

A Quiet Place to Think

MANY questions should be often asked although they have no answers. Some came up when letter writers discussed American Physical Society reorganization in *PHYSICS TODAY* last month. Others are suggested by the concluding sentence of Friedrich Hund's August article: "And understanding is no longer pure physics."

What is physics? Where are its external boundaries and its internal subdivisions? What are its goals and how should it contribute? When should it build bridges and when enlarge man's comprehension of his place in the universe?

IF you find answers to such queries, they will probably be out of date tomorrow. Surely the set that has been acceptable to one age or decade has looked pretty silly to another. Newton, we are told, felt that he was wasting time owed to theology when he worked out his laws of motion. Many changes occurred between 1900, when some thought all physics had been discovered and only computations remained to be done, and 1910, when quantum theory had begun to grow. Bohr's motivations in finding the orbits were different from those that urged his work on chain reactions. And physicists who, as undergraduate majors in the '30's, felt uncertainty as to whether engineers would give them jobs could get doctorates on the post-war GI bill with no doubt whatever that work was waiting for them.

WE HAVE trouble enough with the everyday questions of existence and have no answers for the unanswerable. But we can think of some answers that we hope other people *won't* arrive at.

We hope, for example, that physics will not be fractured into many noncommunicating subdisciplines. We suspect that there will always be an electrical engineer around to build a laser and an optical engineer to use its beam. But that combination of optics, molecular diffusion, quadrupole moments, electrical resonance and energy-exchange cross sections that led to early masers and lasers would be unusual in an engineer's repertoire, and we feel that physics plays its proper role in syntheses of this type.

We hope, too, that physics will never become too practical. Practical matters have a way of taking care of themselves; hard knocks and economic

necessity are always available to teach people about them. But ivory towers and ivy-covered walls are harder to come by and probably in danger of extinction if someone does not worry about their conservation. When they are gone, where is the practical man of affairs to stumble on the ideas of Plato, the physics of Galileo and the uncertainties that led to wave mechanics? How is the future to find a Kepler or a Rayleigh?

Of course there is always this good practical reason for studying the impractical: later on it turns out to have tremendous practical value. Before anyone had found any practical reason to do so, Einstein worried about relativistic transformations, Rutherford studied nuclear reactions and Boys wrote a good book about soap bubbles. The practical values came later.

To look for such motivation (except when talking to congressmen) misses the point, however. A certain type of person is likely to study physics for understanding and to grow to his full height while he is doing so. Create a climate that turns him aside into music or philosophy, and you shake off some of your best and most inspiring friends. Better lose the next patent than the next brilliant idea.

WE LIKE to think of physics as a quiet place in which to think and dream. Let the practical men build devices, we say, and let them specialize as hard as they want to in electricity or mechanics or reactor kinetics. But somewhere at the center should be a home for the man who wishes to understand as broadly as he can the elements of many subdisciplines and the relations among them. We would encourage a man to move into this center and out again as a broker might read Frost after a hard day at the stock exchange and then go back to work. If the only practical contribution were through engineers who got part of their training in such a place, this state of affairs would be all right with us. When a basic discovery led someone living there to the solution of a good, practical problem like building a klystron, we would encourage him to go off and be an engineer for a while. But when a desire to understand became the strong motivation, he should always have a home to return to and to send his sons to. The thrill of understanding has always spawned the best and most ennobling of physics.

—R. Hobart Ellis Jr