# Building for a Science Career

**A career, in science or in any field, should be carefully chosen. The choice should not be made on the spur of the moment, but should be planned thoroughly.**

By FORREST L. SNAKENBERG

➤ TOO MANY PEOPLE put less consideration into the choice of their life's work than into the purchase of an automobile. Sometimes, the results are good, but far too often lead to a lifetime of frustration and regret. Since we spend so much of our time at our chosen work, job satisfaction or dissatisfaction inevitably extends into other phases of our lives as well.

The student with initiative and aptitude would be wise to consider a career in science or engineering. He should start to make plans for this career as soon as possible because the basic concepts that he learns in junior and senior high school will become the groundwork on which he will base his entire professional life. It is therefore important to stress the fact that he should take as much science and mathematics as he can in these years.

A good choice is an informed choice. To judge wisely, you must know what is encompassed by each profession, as well as the qualifications and preparation involved. Time was when we lived in an insulated world, and knew little of the world's work except as we personally came into contact with the various fields of endeavor. Modern communications have changed all this. An informed career choice now is as possible in remote areas as in the large metropolitan centers.

## Information Media

Television, through its educational channels as well as its entertainment programs featuring the professions, does inform us to some extent on the routines involved even though the facts are likely to be a bit glamorized for mass consumption. In addition, every professional group has its association, and every association is busily encouraging young students to enter its field of endeavor. Such career booklets, pamphlets, films and shows make a haphazard career choice inexcusable.

First of all, read and study. Every profession requires a good background of basic education. The schools require English, history, math and science not merely to provide drudgery for their students, but because these subjects are vital no matter what future specialization is chosen. Take even the "hard" or "tough" courses. With good teachers and proper student attitude, these are the courses that will be most enjoyable and rewarding. Deep down, you know it isn't any fun to "get by."

Strive to learn all you can, and attain good grades. Grades should be an indication of what you have learned, and do help gain entry to colleges and universities, and employment. It is the knowledge you have gained, however, that will help your future educational development and on-the-job performance.

Plan your high school curriculum so you will have the requisites for entering the college of your choice. Most science and engineering courses in college need the following prerequisites: English, four units; mathematics, four units including trigonometry; chemistry, physics or biology with laboratory work, two units, preferably a unit or more in each; history, two units, and foreign language, two units. A good rule would be to take all the mathematics and science your school offers.

Participate in as many extracurricular activities as you can without detriment to your actual classroom work. If you have an interest in your science courses, by all means go beyond the classroom assignments in your reading and experimentation. Your library should be used constantly. Enter science fairs, join science clubs, participate in field trips and scholarship competitions. Serious young scientists are usually most welcome at professional scientific meetings, and you will learn a great deal besides meeting professional scientists and engineers in the fields of your interest. If you have no science fairs or science clubs in your area, help to organize these activities. Information is available from Science Clubs of America, Science Service, Washington, D.C. 20036.

These activities all provide experience and information which will prove helpful in deciding your life's work. Even if you decide you do not want to have a scientific career, you will be a better layman because of your scientific knowledge and experience, just as knowledge of English, history, music, literature and art helps make a better-rounded scientist.

It is important to be well rounded, and the best time to concentrate on fundamentals is before specializing. You should know where you are heading, of course, and plan your college studies with a goal in mind. But avoid over-specialization until you begin your graduate work.

## General Background

Research, of any type, involves observation and measurement that rest ultimately on the mathematical disciplines. Physics, chemistry and biology all are important to any scientist regardless of his field. The more general courses in all the sciences you take, the better. Such a background will not only prove valuable regardless of your ultimate choice, but will permit a great deal of freedom in arriving at the final selection of a scientific career.

There is a growing need for scientists and engineers, so the financial rewards should be adequate. More important is the feeling of accomplishment and service that comes to those in creative tasks for our civilization.

Each individual must make his own final choice. Others can only inform, encourage and guide.

Following is a list of career selection aids prepared by groups interested in helping students make informed career choices.

Fremont Davis

*YOUNG SCIENTIST—Deborah Chase, now a junior at New York University, is shown at her summer job at the National Institutes of Health, Bethesda, Md. Debbie was a scholarship winner in the 22nd annual Science Talent Search, and won awards in the 12th, 13th and 14th International Science Fairs as a high school student.*

### CAREER PUBLICATIONS

**A CAREER IN PSYCHOLOGY**—American Psychological Association, 1200 17th St., N.W., Washington, D.C. 20036.

**CAREER GUIDANCE INDEX**—Careers, Largo, Fla.

**CAREERS IN ATOMIC ENERGY**—U.S. Atomic Energy Commission, Division of Technical Information, P.O. Box 62, Oak Ridge, Tenn.

**CAREERS IN BIOCHEMISTRY**—American Society of Biological Chemists, 9650 Wisconsin Ave., N.W., Washington, D.C. 20014.

**CAREERS IN HEALTH PHYSICS**—Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn.

**CAREERS IN INDUSTRIAL HYGIENE**—Oak Ridge Institute of Nuclear Studies, Oak Ridge, Tenn.

**CAREERS IN MEDICAL TECHNOLOGY**—Registry of Medical Technologists, Box 44, Muncie, Ind.

**CAREERS IN SCIENCE**—American Association for the Advancement of Science, 1515 Massachusetts Ave., N.W., Washington, D.C. 50¢

**CAREERS IN SCIENCE TEACHING**—National Science Teachers Association, 1201 16th St., N.W., Washington, D.C. 471-14422—25¢

**CAREER OPPORTUNITIES**, C&E News Annual Guide for Chemists and Chemical Engineers—Reprint Department, ACS Applied Publications, 1155 16th St., N.W., Washington, D.C. 20036. 25¢

**HOW TO GET INTO SCIENCE AND ENGINEERING**—Science Service, 1719 N St., N.W., Washington, D.C. 20036.

**KEYS TO CAREERS IN SCIENCE AND TECHNOLOGY**—NEA Publication Sales, 1201 16th St., N.W., Washington, D.C. 20036. 50¢

**LET'S BE PRACTICAL ABOUT A NURSING CAREER**, and **SCHOOLS OF PROFESSIONAL NURSING**—Committee on Careers, National League for Nursing, 10 Columbus Circle, New York, N.Y. 10019.

**OPPORTUNITIES IN OCEANOGRAPHY**—Smithsonian Institution, Washington, D.C. 20560. 50¢

**REWARDING CAREERS FOR WOMEN IN PHYSICS**—American Institute of Physics, 335 East 45 St., New York, N.Y. 10017.

**WHAT IS A CONSULTING METEOROLOGIST?**—American Meteorological Society, 45 Beacon St., Boston, Mass.

**YOUR CAREER IN OPTICS**—The Optical Society of America, 1155 16th St., N.W., Washington, D.C. 20036.

### U.S. DEPARTMENT OF LABOR OCCUPATIONAL OUTLOOK SERIES

| | | |
|---|---|---|
| Aircraft, Missile, and Spacecraft Occupations | 1375-87 | 10¢ |
| Architects | 1375-3 | 5¢ |
| Atomic Energy Field | 1375-89 | 15¢ |
| Automobile Mechanics and Diesel Mechanics | 1375-75 | 10¢ |
| Biological Scientists | 1375-4 | 10¢ |
| Chemists, Physicists and Astronomers | 1375-39 | 10¢ |
| Construction Electricians and Elevator Constructors | 1375-59 | 10¢ |
| Dental Hygienists | 1375-15 | 5¢ |
| Dental Laboratory Technicians | 1375-16 | 5¢ |
| Dentists | 1375-17 | 5¢ |
| Dispensing Opticians and Optical Laboratory Mechanics | 1375-67 | 5¢ |
| Draftsmen | 1375-45 | 15¢ |
| Electric Light and Power Occupations | 1375-93 | 15¢ |
| Electronic Computer Operating Personnel and Programmers | 1375-50 | 10¢ |
| Electronics Manufacturing Occupations | 1375-94 | 10¢ |
| Engineers | 1375-11 | 15¢ |
| FBI Agents | 1375-51 | 5¢ |
| Foresters | 1375-12 | 5¢ |
| Geographers | 1375-13 | 5¢ |
| Geologists, Geophysicists and Meteorologists | 1375-10 | 15¢ |
| Home Economists and Dietitians | 1375-18 | 10¢ |
| Industrial Chemical Industry | 1375-98 | 10¢ |
| Mathematicians, Statisticians and Actuaries | 1375-34 | 10¢ |
| Medical Technologists, Medical X-Ray Technicians, and Medical Record Librarians | 1375-20 | 10¢ |
| Osteopathic Physicians | 1375-22 | 5¢ |
| Petroleum Production and Refining Occupations | 1375-102 | 10¢ |
| Pharmacists | 1375-23 | 5¢ |
| Physical Therapists and Occupational Therapists | 1375-24 | 5¢ |
| Physicians | 1375-25 | 5¢ |
| Podiatrists | 1375-26 | 5¢ |
| Psychologists | 1375-42 | 10¢ |
| Registered Professional Nurses and Practical Nurses | 1375-27 | 10¢ |
| Social Scientists, Sociologists, and Political Scientists | 1375-42 | 10¢ |
| Teachers—Elementary, Secondary, College and University | 1375-44 | 10¢ |
| Technicians | 1375-45 | 15¢ |
| Veterinarians | 1375-28 | 5¢ |

—Superintendent of Documents, Washington 25, D.C.

### OTHER VALUABLE AIDS

**CAREER INFORMATION SERVICE**—New York Life Insurance Company, Box 51, Madison Square Station, New York, N.Y. 10010.

**NEED A LIFT?**—Listing of career information sources, scholarships and loans, benefits to children and survivors of veterans—American Legion Education and Scholarship Program, Americanism Div., The American Legion, Dept. S, P.O. Box 1055, Indianapolis 6, Ind. 25¢

**OCTOBER—NATIONAL SCIENCE YOUTH MONTH**—Listing of cooperating national groups striving to interest students in science activities and careers. Science Service, 1719 N St., N.W., Washington, D.C. 20036.

If no price is given, enclose a business size, self-addressed, 5¢ stamped envelope.

• Science News Letter, 88:234 October 9, 1965

# *Nature Note*

## Sea Flower

Looking like a beautiful underwater dahlia or chrysanthemum, the sea anemone has many delicate, colored tentacles that radiate from the top of a short muscular stalk.

At the slightest disturbance or irritation, however, these strange animals contract their tentacles and fold them inward into the center of the stalk.

There are about a thousand species of sea anemones, which are members of the Coelenterata phylum, one of the lower groups of animals. The anemones live attached by a broad sucker-like foot to firm objects such as rocks, shells or wharves. They can creep slowly around the ocean bottom on this foot, and some can swim through the water by lashing their tentacles.

When undisturbed and covered with water, the anemone spreads out all its delicate tentacles and displays remarkable combinations of colors—salmon pink, orange, brown, green and vivid red. Anemones also are striped or have breath-taking geometric patterns of reds, blues, grays, greens and purples. Actually these beautiful tentacles are busy wafting minute animals into the anemone's mouth, or cramming it with small sea worms, crabs and, shells. In turn, the anemone is eaten by larger fish, crabs or starfish.

One curious partnership exists between the anemone and the hermit crab. A crab sometimes takes a young anemone and holds it quietly until it attaches to the shell just below the mouth parts of the crab. The anemone receives scraps of food from the rather sloppy feeding of the crab, and the crab is protected from enemies by the stinging tentacles of the anemone, and also takes its share of the anemone's food.

• Science News Letter, 88:235 October 9, 1965

TECHNOLOGY

# Gemini-Type Fuel Cells For British Railroads

➤ FUEL CELLS, similar to those used for providing power in the Gemini spacecraft, may be developed by British Railways to power their locomotives.

The feasibility of this source of power, which might considerably reduce fuel costs, is being investigated by the Chemical Research Division of the British Railways' Research Department in North London.

The purpose of the investigation is to find out if the diesel engine/generator in diesel locomotives could be replaced by a fuel cell.

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