editorial

Reaching steady-state employment

There are indications that we are about at the crest in the rate of production of PhD's. But a satisfactory *steady state* in the employment of the annual increment is not in sight. That will be reached when the rate of departure through retirement and other causes, plus the rate of creation of new jobs equals the rate of production. The rate of creation of new jobs is the only one of these variables that can change quickly, which is of course why we have looked to it for immediate alleviation.

The lengths of time and total changes that would be involved in reaching a new steady state are of interest. A pair of brackets that are approximate in the extreme, but perhaps useful, can be obtained by analogy to radioactive build-up and decay. We can for instance hold the number of jobs constant and let the PhD production rate fall until it matches the job turnover. At equilibrium the rate will be about one third what it is now and the time constant with which it will be approached is about 6 years, the time for training a PhD. Or we can hold the PhD production rate constant and create new jobs sufficiently fast so that each year's new crop is accommodated. In this case the equilibrium number of jobs will be about 3 times what it is now, and will be approached with a time constant of about 30 years, which is a figure I take for the average time in the profession (turnover time). The interesting point is the time constant in the second case. It shows that the creation of new jobs would have to be a long continuing business; not a one-shot correction.

If we can have any control over which course we shall take, I believe we should try to make it more like the second case than the first. I think our society will need that much physics. I do not think this can be accomplished by trying to make more jobs of the same old kind. Rather, it will be accomplished by broadening the role of physics and by improving the match between the variety of physicists available and the opportunities and the work to be done. We should not demur at the 30 year time constant. This is about the time that was spent in narrowing our base since World War II.

Some ways are available for trying to broaden the base of physics. PhD's who are turning all the stones for jobs are trying to do this, but they lack the prior preparation. Faculties might well start explicit programs whereby the graduate students would become knowledgeable about many possible roles for physicists in the modern world—or the thesis advisors might take this responsibility. One would expect this joint effort to go beyond spotting existing slots, and come up with some brand new ones—otherwise there would be no real gain. The internship and exchange programs now under consideration for Federal support will provide the laboratory for this experiment.

Being a right-thinking physicist, I believe society would benefit from more teaching of physics. More jobs would be opened up. The cultural type physics course is an obvious challenge, and it is being worked on. Still, a remarkably small percentage of the students in a big university take physics when it is not required. A less obvious challenge is the fact that the BS in physics is not enough used as a starting point for careers outside physics. It can be excellent basic training for many careers. But many departments have physics major programs that are designed and taught as preparation only for physics graduate school. There is good progress however; some excellent new programs are appearing.

A remark about matching: If the mix of physicists in the various subfields could respond more easily to shifting opportunities and needs, there would be more jobs and more value rendered. Actually, the system is quite rigid. To take an example, a given amount of research support in field theory begets a predictable number of new PhD's in field theory. Somehow the number and specialization of PhD's produced and the kind and amount of research supported will have to be more decoupled, so that they can respond to the needs individually. Another aspect of matching relates to the time dimension: the life cycle of the individual. A person's talents are different at different stages of his career. For example, some of the best applied physicists have metamorphosed into that form from an earlier career in basic research. Freer metamorphosis would make for a better continuous match between the available talents and the opportunities, and perhaps relieve some log jams, like the one in the faculties. More financial stipends to facilitate a reorientation in midcareer might encourage this.

We are in no sense running out of possible solutions. I am optimistic about the future.

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