

In addition, the computer is programed to check the validity of test results, to prepare studies showing how different groups of applicants performed on various sections of the examination, and to assist in establishing appropriate passing scores.

Automatic data processing has been applied to personnel management in the Federal Government for only about 6 years, yet the roots of the cybernetic revolution in government extend back to the 1880's. In fact, there is reason to think that the entire development of automatic data processing was initiated by an invention of a young Census Bureau employee appalled by the paperwork of the 1880 tabulation.

Herman Hollerith was a young engineer working on the 1880 census. Seeing a need for something better than handwork on the mass of census statistics, he put together a tabulating machine that he called his "statistical piano." It was somewhat reminiscent of a player piano, in that it used a roll of punched tape to feed instructions into the machine. People who, then as now, condemned the civil service for a lack of imagination and innovation, must have been looking the other way. Even the inventor may not have realized what he was starting, but in the 1890 census Hollerith's device was credited with saving 2 years of work and \$5 million. Later it became the foundation for a phenomenal business—the company now usually referred to by the initials IBM.

The Government also pioneered in the development and use of electronic data processing. One of the first completely electronic computers ever built was called ENIAC, for electronic numerical integrator and calculator. It was produced by the War Department and the University of Pennsylvania, working together in 1946 to solve problems in ballistic research. In 1951 the first commercial computer, UNIVAC I (universal automatic computer), was installed in the Census Bureau, some 3 years before a private company put a UNIVAC into operation. The Government received good value from its investment in UNIVAC I, running up more than 73,000 hours of operational use on the machine before retiring it to the Smithsonian Institution in October 1963.

When first developed, the digital computer was used merely as a large and very fast calculating machine, or for complex accounting and statistical purposes. In Government, priority was given to its employment in the primary mission of the agency by which it was used. By the early 1960's, however, the Department of Agriculture was using computer facilities for centralized personnel management data processing purposes. Its MODE (management objectives with dollars through employees) system is a large-scale centralized personnel recordkeeping and reporting operation, utilizing a computer in New Orleans. In addition to records and reports, the system computes the pay checks for Agriculture's 100,000 employees throughout the Nation.

The Veterans' Administration, with 156,000 employees, was the second large agency to install a centralized, automated personnel system. This system, called PAID (personnel and accounting integrated data system), operates at Hines, Ill. PAID encompasses general personnel management statistics and reports, career development and training records, a file on employees' length of service, payroll information to permit computation of checks by the machine, and information on the authorized number of positions as compared with the number of employees on the rolls. The system also contains a "suspense" file of personnel matters to be brought up on certain dates.

Twenty-two agencies of the Government now have automated personnel systems covering 1,500,000 Federal employees. Systems covering an additional 500,000 are being developed.

The Civil Service Commission first entered this field in administering the Government-wide retirement system. Through an automated procedure, 750,000 retirement accounts are maintained with an annual increase of 45,000 new annuitants.

Three years ago a 5-percent increase in all current annuities was authorized by Congress. This necessitated recomputation of the annuity for every person on the retirement rolls. The last time such a task was required it took months. The added workload was augmented by a stream of letters from Congressmen, justifiably wanting to know why their constituents were not receiving their higher retirement checks, but in 1963, thanks to the wondrous capability of the computer, 630,000 annuities were recomputed in just 10 days and checks started flowing out before complaints and inquiries began pouring in.

The system is now being used to compute deductions for medicare payments for those annuitants who are not receiving social security benefits. A recently