

letters

in the visible and ultraviolet, as was amply demonstrated in a recent study.²

Rank and McKelvey's remarks about carbon monoxide are in complete agreement with the tentative conclusions that we have reached regarding this trace constituent, based on what little information is presently available about it. We are pursuing the various possible means of measuring the carbon-monoxide concentration in the atmosphere at various locations and at various altitudes. It is certainly not known yet that a significant portion of the carbon monoxide is produced by anthropogenic processes.

Regarding their closing remarks, I believe that scientists have not only the right but the duty to use whatever means are possible to establish *factual* information regarding the impact that activities of any species has on the planet.

References

1. L. Goldberg, *The Earth as a Planet* (G. Kuiper, ed.), U. of Chicago Press (1954).
2. L. Tomley, "A Study of the Atmospheres of the Hot Subdwarfs HD 127493, HD 128220, and HD 113001," PhD Thesis, U. of Washington (1968).

Paul W. Hodge
University of Washington
Seattle

Beyond physics

Recently efforts have been directed to interest physicists in fields not normally considered their domain (for example urban and regional planning) however, without much success. It would appear from the many letters you have received that social programs other than those directly related to environmental sciences are considered outside the scope of physics and that, "if physicists wanted to be in these fields they would have done so from the beginning."

As a physicist who was formerly employed in what is normally considered a physicist's job (electromagnetic scattering and coherent optics), I find these letters interesting, because I voluntarily switched to what has always been considered the realm of the social scientist. A little over two years ago, when physicists in coherent optics were still in demand, I decided that the urban social problems confronting this country were in great need of immediate solutions and all the holograms I could make would be of little importance if people didn't take positive action to help solve these problems. Awareness came easy. It is difficult for any individual, no matter how far behind you are in your technical journals, not to know about today's revolution. The radio, TV, newspapers,

magazines as well as special reports (Commission on Civil Disorders, Commission on Campus Unrest) have publicized these problems so well that no reasonable individual could remain unaware.

From awareness comes commitment, and once committed the rest is relatively easy. By letting people involved in social action programs (local OEO, Model Cities, Urban League, Chamber of Commerce and many others) know you are interested in working with them and are truly committed to help constructively solve our problems the opportunity will come.

In my case opportunity came in the early fall of last year. I was offered a position with the Michigan State Chamber of Commerce to work on a national pilot research and demonstration program called "The Management Assistant Program for Increasing Job Opportunities for the Poor in Private Business and Industry."

Since I took on this job many people have asked how the adjustment from the physical sciences to the social sciences have affected me. Most are surprised to find that my working habits and methods are almost identical to those that I have developed over the last ten years. The reports and administrative details are just like any other government sponsoring agency, so this aspect of the job was well known. As to the work itself, I find the principles of experimental physics are directly applicable. Though the theories and hypotheses one must work with cannot be expressed in a quantitative mathematical fashion, the fundamental concepts of working from first-principle analysis is applicable when these principles are expressed qualitatively. Once this is done, an experimental program can be formulated and implemented. Data are collected, analyzed and evaluated in the same manner as for any other experiment based on qualitative observations.

The ability to seek truth through observation, which is what physical scientists are supposedly trained to do, is indeed needed in conducting R&D programs in the social sciences. Furthermore, most physicists who decide to go this route will be pleased to find that their training and discipline will not go unused and that their efforts are appreciated.

Mitchell J. Rycus
Ann Arbor, Michigan

The Silverman letter leading off the March issue (page 9) needs challenging. The phrases "...who can not find employment, ... will not find employment in the foreseeable future... stand little chance of ever being reemployed in a technical area or in any area for that

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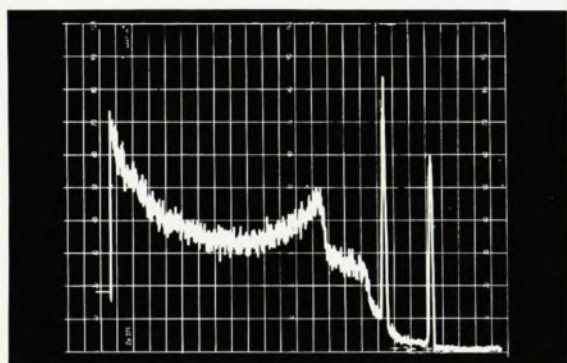


Fig. 1. Nuclear Research : Co^{60} Spectrum with $\text{Ge}(\text{Li})$ Diode.

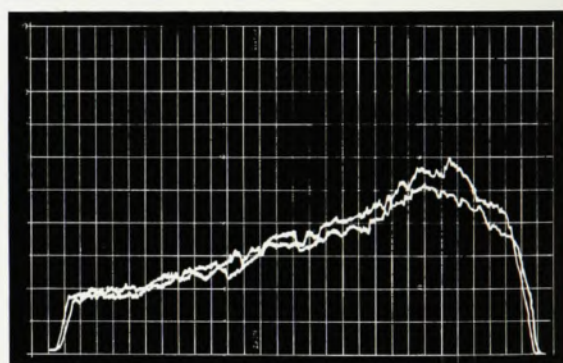


Fig. 2. Nuclear Medicine : Renogram taken with ^{131}I Ortho Iodo Hippurate.

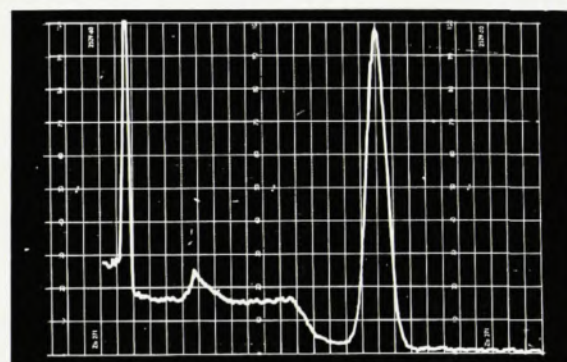


Fig. 3. Educational Purposes : Spectra of Cs^{137} γ -Rays using ELSCINT Detector Base, Model EB.

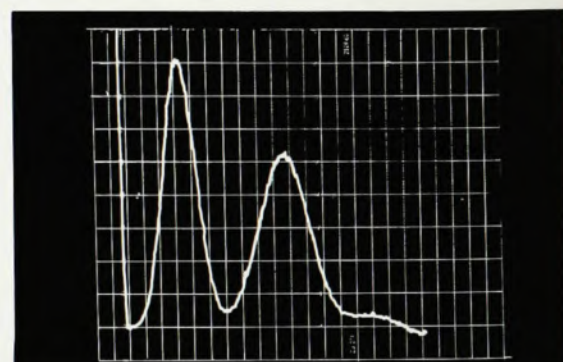


Fig. 4. Mössbauer Spectroscopy : Co^{57} , 6 KeV X-Rays and 14.4 KeV γ -Rays.

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letters

matter..." are unconscionable.

We technical people are experiencing a period of deep and painful readjustment, for sure. The sharp decline of spending on space, the nucleus, and defense, and its shift to people and environment, will result in undiminished demand for technical effort, even though this will take time to formulate and come into focus. The problems calling for technical solutions (aside from those, equally urgent, calling for social solutions) have apparently never been greater or more pressing, and the physicist's capability to contribute to these solutions will in the long run continue to be recognized.

It will help if the physicist recognizes, himself, the breadth of his capacity. Specialization is only habit of thought. Changing fields can always be sharply beneficial both to the individual physicist and his sense of well-being, and to his useful output; fear of venture into totally new problem areas is—to paraphrase the old saw—understandable, natural, almost universal, wrong.

It will be wise not to sit back and wait for those overly swayed by philosophical fluctuations to develop the market for our talents for us. The time to wade out into these shifting currents, to identify some of the myriad technical problems and opportunities, to rank these as closely as possible with real human needs—whether short range or long range, local or universal, to take the responsibility for initiating work toward their solution (and incidentally to support ourselves in the process), is now. The one to do it is he who is best prepared to do it. Have a look in the mirror.

W. A. Thornton
Cranford, N. J.

Handicapped groups

In response to your editorial in the April issue (page 84) you may be interested to learn that several minority-group scientists have organized a national committee [Committee for Minority Participation in Physics, W. E. Henry, chairman (Howard University), F. R. Norwood, co-chairman and secretary (Sandia Laboratories)] to augment the development of scientists and technicians among the minority societies. One of the principal problems faced by this committee will be finding ways to bring this effort to the attention of members of minority groups who may not realize that a small number of their members have survived the obstacle course. Several means come to mind, and some avenues will be explored with firm determination, but it is to be noted that placement of minority-group per-

sons may test the extent to which the present-day scientist's objectivity has been conditioned by his social environment.

It seems clear that the long periods during which the occupations open to the minority members have denied them a prestige education—short of living a Spartan routine—have taken their toll. It is no longer a question of working at peak efficiency just to keep up; rather, the question will be in what manner and how soon minorities may reach the starting gate. It is also clear as a result of our recent enlightenment on the plight of the minority-group member that he should not be flatly denied should he ask for more than the average assistance to help begin his career.

J. V. Martinez
St. John Fisher College
Rochester, New York

X-raying biomolecules

In his article "Mossbauer spectroscopy and biophysics" (February, page 35) Charles Johnson states that "because biological molecules have high molecular weights (between 10^4 and 10^6 g/mole), they are not amenable to structural analysis by x-ray diffraction." Max Perutz was awarded the Nobel prize for the structure of hemoglobin (molecular weight 6.6×10^4) determined by x-ray diffraction analysis. Since that pioneering work, many other molecules with molecular weights in the range 10^4 – 10^5 g/mole have also been successfully studied. No structures with molecular weights in the range 10^5 – 10^6 have yet been determined, but there are no insuperable obstacles to success here. Further, Johnson suggests that knowledge about the state of the iron in iron-proteins is sufficient to understand how the molecule works. This idea grotesquely oversimplifies the complexity of the problem. For example, cooperative behavior among the subunits of hemoglobin can only be understood with the full, three-dimensional structure of the molecule in hand.

Eaton Lattman

The Johns Hopkins University
Baltimore, Maryland

The author comments: Lattman is quite right in pointing out that the beginning of the article oversimplifies the problem of understanding biological molecules. The article was an edited version of a paper presented to the Magnetism and Magnetic Materials conference in Miami. The offending distortions were introduced in the editing process and were not caught by me when I approved the edited version forwarded

Continued on page 81

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