editorial

Physics forty years from now

In this special issue we commemorate the 40th year of the American Institute of Physics. The expected thing to do in celebrating the Nth-year anniversary of something is to make predictions about how things will look in another N years. If some readers question what personal interest our current audience could have in the state of things in the year 2011 let me point out the mildly surprising fact that more than half the people reading *physics today* today will still be alive and (we hope) reading our journal 40 years from now. It turns out that the majority of physicists in the country are under 35 years of age.

But what can anyone possibly predict for 2011? Of course, we can be certain, barring a nuclear war, that the population of the US will have reached 300 000 000 by that date. The key question for physics is will the population of physicists show a comparable increase. The answer, as we know from the current job crisis, will depend on the system of values embraced by our society during the next 40 years. As things stand now almost any movie star or television personality enjoys greater esteem in the public eye than the most renowned of our Nobel-prize-winning physicists.

To attempt to predict whether the values of society can change for the better we need to believe that we can explain how our national values have come to what they are at present. A compelling explanation, which leads to a pessimistic outlook, was proposed 20 years ago by David Riesman in his *Lonely Crowd*. He theorized that civilizations experience three major phases of development: 1. A tradition-bound phase, typical of primitive cultures, in which the society remains static and innovation is not encouraged. 2. A pioneering phase in which the society expands rapidly in many ways—population, land area, technical knowledge and so on. Individual initiative and achievement are highly valued. 3. A final, third phase in which growth declines and the primary role of the individual becomes that of consumer rather than achiever.

Already 20 years ago Riesman was arguing that American society was well into "phase three." The history of our society since then, if anything, has made it easier to conclude that the phase-three condition is the eventual fate of all civilizations. Once a society has evolved to the point where its political, economic and communication systems become monolithic in nature, it would, indeed, seem that the individual's most important function becomes that of consuming the mass-produced communications and goods that issue from the system. Except possibly in a narrow occupational specialty, the average person is not encouraged to be self-reliant. It is assumed that simple tasks such as rewiring a lamp or replacing the tubes in his television set are beyond him.

In our phase-three culture, is basic research in physics coming to be regarded as an old-fashioned pioneering activity left over from another age, which will diminish rapidly in importance by the end of the century as shortages of natural resources focus still more attention on the business of production and consumption?

This is a bleak prognosis—but where are the arguments that can be raised against it? The only thing that occurs to me is the image (now familiar) of a long-haired, college-age youth tramping along a city street in frontier clothes with camping gear slung over his back. If there is one thing we can say with certainty about the values of the young people it is that they insist on being self-reliant. They reject the material comforts of Riesman's phase-three consumer society. They *want* to be pioneers! As Charles Reich argues (in *The Greening of America*), perhaps we are seeing a rebirth of individualism among the young in our society, which could refute the depressing predictions of the Riesman model. We bygone-age pioneers—physicists and other scientists—can only welcome such a movement but we would have to point out that in this age the meaningful frontiers will not be found by camping in a street-people commune in Harvard Square. The frontiers worth pioneering today are those that involve using one's mind to advance some area of human knowledge—first to understand and appreciate what is already known and then to extend that knowledge.

Where physics stands in the year 2011 may depend more than anything else on whether the new pioneering spirit now in evidence proves 40 years from now not to have been a fad but a true philosophical revolution that changes the values of our society.

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