vices for rural communities. One section, for example, provides plans for building a 30-gallon-per-minute hand-operated irrigation pump with simple tools, from galvanized iron, barrel metal, wire, and wood. Another tells how to convert a steel drum into a boiler for purifying water. There are plans for constructing latrines, seed and grain cleaners, bamboo poultry houses, and simple concrete structures.

VITA, which is now headed by Benjamin Coe, a chemical engineer at General Electric's Waterford, New York, plant, has chapters in Morgantown, West Virginia; Rochester, New York; Santa Barbara, California; and New Holland, Pennsylvania. It also has an extremely active affiliation with the Institute of Food Technologists, which handles virtually all inquiries involving agriculture and food processing, and with the Engineers Joint Council.

—D.S.G.

ACE Study: Higher Education's Aloofness From "Occupational" Education Seems To Be Thawing

American higher education is suffering a mild attack of social conscience over its relative noninvolvement in postsecondary vocational and technical education.

In part because of the variousness of such education, a real vagueness has existed over jurisdiction and responsibility. The term "postsecondary vocational and technical education" attaches to no specific curriculum or type of institution and denotes on the educational map a sector lying in an undefined border area between high school and higher education.

The new interest on the part of colleges and universities in this kind of education seems to derive directly from recognition of the profound effect technological change is having on society. To oversimplify, it is now widely accepted that the undereducated become the unemployed. Only 20 percent of students go through college, and the dropouts, the delinquents, the low-skilled unemployables and career welfare cases are drawn largely from the other 80 percent.

In examining the system which it has helped to form to see how it can help create broader opportunities in the changing organization of society, higher education has understandably been attracted to postsecondary education where, by closeness, it can claim competence, and where the demand for graduates now exceeds the supply and shows promise of continued growth.

Seminars and symposiums on the general subject of automation and social change have abounded in academia for several years, and it is fair to say that the collective consciousness of the scholars is troubled not only by present difficulties and dislocations but by extrapolations of future ones.

One of the prophets most honored by quotation and imitation is Daniel Bell, Columbia University sociologist and a former labor editor of *Fortune*, who drew a convincing and intimidating picture of what is coming, barring war, in a paper called "The Post-Industrial Society."

Dispossessed Groups

Bell depicts a sort of intellectual's New Jerusalem in which dominance in the society has passed from businessmen to productive researchers. As technical competence becomes the criterion for status and affluence, Bell sees the creation of groups of "dispossessed" among those who have lost out in the race. Along with other informed observers he sees, for example, the relative economic position of the Negro deteriorating in coming years, whatever happens in Congress and the courts, because, unless drastic measures are adopted, educational opportunities for the Negroes are not likely to keep pace with technological change. This is why the second part of the civil rights rallying cry of "freedom and jobs" may prove to be the hardest to achieve.

The importance of gearing education to social change and creating the right kinds and amounts of "human capital" —which concerns many economists these days—has been one of the main factors that has influenced higher education to forsake its own version of splendid isolation in recent years and begin to think and act more as if it were a part of the nation's total education system.

One symptom of the attitude is a new study, *Man, Education, and Work: Postsecondary Vocational and Technical Education*,* published by the American Council on Education (ACE), the association which comes closest to being the voice of American higher education, or at least of college and university administrations.

The report, based on a year-long study backed by ACE, was written by Grant Venn, former president of Western State College, Colorado, who has returned to school work as superintendent of schools in Wood County, West Virginia; he was assisted by Theodore J. Marchese, Jr., who had senatorial staff and Peace Corps experience before joining the ACE staff.

A keynote in the report is struck by a reference to higher education as "part of a whole system of education that is failing to prepare individuals for a new world of work in an advanced technological society."

The larger part of the study is devoted to a useful history of vocational and technical education in the United States and to a survey of the present situation.

Venn's central argument is that the bias of the American school system has been academic and not "occupational" in the sense that the schools continue to be decisively influenced by their original mission of preparing students for college rather than for jobs, even though the majority of students have not, since the early 1900's gone on to college.

European Leadership

From the middle of the 19th century on, it seems, the major Western European nations were much more active in providing schooling in occupational skills—particularly technical skills—than the United States, a rather odd note in view of the American reputation for practicality.

A start in a new direction was made with passage of the Morrill Act in 1862, which created the land-grant colleges to foster the agricultural and mechanical arts. But it was not long before the training, which was aimed at what would be called middle-level manpower today, was upgraded into engineering and agricultural science, leaving a vacuum once more in occupational training.

Nearly two generations passed before the manual training movement of the late 19th century was finally to produce the vocational education program at the secondary school level that was launched by federal legislation during World War I (*Science*, 14 June 1963). And it is significant that the advent of vocational education was delayed by a long wrangle among labor, manage-

* Available from the publications division, American Council on Education, 1785 Massachusetts Ave., NW, Washington, D.C., $1.50.

ment, and agricultural interests as well as by the resistance of the educators then in charge of the schools.

For a number of reasons, vocational education developed as an alternative to regular high school education. There was little academic content in most standard vocational courses, so the student could not normally go on to college, and "Voc-Ed" became, in effect, terminal education.

At the postsecondary level, clear alternatives to college have been slow to emerge. Some area vocational schools offer advanced technical or specialized training, but in most cases this is not regarded as being of "semiprofessional" standard.

Junior colleges have in most cases aimed first at providing the first two years of conventional college training. In respect to occupational education, with the notable exception of the junior colleges in California and a few other places, junior colleges have not, says Venn, "run with the ball." Four-year colleges, with a few exceptions, have been half-hearted about their subbaccalaureate programs.

Technical Programs

Technical institutes, many of the best of which are privately run or attached to engineering schools, offer a heavily technical course of study, generally 2 years long, which prepares graduates for immediate employment.

Semiprofessional engineering technicians with 2 years of training in a technical institute, or the graduates of hospital-based courses in medical technology or x-ray technology, are perhaps the most readily recognizable examples of middle-level manpower.

Venn offers, in addition, the following list of technical occupations requiring postsecondary training: data processor, construction estimator, marketing specialist, technical secretary, illustrator, structural draftsman, production control supervisor, dental assistant, flight engineer, radiation technician, cartographer, technical photographer, color television monitor, practical nurse, food service manager, and government safety inspector.

Venn puts the case for more participation of higher education in this kind of occupational training in these terms. "Inevitably in the same way that pupilage and apprenticeship gave way to professional education in law and medicine, on-the-job training and apprenticeship are giving way to occupational education within the education system. The time has come for schools and colleges to recognize that new occupations of technology must be taught where they are best able to be learned."

The report's recommendations predictably call for further research, creation of national and state planning bodies, and the holding of area conferences to discuss the appropriate role of higher education in vocational and technical education.

The key recommendation is the flat one that "higher education should assume a greater responsibility for the education of youth and adults for occupational competence in the technical and highly-skilled occupations at the less than baccalaureate level."

It is unlikely that all institutions will respond equally to the tocsin. The large private universities and well-known colleges with national constituencies will hardly react to the same degree as institutions directly supported by public funds and with closer ties and greater responsibilities to a particular area or state. But the old *cordon sanitaire* prejudice in higher education against occupational education seems to have been breached.

As the attitude toward technical education within higher education changed from indifference toward engagement, signs began to appear that there was competition ahead. The rivals were the well-organized forces of the vocational educators—administrators and teachers—who see postsecondary education in technical subjects as their natural domain.

Cost Is High

Technical education is a costly affair. Not only are buildings and equipment expensive, but the right kind of faculty is hard to find and commands substantial salaries. It is fairly widely agreed that major expansion of technical education depends on sizable flow of federal funds. And some money has already been provided, in last year's National Defense Education Act and Vocational Education Act. Skirmishes over who should exercise influence over funds for postsecondary vocational and technical education were indecisive, however. And while he tactfully does not put too fine a point on the rivalry, Venn is probably right in the analogy and conclusions of his summary section on technical education.

"Technical education finds itself today in a position similar to that of vocational education some fifty years ago. As already pointed out, the question of need for a concerted educational effort to meet the manpower needs of the technical occupations has now been resolved. The need can be met only within the educational system, and society will insist that the job be done there. Decisions are going to be made. But whether these decisions will be made by educators acting within a consensus that this is a legitimate and necessary form of education for our time or by legislators reacting to societal pressures to get a job done is still an open question. The history of vocational education should suggest to all educators, particularly those in higher education, the importance of a vigorous, imaginative approach to the educational needs of the technical occupations."—JOHN WALSH

Announcements

The Smithsonian Institution and T. F. H. Publications, Inc., have begun a project to reprint publications in **ichthyology** and related fields. The publishing house will reprint chosen books and donate them to the Smithsonian, which will in turn sell them at not less than cost. Proceeds from the sales will be used to establish the T. F. H. Fund "for research, collection or purchase of fish specimens, explorations, and publication of scientific reports related to aquarium fishes." Suggestions of out-of-print books to be reprinted may be sent to Leonard P. Schultz, Curator, Division of Fishes, Smithsonian Institution, Washington, D.C.

The first reprint in the project is *The Fishes of North and Middle America,* parts 1–4, 1896–1900, by David S. Jordan and Barton W. Evermann; it is available from the Smithsonian's Editorial and Publication Division, for $25.

The National Institute of Arthritis and Metabolic Diseases is seeking patients for a study of the effectiveness of corticosteroids in treating **lupus nephritis.** The main objective of the study is to compare the relative efficacy of high dosage (50 mg) with moderate dosage (20 mg) corticosteroid therapy. Physicians are asked to refer suitable patients; there must be a definite diagnosis of systemic lupus erythematosus, supported by a positive lupus erythematosus preparation. Laboratory evidence

(*Continued on page 1390*)