do basic research could perhaps be termed academicians, to borrow the Soviet term, but we are not professionals in the sense the public understands the word. We are not witch doctors.

I think, therefore, that we must approach our relationship with the employer as a specially skilled and educated employee, not as a member of a profession that we claim exists in some undefined limbo. Moreover, I don't think we can successfully create professional societies to promote this fictional professionalism. Conversely, there is no reason why a scientific society cannot alter its role so as to seek the most efficient and mutually profitable utilization of scientific talent by employers. It would be nice if we could turn scientific societies into organizations representing our personal interests, but I'm afraid that is precluded by reality.

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THE HUMAN ELEMENT IN CHEMISTRY

The chemist is first and foremost a professional person. And he is mighty sensitive about being recognized as such. The problem is minimal on a university campus or in some similar setting. But in business and industry, where he is usually in some sort of staff capacity, his pride suffers when he finds he is often considered to be handmaiden to the more glamorous sales or manufacturing departments.

Why is the chemist looked upon as a mere technician--albeit a very important one? Is he misunderstood, ignored, or just plain overlooked? Is the reason to be found in his training or education, his personality, the nature of his work, or perhaps the bias of people in high places? All of these factors influence the way society views the chemist. For the moment, let's take a look at the scientist as a person.

An early interest in things and impersonal abstractions occupies the young scientist's attention. His interests, skills and thinking habits typically center around the solving of logical problems. He is usually good in mathematics and finds that quantitative material is easy to grasp. Friends, relatives, teachers encourage him in these directions, and college or advanced training merely strengthen skills already well-developed.

Rarely do we find an individual who is equally good with people as with things. So with the chemist, as his total time devoted to technical problems through the years becomes significantly greater than the time spent in systematic attention to people problems, his development is likely to become somewhat unbalanced. The young man who was rather quiet and introspective becomes more reserved as he buries himself in technical matters. He readily agrees that he "likes people," but actually he feels more at home in the lab than in a group of people--especially in new social situations. He talks easily about his specialty but language skill in general is not one of his strong points. The chemist--expert with tangibles--finds he

is in need of greater understanding of intangibles.

It is commonly said that everyone who holds any kind of important position has to "sell" himself and his ideas. This is particularly true of staff people--such as chemists--who have no line authority, cannot order people to carry out their wishes, but instead must rely on the "authority" of their professional and personal qualifications. And here is where the intangibles, the intuitive factors connected with communication, emotions, feelings, attitudes, prejudices and the like, combine into either a satisfactory or unsatisfactory degree of persuasiveness. The chemist tends to fall back on a purely logical presentation of his views, without fully realizing the major role of emotions and personality traits in the selling process. He is understandably hurt when the manufacturing department ignores his warnings about quality, when the sales department makes unreasonable demands for new products or makes claims for present products which go beyond supported laboratory findings.

Even within his own field, the modern chemist is likely to find himself a member of a research team instead of an individual specialist. Present-day technology is so complex that the old-style inventor with his sudden flashes of inspiration seems almost a thing of the past. Now there is a need for teamwork, mutual stimulation, communication and a generally heavy emphasis on human factors in addition to good technical ability.

What can the scientist do to improve his skills with people, to become more at home with intangibles? He can read more of the better novels. He can study the humanities. He can take up one of the arts as a hobby. Most importantly, he can get out with people more often (as his wife has probably been trying to get him to do!) Especially important is the type of community service in which he has to give of himself to others in need. And heading up such activity, becoming personally involved in it, is particularly valuable, since it gives practice in plan-

(Continued on pg. 14)

AMERICAN CHEMICAL SOCIETY URGES DRAFT DEFERMENTS FOR GRADUATE STUDY

An end to student deferments for qualified graduate students will damage our national defense effort and hamper our attack on the crucial social problems of our times, says the American Chemical Society in a letter from its president, Dr. Charles G. Overberger of the University of Michigan, to the National Security Council.

"The American Chemical Society strongly favors a Selective Service Policy that will not only permit, but encourage qualified students to obtain advanced education," said Dr. Overberger, commenting on regulations for administering the Universal Military Training and Service Act, passed by Congress last summer, which eliminate student deferments for graduate study except for a small area of health-related specialties.

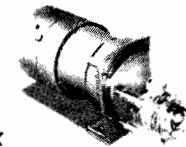
The National Security Council has been assigned the task of recommending to the Selective Service Director such other subject areas as are needed for the maintenance of the national health, safety and interest. President Johnson heads the Council.

The Society does not make a special plea for chemists or even scientists and engineers, Dr. Overberger told the NSC, but instead urges that selective consideration be given to all advanced students whose flow through the graduate schools is so essential in providing educated manpower for the nation.

Recognizing the many problems of administering an equitable Selective Service policy, the Society offers several alternatives to its principal recommendation. Graduate study might be classified as an essential activity, thereby permitting graduate students to obtain II-A deferments. If this is not timely now, the ACS suggests, a one-year moratorium on drafting graduate students might be permitted in order to give sufficient time for further study of the problem to prevent the drastic change in graduate school enrollment now projected for 1968.

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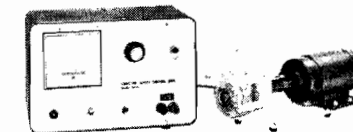
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