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THE ACADEMIC REVOLUTION—Christopher Jencks and David Riesman, new foreword by Martin Trow—U of Chicago Pr, 1977, 606 p., \$7.95. First published in 1968, describes the characteristics and tensions of American higher education in all their contradiction and diversity.

ARCHAEOLOGY FOR EVERYONE—Mark Feldman—Quadrangle, 1977, 366 p., illus., \$12.50. Discusses the purpose and scope of the amateur archaeologist in the U.S., permission required, training and discipline, institutions for historic preservation, archaeological sites, museums, the tasks of excavating, recording and preserving.

EXPLORING THE GALAXIES—Simon Mitton—Scribner, 1977, 206 p., 22 plates, diagrams, tables, \$12. Astronomer describes for the nonspecialist the methods used for finding distances, the normal galaxies and the Milky Way, extragalactic research, quasars, radio galaxies, interacting galaxies, and the controversy underlying much of contemporary research.

FLYING TO THE MOON AND OTHER STRANGE PLACES—Michael Collins—FS&G, 1976, 164 p., photographs, \$6.95. Astronaut and now director of the Smithsonian's Air Museum writes about past and future spaceflights in a personal and highly readable style.

FRESHWATER BIOLOGY—L. G. Willoughby—Pica Pr (Universe), 1977, 168 p., plates, drawings, tables, \$12.50. Blending general treatment with discussions of recent research, the author presents integrated view of freshwater habitat, flora and fauna, thereby illuminating photosynthesis, food chains and other ecological principles.

FUTURE FACTS: A Forecast of the World as We Will Know It Before the End of the Century—Stephen Rosen—S&S, 1977, 535 p., illus. by Chartmakers, Inc., \$14.95. Succinctly describes technical innovations of forthcoming products, services, processes and ideas in the

fields of health and medicine, energy, foods and crops, transportation, behavior and society, construction and materials, communication, business, pastime, and environment.

HANDBOOK OF UNUSUAL NATURAL PHENOMENA—William R. Corliss—Sourcebook Project, 1977, 542 p., illus. by John C. Holden, \$14.95. Collection describes curious phenomena observed, mostly by scientists, in the categories of luminous events, optical and radio anomalies, unusual weather, mysterious natural sounds, strange tremors, unusual waves, falling material, and magnetic disturbances.

LANDSAT INDEX ATLAS of the Developing Countries of the World—The World Bank—Johns Hopkins U Pr, 1976, 19x13, multipaged, maps, paper, \$12. Atlas designed to assist developing nations in their planning activities, shows the satellite coverage available and describes interpretation techniques.

MATHEMATICS UNRAVELED: A New Commonsense Approach—James Kyle—TAB Bks, 1976, 280 p., diagrams, tables, \$9.95; paper, \$6.95. Presents the subject in a progressive, building-block way, from arithmetic to such computer-age skills as probabilities, Boolean algebra and topology, and shows how to put them to practical use.

MEGALITHS, MYTHS AND MEN: An Introduction to Astro-Archaeology—Peter Lancaster Brown—Taplinger, 1977, 330 p., 142 photographs and drawings, \$13.95. Astronomer's engrossing account of astronomy in the Stone Age. Examines the nature of early astronomical knowledge via the interpretation of ancient standing stones and such stone groups as Stonehenge.

METHODS IN EXPERIMENTAL BIOLOGY—Robert Ralph—Halsted Pr, 1976, 142 p., diagrams, paper, \$7.95. Presents introduction to the theory and practice of some of the most important techniques, from spectrophotometry to osmometry, radioisotopes and radioactivity.

... Creativity

separate variables—much less claim to be able to measure all of them. But factor analysts do see creativity in terms of several independent abilities, which can be applied to tasks in many areas. Factor analysts concentrate a great deal of energy on devising tests that can measure the proposed abilities separately, and their results are likely to appear in the *JOURNAL OF CREATIVE BEHAVIOR*.

One leader of this school is E. Paul Torrance, who told *SCIENCE NEWS* that "the facts do not support Wallach's contention" that many of the abilities measured by Torrance's creativity test are simply not independent variables, unrelated to IQ. Torrance admits his test is not "factor pure," but says the abilities he measures are independent of IQ. These abilities can also be taught, he says, in a "disciplined approach to problem solving" that can increase a person's creativity for many applications.

The opposing school of thought is less cohesive, but generally shares the idea that abilities worthy of being called distinctly "creative" are very few. Adherents spend little time on developing creativity tests and are skeptical about how well such tests relate to achievement

in the real world. Finally, they say that creative abilities mastered in one field are probably not much help in preparing one to be creative in another field.

Michael Wallach calls this group (to which he belongs) the "achievement-centered" school. He says that he declines to publish in the *JOURNAL OF CREATIVE BEHAVIOR* because he sees it as the "specialized outlet" of a group of "true believers," who have their own preconceived notions about what creativity means. Rather than relying on tests, scientists should investigate creative accomplishments in the real world, he maintains. When they do, he says, they find only specific sets of creative abilities for each task—not generalized problem-solving skills. These narrow abilities can still be taught, but not by training students in "general mind-wandering."

Such strongly held differences of opinion are, of course, common in science, and provide its strongest attraction as a spectator sport. However, the evident breakdown of communication between opposing sides in this issue and their apparent lack of mutual respect seem particularly ironic among researchers dedicated to exploring the creative impulse.

Divided as they are, the two schools nevertheless have some important tenets in common. The first is that at least some creative abilities (particularly fluency of ideas) are independent of IQ and have thus been missed in efforts to spot "gifted" children. Second, there is a shared conviction that creative ability—however conceived—can be learned, and that society has only begun to till the ground for nurturing creativity. Finally, an unaccustomed humility has settled over the whole field of intelligence testing. Some researchers have even proposed a "threshold model" of intelligence, saying that IQ doesn't really matter above a certain level (which would be different for each individual line of work). Above this level, they say, success depends almost entirely on other factors, creative and emotional.

Donald W. MacKinnon, at the University of California at Berkeley, for example, concluded that there was generally little connection between adult IQ and adult achievement above an IQ level of about 120. Specifically, he found that a scientist with an IQ of 130 was as likely to win a Nobel Prize as one with an IQ of 180. (Wallach concludes that the evidence does not so much support a threshold model of real intelligence as simply indicate that IQ tests aren't very accurate at their upper extreme.)

Whichever school eventually triumphs, society is clearly faced with an immediate challenge to identify "gifted" children, whose creative abilities have previously gone undetected, and to help all people recognize and develop their creative potential. In this way we may someday hope to tap the spark of genius that apparently lies in each of us. □

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