Letters

Can One Predict Success in Science?

On 19 April 1876, David Starr Jordan, at that time a young ichthyologist and teacher of zoology, wrote to Edward S. Morse, director of the Peabody Academy of Science at Salem, Massachusetts, as follows: "I am a candidate for the chair of natural history in the University of Cincinnati. The acting president of the institution writes me as follows: 'I think that you ought to get a recommendation if possible from Ned Morse. He has lectured here, I believe.' If you can conscientiously give me a word or two, I shall be very grateful." It is apparent that Morse did not give the recommendation, for on 26 April Jordan wrote him again, as follows: "I wish to thank you for your letter and to say that I fully appreciate the reasons why you do not wish to give me a letter of recommendation. I will say for myself that you are the only naturalist not *closely* acquainted with my work to whom I have applied for letters and I should not have taken the liberty of writing to you were it not that the acting president of the University had specially mentioned your name as one from whom word would be particularly desirable."

Two years earlier, Jordan had studied fishes under Frederic W. Putnam at the Anderson School of Natural History, which Louis Agassiz had founded on Penikese Island. Putnam at that time was director of the Peabody Academy at Salem, but he left the following year to become curator of the Peabody Museum of American Archaeology and Ethnology at Harvard University. He also was a leading ichthyologist of the day, having been trained by Agassiz. It was unfortunate for Jordan that Morse, Putnam's successor at Salem, was called upon to make the recommendation rather than Putnam, who was much better acquainted with Jordan. The latter frequently turned to Putnam for aid and advice, which were given wholeheartedly. Jordan wrote Putnam on 11 January 1875, "You must excuse me if I sometimes bore you with questions and if you can't spare time to answer me put the letters in the stove and no harm done, but you are almost the only ichthyologist who doesn't prefer to keep all he knows to himself lest somebody forestalls him and makes a genus first."

Jordan pointed out in his autobiography [D. S. Jordan, *The Days of a Man* (1922), vol. 1, pp. 149–153] that in this period of his life (1875–78) he failed to get an appointment at any of the institutions to which he had applied. These included Purdue, the University of Wisconsin, Princeton, Vassar, Williams, the University of Michigan, the University of Cincinnati, Cornell, and the Imperial University of Tokyo. At the time, he was teaching in the Indianapolis High School and in Northwestern Christian University, which later became known as Butler University. In reference to his application at Cincinnati, he wrote, "I was selected for the professorship of natural history in the University of Cincinnati by the acting president, Dr. Henry Turner Eddy, my excellent teacher in applied mathematics at Cornell. But the then Board of Trustees failed to ratify, giving as the more or less legitimate reason that they already had among their dozen or so professors three from Cornell." As Jordan himself intimates, the reason given was more than likely one of convenience. Morse's failure to recommend Jordan must have been a significant factor. Jordan summarized the situation with the bold and honest statement, "Looking back over these various experiences, I am reminded that I never got anything I tried for." Analyzing the situation at a later date, with the advantage of hindsight, he gave the following explanation, "And it further occurs to me that for this there were three reasons which I did not realize at the time: I was bent on being a specialist in zoology; I had been trained at Cornell, a fountainhead of educational and other heresies; and I was a 'western man,' though not yet aware of the fact myself. Afterwards these same features seemed to appeal to university authorities and they, in turn, sought me out."

In time, Jordan became the leading ichthyologist of his day and, as president of Stanford University, one of the best-known educators in American universities. Ironically, he followed Morse as president of the American Association for the Advancement of Science after a lapse of 23 years (Morse was elected in 1886; Jordan, in 1909). Not only Morse but many others failed to recognize the budding genius of Jordan at the beginning of his professional career. Perhaps there is no way of predicting success in science.

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Laputans and Lemurians

The letter by Bargmann and Motz [*Science* **138**, 1350 (1962)] suggests an expansion of their theme. Pointing out that Velikovsky predicted the strong radio emission of Jupiter and the high surface temperature of Venus, they "urge, in view of these prognostications, that his other conclusions be objectively re-examined."

Fair's fair, of course, but why stop with Velikovsky? In describing Gulliver's third voyage, Swift remarked that the Laputans had discovered that Mars had two moons. Since this was written a century and half before Hall found them telescopically, we ought to try out some of the other remarkable experiments and devices of Laputa. Conceivably we have here the potential for a new scientific and technological revolution.

A still more inexplicably neglected field exists in the files of *Amazing Stories* for the years between about 1945 and 1950. During those years a series of narratives appeared, by one Richard S. Shaver, which purported to be only slightly fictionalized accounts of the author's memories of a former existence in vanished Lemuria. According to Shaver, the original inhabitants of Earth were wise, benevolent, and immortal; they possessed a science far in advance of our own. But as the sun

aged, its radiations became poisonous and produced debility and death. Most of the Lemurians abandoned Earth. Some remained, one branch becoming our own ancestors. The other branch degenerated completely, withdrew to a vast system of caverns, and became a misshapen, evil race of "deros." Coming upon some devices left behind by the Lemurians which project mind-controlling rays, the deros have amused themselves ever since by causing all types of aberrant thought and behavior in mankind.

Obviously Shaver has predicted (i) solar particle emission, (ii) the aging and mutagenic effects of ionizing radiation, and (iii) recent findings as to the effect of direct electrical stimulation of various brain centers. In view of these prognostications, his other conclusions must be objectively re-examined—unless, that is, one simply feels, as I do, that while one bad apple spoils the rest, the accidental presence of one or two good apples does not redeem a spoiled barrelful.

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The Possibility of Compound Formation by Helium

The recent letter "On the chemistry of inert gases" by George Wald (*1*) contains many points which deserve discussion. We wish to comment only on Wald's proposition that "it should be exceedingly difficult to prepare compounds of helium, in which the . . . 1*s* orbital is filled and no others are available. . . ." The statement is undoubtedly correct if one considers only ionic bonding, as in the first reported xenon compound, $Xe^{+}PtF_6^{-}$ (*2*), or covalent bonding with heavy atoms, such as appears to be present in XeF_4 (*3*).

However, helium has long been known to form covalent bonds in the species HeH^{+} and He_2^{+}, first observed in mass spectrometric studies of ionized gases. Recent mass spectrometric studies of the beta-decay of HT and T_2 gases have shown that the predominant products are $^3HeH^{+}$ and $^3HeT^{+}$, respectively (*4*). About 90 percent of the helium-3 product of the decay reactions is found as helium hydride molecule ions which survive the 10^{-4} sec transit time of the mass spectrometer (*5*).

A qualitative explanation can be given for the stability of these diatomic