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letters

vember issue of PHYSICS TODAY? Fifty years of physics in America. A pretty impressive issue; nearly 300 pages and all those shiny ads.

Second physicist—I have it, but I haven't read it yet. Waiting for the football season to end so I can fill a cold Sunday afternoon. What is in it? I expect masterly expositions of different fields of physics: solid-state physics, elementary particles, nuclear physics, atomic physics, astrophysics, all that good stuff.

F. P.—Well, yes and no.

S. P.—What do you mean yes or no?

F. P.—What I mean is, yes, for solid-state physics, atomic physics, and so on; (except elementary-particle physics enters under the colors of unified field theory, quite good, too, as you would expect from Weisskopf) but a no for nuclear physics.

S. P.—No nuclear physics?

F. P.—That's right. There is a section on accelerators including the obligatory old-fashioned photograph of Lawrence and collaborators perched on a cyclotron, but there is nothing on nuclear physics as such.

S. P.—I don't believe it! Nuclear physics gave birth to all of modern physics. Are you sure; there is nothing on nuclear reactors?

F. P.—Nothing; they must consider that technology.

S. P.—But surely neutron cross-sections, the Breit-Wigner formula, diffusion, Monte Carlo calculations, fission, all that is physics.

F. P.—That may be so, but it's not PHYSICS TODAY. Must be Physics Yesterday.

S. P.—O.K. But how about things like nuclear reactions, the statistical model, the shell model, nuclear-matter theory, direct interactions, nuclear structure, nucleon-nucleon forces, isospin, neutrino mass, anything?

F. P.—There is a picture of Maria Goeppert-Mayer on the cover. First one, in the second row.

S. P.—How about modern accelerators, new electrostatic machines, sector focused cyclotrons, proton and electron linacs; all the modern developments for the acceleration of heavy ions. All US developments in the past 50 years?

F. P.—There is a small photograph of the German heavy-ion linac at Darmstadt—as an example of atomic physics apparatus.

S. P.—I suppose there is nothing on meson-nucleus interactions, giant resonances, states of very high angular momentum, few-nucleon systems, nuclear masses, backbending, orbiting, Hartree-Fock, Hauser-Feshbach, Bohr-Mottelson?

F. P.—You guessed it.

S. P.—Let me try a different approach. Is there no mention of the role of nuclear physics as the link between neutron cross-sections and the abundance of the elements? Or about nuclear medicine along with all the radioisotopes, detectors and analyzers that make it possible? Anything on that?

F. P.—Well a little. Rosalyn Yalow gives nuclear physics a lot of credit for developing the tools that made radioisotope tracer work in biology and medicine possible. You know her prize was for work in radioimmunoassay, which is related. Biologists seem to think nuclear physics is interesting and valuable.

S. P.—But nuclear physics as a science, nuclear technology as an energy resource, or nuclear physics as a source of diverse application to so many other sciences or to practical ends; there is nothing on that?

F. P.—Nothing.

ALEXANDER ZUCKER

Oak Ridge National Laboratory
Oak Ridge, Tennessee

1/82

Our apologies to nuclear physicists—our plans to cover their subject did not work out as we had hoped. The Editors

Astronomers in Washington

Your July cover story "Astronomers in industry" was very eye-catching, because I am one. In an effort to observe the extent of this phenomenon, I examined the list of members of the American Astronomical Society and noted members with nonacademic professional addresses in the Washington, DC metropolitan area. The following lists of public and private firms show the number of members employed by each on the right.

Federal Agencies

Arms Control and Disarmament Agency	1
Bolling Air Force Base	2
Carnegie Institute of Washington	6
Defense Mapping Agency	1
National Academy of Sciences	1
National Aeronautics and Space Administration (D.C.)	11
National Aeronautics and Space Administration (Greenbelt)	130
National Bureau of Standards	8
National Geodetic Survey	1
National Oceanic and Atmospheric Administration	2
National Science Foundation	6
Naval Research Laboratory	42
Office of Technology Assessment	1
United States Naval Observatory	34
United States Naval Sea Systems	1

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Institute of Scientific and Space Research	1
JAYCOR	1
JFM Associates	1
McKinsey & Co.	1
MITRE Corporation	1
OAQ Corporation	1
Science Applications, Inc. (SAI)	1
Systems and Applied Sciences Corporation (SASC)	5
System Planning Corporation	1
Technology Service Corporation	1
Wood Associates	1

Perhaps it would be helpful to the new astronomy PhDs if this kind of list were prepared for all areas of the United States. They should know where to find many of their predecessors.

G. STANLEY BROWN
JAYCOR

8/81

Alexandria, Virginia

Predicting the future

A few comments on the November 50th Anniversary Issue, particularly Norman Ramsey's article, "Physics in 1981 $\pm$ 50" (page 26).

► One quite safe prediction that Ramsey missed could have been based on the cover page, which showed photographs of the 1931-1981 Nobel Prize winners in physics. It appears quite clear that a sure way to avoid the Nobel Prize would be to sport a beard.

► I am reminded of the 50th Anniversary Issue (May 1962) of the Proceedings of the Institute of Radio Engineers, which contained 918 pages of advertisement-free text. Under the heading, "Communications and Electronics—2012 A.D.," 55 outstanding Fellows of the Institute presented, in 94 pages, their views regarding future progress in eight broad categories. With 40% of the 50 years now behind, I recommend that future predictors review the scores of the IRE predictors. As expected, many of the most imaginative predictions have yet to be realized. On the other hand, it is significant that experts in their own fields did not anticipate wideband communication utilizing fiber optics (gas-filled pipes were discussed), nor was there any indication that the present fantastic density of very large scale integrated circuits would be realized so soon. One favorite prediction of the period, that of the television "picture on the wall," was made and claimed to be just around the corner—where it still is.

► A thoughtful comment on the art of prediction is the first paragraph of C. G. Suit's paper, "The Potential of Progress: An Optimistic View":

However diverting it may be to gaze into crystal balls it is well to

realize that they are essentially mirrors, for they reflect only the philosophy of history that the viewer happens to embrace at the moment. Predictions tend to be projections of trends or, if not trends, experiences; and trends themselves are quite relative, based as they are upon individual interpretation of past and present events. It has been said that there is no history, there are only historians. So also, in this sense, there is no future, except in the minds and abilities of creative and perceptive people, who will give substance and form to the future patterns of nature.

In reviewing the anniversary issue of the IRE Proceedings, I found that most predictions were, indeed, rather ordinary extrapolations of the then-present art.

► The section in PHYSICS TODAY, "Looking back on books and other guides," was very interesting. One significant point of interest to me is that three contributors (Pauling, Hofstadter and Townes) spoke favorably of the influence of Ed Condon. Condon was my boss for the few years he was director of research at Corning Glass Works. The power of his intellect and personality was impressive. I was 50-ish at the time, perhaps too late for a change. However, to this day the younger men here still speak of his influence. Frequently I have pondered on the course Condon's career would have taken had he not turned to industry (Westinghouse, National Bureau of Standards, and Corning Glass). I am convinced that had he stayed in the academic world his picture would have been among the other Nobel Prize winners on the front page.

After leaving Corning, he continued as a consultant until his death and visited here regularly for many years. During this period I lunched with him many times and I recall with pleasure the stimulating discussions on many subjects. The enthusiasm and spirit of the man was tremendous.

JOHN L. SHELDON
Corning, New York

12/81

Physicists are "frustrated"

The objectivity of science and especially of physics is reflected in its formalized language. Subjectivity is suppressed to such a degree that the attribution of a physicist's name to a formula is a subtle way of taking out its personality.

Some exceptions exist with the use of words like "color" and "charm"—referring, however, to objects or qualities as seen from the outside. Recently a ser-

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