

as does structuring the Federal Government into departments and agencies, each with a reasonably coherent mission. Certainly, it makes managerial sense. Unfortunately, this arrangement for federal R&D exhibits ... serious weaknesses."

Further, Dr. Handler said, "It seems to me that the time has come for the Congress and the Executive either to accept the general philosophy by which we have operated—or reject it. But not snipe at it annually. If such acceptance is politically unacceptable—although I do not see why—then let that be made clear so that we may proceed instead to erect NIOSH, as once proposed by this Committee, or go further and transform NSF into a Department of Science and Technology which is deemed politically supportable."

And so it went. The House committee is yet to hear from a host of witnesses, including all former Presidential science advisers. After drafting a bill to set up a council, the committee will hold a series of public hearings. And Administration science officials, including Dr. Stever, as the key witnesses. At that time, Dr. Stever, who has been getting high praise for an admirable job from critics of the present administration, will get a chance to say how well things have been going and whether he feels there ought to be a change, albeit within the constraints of being an Administration official.

ICI ends its silence on vinyl chloride

The argument over the handling of results from animal toxicity studies that have helped to establish an apparent link between exposure to vinyl chloride and a rare form of liver cancer in humans isn't over yet. The studies are being conducted by Prof. Cesare Maltoni, director of the Istituto Di Oncologia, Bologna, Italy.

In an earlier story (May 20, page 16) C&EN reported that the Manufacturing Chemists Association seemingly held in confidence from January 1973 until January 1974 scientific findings by Prof. Maltoni on vinyl chloride as an agent causing liver cancer in rats.

The story also raised the question of what an MCA group, which included an Imperial Chemical Industries physician, did, or did not, reveal about these rat studies during a July 1973 meeting with officials of the National Institute of Occupational Safety and Health (NIOSH). According to NIOSH director Marcus M. Key, the group made reference to neither Prof. Maltoni by name nor to angiosarcoma of the liver in humans and animals (C&EN, June 10, page 3). In May of this year, MCA released a "vinyl chloride chronology" that includes its version of the meeting (C&EN, June 10, page 1).

ICI, which had remained silent on

the issue, now has decided to come forward with a letter to C&EN that it hopes will be a constructive contribution to help clarify the situation. The letter, and NIOSH's response, follow.

Dear Sir:

Dr. Marcus Key, in a letter in your issue of June 10, 1974, describes a meeting between NIOSH and MCA on July 17, 1973. He refers to an ICI doctor who flew specially to Washington on this occasion to acquaint NIOSH fully with the results of a wide-ranging investigation on vinyl chloride monomer, currently being carried out by a group of European companies. Since certain of the phrases in Dr. Key's letter might be capable of misinterpretations, which I am sure he would not have intended, some comment from Europe may be helpful in clarifying these.

(1) Dr. Key reports that the ICI doctor "critically reviewed the work of Prof. P. L. Viola." This was an entirely proper review of the scientific criticism which had been made previously of Dr. Viola's paper and provided a possible explanation for the general lack of interest shown by the rest of the world in Dr. Viola's conclusion. The meeting provided a forum for the European group to outline the animal experimental work which it alone had sponsored in 1971 and to present its findings to date. The protocol for the new work had been designed to avoid any criticism similar to that directed at Dr. Viola. Dr. Key, of course, confirms this in his brief reference to "more reasonable levels of vinyl chloride," though this was by no means the only important difference between the new and old work.

(2) Dr. Key then reports the European representative as saying that "several tumors interpreted as confirmation of Dr. Viola's work had been observed." For complete clarity, this sentence needs a little expansion. Our doctor, in fact, reported that primary tumors at several sites had been produced and that this confirmed Dr. Viola's overall, and previously disregarded, conclusion that vinyl chloride was carcinogenic to rats. He did not say, as some of your readers might misconstrue Dr. Key's sentence, that we confirmed Dr. Viola's results in that vinyl chloride produced only Zymbal gland tumors metastatic to other sites. Such a statement would have been untrue.

(3) Dr. Key is correct in saying there was no discussion of angiosarcoma of the liver in rats at the meeting. Nor has anyone in Europe attempted to say that information was transferred in this specific form. As of July 1973, the major new development in European work, which contrasted with Dr. Viola's, was that vinyl chloride had proved carcinogenic to rats at several sites and at levels down to and including 250 p.p.m. To those concerned with the work, this conclusion had far greater

impact than the observation that one of the types was angiosarcoma of the liver, a form very rare in humans and unknown at that time in vinyl chloride workers. In his initial presentation, therefore, the European delegate presented the animal results in the generalized form that would make maximum impact, within a wide ranging survey of past and future activities.

The major facts were made clear. NIOSH was told that vinyl chloride caused multisited primary tumors in rats at concentrations down to 250 p.p.m. It also was told of a wide range of further actions already under way, in Europe and the U.S., as a result of this finding. The European doctor was fully prepared to provide any further detailed information, within this main statement, that NIOSH might ask for. That NIOSH asked for little more before the meeting ended indicated to MCA and the European group that both information and proposed actions were thought adequate and proper.

At that time and in the absence of a known human hazard, that was a reasonable conclusion for NIOSH to come to. When unexpected results first emerge in a long-term animal toxicological program, the normal and proper course of action is (a) to scrutinize further results to ensure that the first indications are significant, (b) to start new experiments aimed at a more precise definition of the effect, (c) to start work with other animal species, and (d) to look urgently for any similar effects in human populations. All of these add to the time span of the study unless and until (d) produces positive results or even suspicions. In the case of vinyl chloride, all these actions had been started by mid-1973 in a coordinated program between European and U.S. industry. Indeed, within ICI, an epidemiological study had been completed to the end of 1971 and updated to the end of 1972. This study disclosed no increase in deaths attributable to cancer among vinyl chloride workers when compared with a control group of chemical workers never exposed to vinyl chloride. The best view from all the information at that time was that there was no indication of a hazard to man. The further work was being done to make quite sure that this assessment was correct.

Finally, may I list a few facts about the role of the polyvinyl chloride industry in the whole problem of vinyl chloride and health. Before 1964, no health problem with vinyl chloride had been recognized. In that year, Solvay first observed angiosarcoma (AOI). Their finding of a link between AOI and vinyl chloride was published in 1966 and was also communicated directly to U.S. manufacturers, and a great deal was done quickly to get this under control. In 1967 Dr. Viola (who is a senior member of Solvay's medical group) began animal experiments to

Continued on page 17

California State University, Fresno ... Arnold J. Krubsack promoted to associate professor, department of chemistry, University of Southern Mississippi, Hattiesburg ... Donald K. Kunimitsu promoted to professor, department of chemistry, California State University, Fresno.

Ronald Neuman joins University of Minnesota, St. Paul, department of forest products, as assistant professor ... James W. Pinson promoted to professor, department of chemistry, University of Southern Mississippi, Hattiesburg ... Henry Rakoff joins chemistry faculty of the University of Southern Mississippi, Hattiesburg, as associate professor ... Stephen A. Rodemeyer promoted to professor, department of chemistry, California State University, Fresno ... Carl H. Snyder promoted to professor of chemistry, University of Miami, Coral Gables.

E. C. Taylor appointed chairman, department of chemistry, Princeton University, N.J. ... Sidney Toby becomes director, school of chemistry, Rutgers University, New Brunswick, N.J. ... William H. Wade appointed chairman, department of chemistry, University of Texas, Austin ... Glenn S. Weiland, professor of chemistry, Gettysburg College, Pa., retires after 25 years on the faculty ... Scott R. Wilson appointed assistant instructor of chemistry, Gettysburg College, Pa.

Books

New quarterly

A new journal, *Resource Recovery and Conservation*, to be published quarterly with the first issue scheduled for mid-1974, will be dedicated to detailed and comprehensive investigations of the interdisciplinary aspects of resource recovery and conservation. Editors of the journal are Dr. James G. Abert and Dr. Harvey Alter of the National Center for Resource Recovery, Washington, D.C. The yearly subscription price (one volume, four issues) is \$34.50 from Elsevier Scientific Publishing Co., P.O. Box 211, Amsterdam, the Netherlands.

Functional Monomers: Their Preparation, Polymerization, and Application. Vol. 1. Ronald H. Yocum, Edwin B. Nyquist, editors. xii + 715 pages. Marcel Dekker, Inc., 305 East 45th St., New York, N.Y. 10017. 1973. \$43.50. A practical reference work.

New Developments in Gas Chromatography. Howard Purnell, editor. viii + 408 pages. John Wiley & Sons, Inc., 605 Third Ave., New York, N.Y. 10016. 1973. \$9.95.

Organicum: Practical Handbook of Organic Chemistry. Heinz Becker, et al. xx + 747 pages. Addison-Wesley Publishing Co., Inc., Reading, Mass. 01867. 1974. \$23.50.

Polymers: Chemistry and Physics of Modern Materials. J. M. G. Cowie. xii + 298 pages. Intext Educational Publishers, 257 Park Ave. South, New York, N.Y. 10010. 1974. \$11.75.

Principles of Quantum Mechanics. W. V. Houston, G. C. Phillips. xi + 376 pages. American Elsevier Publishing Co., Inc., 52 Vanderbilt Ave., New York, N.Y. 10017. 1974. \$39.50.

Continued from page 21

get a better understanding of AOL. He reported preliminary findings in Tokyo in 1969 and his earliest observations of a carcinogenic effect were delivered to the 10th International Cancer Congress in Houston in 1970. It must be assumed that his paper reached a large and influential audience. Nevertheless, the only action came first from European industry, through the Maltoni animal studies, in 1971, and then from U.S. industry with its Biotech [Laboratories] program in mid-1973. ICI initiated epidemiological studies in 1971. The results of these were given to MCA in late 1972 with the recommendation that similar work should be done by MCA. It was this latter work that finally led to the discovery of a human cancer hazard.

The point is obvious. For the past 10 years the industry on both sides of the Atlantic has been active in its work to protect health, and, in Europe, animal studies have been in continuous progress for the past six and a half years. The latest and most serious hazard of angiosarcoma of the liver has only been discovered through the coordinated and unprompted effort of European and U.S. industry.

This is the record of an industry that has taken action and published, and not, as you have "hinted" in other columns, of an industry that "withholds information."

A. W. BARNED

Director, Imperial Chemical Industries plastics division

Here is NIOSH's response:

Dear Sir:

It is still difficult for me to understand how a description of the preliminary findings of a rat study conducted by an unnamed Italian investigator can be retrospectively interpreted as providing to NIOSH full information on the significance of Prof. Maltoni's findings in July 1973.

We still disagree on the details related to us. Our notes do not confirm a description of tumors other than Zymbal gland tumors or their metastases, nor do they confirm specific mention of 250 p.p.m. of vinyl chloride as being tumorigenic. It is reassuring, however, that the ICI letter corroborates our notes that there was no discussion of angiosarcoma of the liver at the July 1973 meeting.

In spite of the differences, I respect the ICI medical officer who attended the meeting and appreciate very much his coming to this country and briefing us. Incidentally, I did not mean to use the word "critically" in the pejorative sense, but rather in the sense of exercising careful judgment or judicious evaluation.

Marcus M. Key, M.D.

Assistant Surgeon General, Director, National Institute of Occupational Safety and Health

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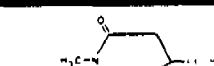
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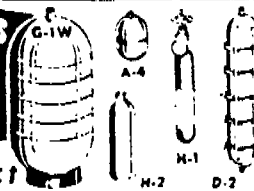
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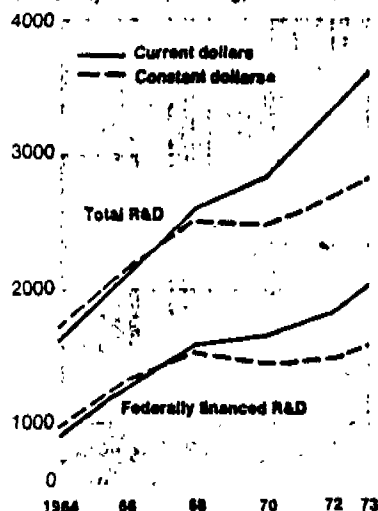
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Academic R&D spending has doubled in past eight years

University R&D spending, \$ millions



a Base year 1967, based on gross national product implicit price deflator. Source: National Science Foundation

Further, this group received \$96 million or 9% more R&D monies in 1973 than in 1972. Federal funds accounted for \$85 million or 89% of the increase. NSF adds that the 20 largest institutions accounted for "41% of federally financed R&D performed by all academic institutions in both 1972 and 1973." And, NSF says, that "almost one half, or \$56 million of the support from foundations and voluntary health agencies was concentrated in these 20 institutions in 1973."

High court eases pollution inspection

The Supreme Court has ruled that government air pollution inspectors do not need a search warrant or other permission to enter a company's unrestricted grounds to visually monitor the smoke being emitted from its chimneys. An Environmental Protection Agency spokesman says that the agency is very satisfied with the court's decision since it makes the job of monitoring air quality easier.

The unanimous ruling overturned two lower court decisions that held that conducting such tests without either a warrant or the company's consent constituted an unreasonable search within the meaning of the Fourth Amendment.

The air pollution decision stemmed from a June 1969 inspection made on the grounds of Western Alfalfa Corp. by a Colorado

state health inspector. The inspector entered the company's yard to take an opacity reading on the smoke coming from Western Alfalfa's chimneys during a drying operation. Subsequently the company was told that its emissions violated state standards and was ordered to cease and desist.

Writing the court's opinion Justice William O. Douglas said that Fourth Amendment protection does not extend to sights seen in "the open fields." Further, he observed that the field inspector did not enter the company's plant or offices, or inspect either its equipment or its files and papers. "He had sighted what anyone in the city who was near the plant could see in the sky—plumes of smoke," Justice Douglas said. He also noted that although the inspector was on company property, "We are not advised that he was on premises from which the public was excluded." Hence invasion of privacy, if it can be said to exist, is "abstract and theoretical."

Argentina plans huge chemical program

Argentina is launching a massive \$1 billion investment program to develop its chemical and petrochemical industry. Some of the plans were unveiled last week in Buenos Aires, when president Juan Peron was on hand at the signing ceremony involving members of his government and senior officials of Italy's Montedison. Montedison will act as general consultant to Argentina for the development.

Though full details are not yet available, Argentina wants to set up a variety of projects during the coming eight years. These include plants for making polyolefins; basic organic chemicals such as ethylene oxide and acetic acid; and man-made fibers and fertilizers.

Montedison will be directly involved in the first stage of the plan, which will cost an estimated \$400 million and includes a major petrochemicals center to be sited at Bahia Blanca, about 350 miles southwest of Buenos Aires. The Italian company also will invest in an aluminum plant that Italmipi-anti, a major Italian construction firm, will help build at Puerto Madryn, 325 miles farther south.

Other West European chemical firms are expected to take part in the overall plans. Like Montedison, they will have a financial stake in the new plants.

Vinyl chloride issue focus of U.K. group

Reflecting growing international concern about vinyl chloride, the U.K.'s Chemical Industries Association has set up a committee to coordinate research into possible health risks involving the monomer and to recommend ways of avoiding them.

On the committee are representatives of the four U.K. polyvinyl chloride makers—British Industrial Plastics, BP Chemicals International, Imperial Chemical Industries, and Vinatex, a subsidiary of Continental Oil—which can produce a total of 410,000 metric tons of PVC annually. Also represented are the British Chemical Industry Safety Council, the British Plastics Federation, and the Chemical Industries Association itself. The companies have agreed to spend about \$10 million for detailed studies on in-plant safety conditions, for reducing the atmospheric vinyl chloride vapor levels in their plants to 50 p.p.m. or less, and for developing improved monitoring systems. The funds also will be used for animal experiments and epidemiological studies.

Committee chairman A. W. Barry Barnes of ICI's plastics division, stresses that the move is a positive one on industry's part to counter a recently recognized industrial problem head-on. He also strenuously denies that the industry has been responsible for keeping the lid on release of research results of Italy's Prof. Cesare Maltoni, who has shown that vinyl chloride vapor at concentrations down to 50 p.p.m. induces onset of angiosarcoma, a liver cancer, in rats (C&EN, May 20, page 16).

Focal point of the committee's attention is the polymerization process, where workers run the greatest risk of vinyl chloride exposure. Mr. Barnes points out that atmospheric concentrations of the monomer in U.K. plants already have dropped dramatically from a level of about 1000 p.p.m. 20 years ago to 150 p.p.m. by the middle of last year. Improvements in operating conditions and the installation of leak-proof valves and the like have brought the level to 50 p.p.m. today, he adds.

"The ultimate for most existing plants is 10 p.p.m.," Mr. Barnes claims. "New plants with the most modern technology might achieve 5 p.p.m." But amounts below this "are not conceivable," in Mr. Barnes' view.