To foster growth, every major computer manufacturer encourages employees to increase their skills through career training programs. These afford an excellent opportunity to gain a practical knowledge of today's broad range of computer concepts .The industry is also characterized by a liberal policy towards reimbursing the cost of tuition for employees continuing their formal education at outside institutions.

Salaries in data processing are higher than for most industries and fringe benefits are generally excellent.

In short, if you are looking for an exciting, meaningful career, the data processing industry has the elements which can spell success. The challenges await you.***

ROBERT E. McDONALD, President of the UNIVAC Division of the Sperry Rand Corporation since 1966, has been engaged in computer technology for the past 15 years.

Mr. McDonald, 53, graduated from the University of Minnesota in 1940 with two degrees, a Bachelor of Electrical Engineering and a Bachelor of Business Administration. He received his MBA from Chicago in 1942 and joined the Navy, serving as a pre-radar instructor and later as an advanced radar systems engineer at MIT.

From 1946 to 1953 Mr. McDonald held various management positions with Northwest Airlines and Braniff International Airways in the Twin Cities. He was Director of Manufacturing for Engineering Research Associates when that firm was acquired by UNIVAC.

Mr. McDonald rose from Twin Cities Operations Manager to General Manager of the UNIVAC Defense Systems Division in eight years, and then was elected Division President. He is also Executive Vice President of the Sperry Rand Corporation.

computers must eliminate growing information gap

By DR. GEORGE SCHUSSEL
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You have just spent four or more years learning how to effectively manipulate information to get answers to problems. The problem might be one in engineering, physics, mathematics, or business administration. You solve the problem by the application of calculus, linear programming, legal concepts, stress analysis, or circuit theory. In most problems the basic data has been given in the text, and you needed to know the theory on how to use that data. Once you leave school, you'll find that most real-world problems are just the other way around. The most difficult part of a problem is to get the basic data. Once you have the basic data, a fairly simple analysis will usually give you a good answer.

It is this unsolved problem of getting data in usable form that has resulted in the tremendous growth of the information systems field. Much of this growth has resulted from the advent of computers with tremendous capabilities for rapidly handling and manipulating information. The modern scientific community has created a fantastic wealth of information. Over 90% of all scientists who ever lived are alive today, working, creating discoveries and new information. In order to be useful, this information must be selectively disseminated to those who are interested in it, must be stored, and must be retrieved when necessary. This necessity for handling information has created the new field and science of information systems.

Most computer oriented companies are vitally concerned with the handling of information. The fact that the stocks of computer companies are so highly priced (a 60 to 1 price earnings ratio is typical) conveys the market opinion of the growth that these companies expect. IBM, the largest company in the information and computer business, has increased its sales 17 times in the last 15 years while its net

income has gone up 20 times.

GROWING SHORTAGE

This tremendous growth has created a severe shortage of qualified people to fill important positions in the information systems business. It has been estimated that there is currently a shortage of over 100,000 programmers in the United Sta-
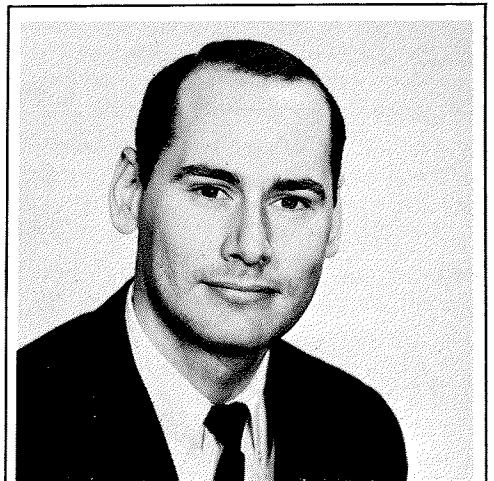
DR. GEORGE SCHUSSEL is Manager of the Information Systems Division at Brown Engineering, a Teledyne company, in Huntsville, Alabama. He graduated from U.C.L.A. with a major in physics before going on to Harvard and taking his masters degree in applied math and his doctorate in business administration.

His first exposure to computers came while working for the Space and Missiles Division of the Douglas Aircraft Company. He subsequently worked in the Computer Department of Aerospace Corporation. Prior to assuming his present responsibilities, he served as a consultant to the Polaroid Corporation and directed the work of the corporate Management Science Staff at Northrop Corporation.

Dr. Schussel has retained a strong interest in academic affairs and works closely with the University of Alabama in Huntsville. When he worked for Northrop, he was concurrently Assistant Professor at the nearby University of Southern California.

tes alone. This fact is born out in the market place where the law of supply and demand has pushed the salaries of programmers substantially above those of comparably trained engineers, mathematicians, or physicists. Also, this tremendous shortage of qualified people has made for very rapid advancement opportunities. It is not unusual to find managers with substantial responsibility in the information systems business who are still under 30 years of age.

The information systems business is ever changing. One person can simultaneously be working on an automated system for writing a payroll, be developing a means of storing and rapidly retreiving information or be working on a mathematical model for determining a missile system's effectiveness.

This field requires training and experience in mathematics, computer science, business administration, engineering, behavioral sciences, and the various branches of physics. A broad background is highly useful since a capable analyst might find himself successively performing systems consulting, systems analysis, systems design, programming, training, or computer processing. The results from his efforts could be effective solutions in operations research, medical administration, management systems, resource analysis, transportation, advanced planning, weapons and defense systems, simulation modeling, engineering reliability, vulnerability, personnel, statistics, or logistics.

COMPUTER MANUFACTURERS . . .

Since computers play an integral part in the rapidly burgeoning field of information systems, the graduate engineer may decide to join a computer manufacturer and involve himself in basic computer hardware design and manufacture. Modern computers tend to be modular; that is, one can assemble a computer system from several discrete components, picking the component at each step that suits his own specific needs best. The speed of the central processing unit, the size of the memory, the speed and capacity of tape drives, disc drives or drum memories — these all represent characteristics that must be designed and balanced against needs in the market place.

On the other hand, the engineer may be interested in the "software" end of the business. "Software" refers to programming or the writing of instructions for computers. Many fine programmers

have been made out of engineers, and the associated opportunity for systems analysis in business, scientific, and engineering fields can provide a challenging job opportunity for any graduate.

. . . AND USERS

More directly related to engineering information, the graduate engineer may find that he is interested in systems to manipulate information of the general field of information storage and retreival. Here, he may be designing systems for information storage and retrieval or he might get involved in the actual operation by joining the inquiry staff in an information inquiry center.

The advent of the information inquiry center is a phenomenon of the last decade. A typical such center specializes in one subject area such as parts or reliability information. Questions are directed to the center by diverse users who have need for information. The question is first handled by an inquiry staff specialist who knows how to take a general need for information and re-format it into the form necessary for effective search of the material at his center. He will then initi-

ate a search among various systems which could involve computers or microfilm.

The growth in size and numbers of information centers has been spectacular, primarily because of the explosion of technical knowledge, with 1100 centers now in the U. S. Today, it has become almost axiomatic that companies must search beyond their own inhouse information centers in order to be assured that an awareness of the latest information on a given item or topic is maintained.

To summarize, I can say to any young graduate who wants to go into a field where his salary progression will be fast, where he will have demanding technical responsibilities for designing and integrating man-machine systems, and where he is likely to assume management responsibility at a much younger age than he might expect, information systems is the field for you.***