Letters

Parapsychology Not Guilty

Under the heading "A pseudo experience in parapsychology" (Letters, 18 June, p. 1541), Luis W. Alvarez tells of a coincidental experience. He ends his account by saying that such coincidences "are reported in the parapsychological literature as proof of extrasensory perception. . . ."

I have long been working with extrasensory perception and with the general field of parapsychology, and on the basis of my knowledge and experience I can assure Alvarez that no serious worker in this field would ever think of his type of coincidence as in any way parapsychological. His case involved the unusual coincidence of finding two similar names in the same newspaper. Parapsychology deals with a type of communication between person and environment not mediated by the sensorimotor system. It is concerned with coincidence and probability theory only in the same way that any other branch of natural science must be.

There is another aspect to the misunderstandings in the letter. In my 40 years of work in parapsychology I have not come upon any attempt to base a serious conclusion upon spontaneous case material even when such material does belong to the parapsychological category, as that cited by Alvarez does not.

If Alvarez or anyone else wishes to become acquainted with the parapsychological literature to which he refers, a request for a reference list will be promptly filled.

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The letter by Alvarez is a variation on a theme which should be frequently repeated to the swelling audience of overeager followers of the popular parapsychological literature. Essentially, the point is that the *statistically improbable*, with a sufficient number of cases, can also be the *frequently observed*. The Sunday supplements abound in such improbable coincidences as the one cited by Alvarez, coincidences whose frequency of occurrence he estimates at approximately 3000 per year in the population of adult Americans.

Unfortunately, the figures he gives cannot be directly applied to the so-called "spontaneous cases" most frequently cited by the more serious parapsychologists. These cases do not fit the relatively simple model he entertains, yet they are the core of most serious arguments in favor of extrasensory perception. In general, these cases concern coincidences of a much more specific nature—for example, the thought of a known person's *death* in a 5-minute period just before learning of that person's death, or (perhaps more typically) the thought of a known person's *death at a particular time by a particular agent* just before learning of that person's death at that time by that agent. Clearly, such coincidences are much less probably than the simple "recollection of a known person in a 5-minute period just before learning of that person's death." Thus, such events should occur much less frequently than the events specified in Alvarez's model. In the absence of specific probabilities on this more specific level, one's impression is that the actual frequency of such "spontaneous cases" is many times greater than even a liberal frequency estimate using the Alvarez figures as a base from which to proceed.

Thus, while Alvarez has offered a solid rejoinder to the popular press, he has not offered information relevant to the evaluation of the source of the issue: the more serious parapsychological literature. It would appear that the latter information would be the more appropriate and worthwhile for the inquiring scientist.

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Alvarez's reduction of some "evidence" for extrasensory perception to impression by positive coincidences invites the reduction of some further "evidence" to the overlooking of negative instances.

When I was a young instructor I awoke in the small hours one morning with a feeling which I had never had before and have never had since: a compelling feeling that something terrible had happened at my parental home. Habitually skeptical about such things, I resolved to record this experience carefully and check it with whatever the reality might prove to be. With that resolution formed but not carried out, I turned over and went to sleep. Upon waking, I was too preoccupied with my teaching to think of the "revealing" experience, and did not think of it again until, within a week, a student asked: "What about those feelings you get that something bad has happened at home, and then you get a message that it has happened?" This reminded me suddenly of my vivid experience and faint resolution, which otherwise I suspect I would have forgotten completely. Thus I was able to cite the experience together with the news, which had come meanwhile, that all was as usual at home.

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What Professors Are For

The sound remarks in Abelson's "What are professors for?" (18 June, p. 1545) suggest another question: What do professors get? Abelson is correctly sensitive to the fact that students are increasingly deprived of human contact by changes in the techniques and the social conditions of modern higher education. What needs to be understood as well is that recent trends are depriving professors of the satisfactions which teaching should bring. The losses are mutual because the pleasures of teacher and student are mutual and interdependent: the growth in the mind and the powers of the student must be visible to the teacher, the pleasure of the teacher upon seeing this development must be visible to the student, and so on.

As such shared experiences become rarer in American colleges and universities, the students are the first to complain, because they are more re-

sponsive to their own needs and expectations. But when teaching begins to lose its proper rewards for the teacher (whether or not he is aware of the loss or frustration), the teacher will flee and the fabric of the system will decay. The rewards of the teacher compose the warp of this social fabric, while the intermeshed rewards of the student make up its web. The system which best provides appropriate conditions is the tutorial arrangement, the next best things being the group tutorial, the seminar, and the small class. The more our arrangements depart from these ideals, the greater is the strain on the system and the less is it effective and satisfactory. I see the current excessive flight into graduate education in considerable part as an attempt to realize certain human conditions missing at the undergraduate level. Yet as graduate education becomes more impersonal, new arrangements such as postdoctoral programs and institutes evolve to meet persistent needs for satisfactory communication. I recognize that advances in knowledge also demand the prolongation of education, but that factor does not fully explain the changing state of affairs, even coupled with the factor of increasing social and economic demand for higher degrees. The fostering of graduate education reflects in part an implicit need to teach in a certain way, as well as a need to be taught in a corresponding way. If professors become aware of the attainable sources of their vocational satisfactions, they may become capable of designing both undergraduate and graduate systems of education which are purposeful, effective, rewarding, and therefore viable.

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. . . Unlike the editor of *Science*, I believe that the most neglected person on a university campus is not the undergraduate; it is the graduate student. The biggest gap today in American higher education is in thinking about graduate education—as distinct from finding bookkeeping devices to add more federal graduate "traineeships." . . . It is a remarkable tribute to the herd-instinct that in the Niagara of tears spilt over the neglected undergraduate and the horrible influences of federal money on his education, few have wept a tear over the more immediate victim of the research-orientation in universities—graduate education, into which universities put relatively little of their own money, thereby often making their graduate programs subsidiaries of the federal research structure.

What keeps us from making any progress is the belief that undergraduate teaching and research are, or should always be, connected in some way—that only the man who is active in research in his field can "challenge" the undergraduate. There is very obvious empirical evidence against this. We are all fully aware of the excellent undergraduate student produced for decades in the small liberal arts college, where "research" was barely present. You do not need to conduct research yourself in order to infect the young men in your classes (or your home) with the "vision" of science. Indeed, most of the good scientists I know are too busy to have much personal contact with students. Many have a narrow view of science rather than the catholic view that undergraduates need. It is unsound to point to the occasional brilliant exception like Linus Pauling, who has done both research and undergraduate teaching so well, and suggest that he be the pattern for modern teachers. In fact, I doubt seriously whether a 30-year old Pauling today would develop the way the original did. More likely than not, he would be deeply immersed in his research and in the federal science enterprise, and find his teaching outlet in graduate students.

A university really consists of a federation of two types of institutions—one a collection of undergraduate colleges, and the other a graduate-education-and-research enterprise. The radical restructuring of the latter complex would do a great deal to improve graduate education. It would also bring universities into a more defensible position vis-à-vis the public purse, which provides most of its money. The eventual abolition or substantial weakening of the ironclad departmental structure and the introduction of interdisciplinary research-and-teaching groups are virtually certain. Such groups can become the communities of learning where some of the personal interaction can take place, if only at the graduate level. I am sure that the creation and operation of such groups would be much more effective if they were recognized as having a perfectly legitimate teaching function, alongside of but administratively separate from the undergraduate programs. Such an administrative innovation would not exclude the exceptional Nobel Laureate from teaching freshman chemistry, but it would relieve undergraduate teachers of the ridiculous pressure of having to pose as researchers in order to be advanced.

The answer to the question "What are professors for?" can also be stated: To teach undergraduates, to teach graduates, to do research. My thesis is that there are two distinct though overlapping functions here with the division after the first comma, and that the sooner the universities recognize this division, the sooner we will be able to help professors be what they are supposed to be: Type-I professors inspiring undergraduates by their enthusiasm and desire to communicate the fundamentals and the overview of the field, and by a human relatedness which the earlier formative years demand; and Type-II professors functioning in the new communities of science (groups of professors and their postdoctoral and graduate students), where there is a thorough involvement in the real world of science (including government and industry and contracting and consulting). Not only should this break the traditional isolation of the academic community from society; it should encourage the adventure of tangling with the complexities of our modern world. If Type-II professors can teach this to the graduate students who will become the teachers of undergraduate scientists and the powerful science-administrators of tomorrow, who will claim that this is somehow less important than the personal factor in undergraduate education?

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Project Orion

Freeman Dyson's article on the demise of Project Orion ("Death of a project," 9 July, p. 141) is useful and interesting. One must, however, question his conclusion that "this is the first time in modern history that a major expansion of human technology has been suppressed for political reasons."

There has been no "suppression," but only a government determination that public funds will not be expended