W. R. Whitney, the Man and His Contribution to Science

Willis Rodney Whitney was a perfect example of what may be called the ideal scientist—perhaps one should say the experimental scientist, because he had a passionate love of experiment. Keen, imaginative, bold, with insatiable curiosity, he literally worshipped the search for truth. It was said of him that if he had elected to pursue the solitary path of an inventor, he doubtless would have become one of the world's most famous and prolific inventors.

However, he sacrificed this opportunity for a greater service—the organization and successful direction of the first industrial research laboratory in the country devoted to fundamental research. This was a truly pioneer task. Industrial laboratories at that time were almost exclusively devoted to product development and improvement. Fundamental research was confined to universities. Could it be done profitably in an industrial laboratory? E. W. Rice, at that time chief engineer of the General Electric Company, had the vision that it could.

Dr. Whitney was well started on a successful career of teaching and research at Massachusetts Institute of Technology, and had already made important contributions to colloid chemistry, when Rice visited him and made the proposal that he start a research laboratory at General Electric. Rice proposed that it should combine fundamental with applied research—a new and bold idea. At first Dr. Whitney demurred, for he was happy in his work at M.I.T. But in response to Rice's quiet persistence, he finally agreed to try it on an experimental basis, for he loved an experiment. He agreed to spend three days a week at General Electric, commuting between Schenectady and Boston.

Whitney's first laboratory was a barn in the rear of Steinmetz' house, and his staff consisted of himself and one part-time assistant, whom he shared with Steinmetz. The next year he moved to a room in the Schenectady works and began gradually to build up a staff. For three years he continued to commute, until he was finally convinced that this research "experiment" held sufficient fascination to enlist his wholehearted devotion. It was typical of Rice that he did not choose an organizer. Dr. Whitney was not an executive type. He hated routine. Conferences and committees bored him. Budgeting and bookkeeping were not among his interests. Nor had he that passion for being "at the head of something" that characterizes many leaders. What Rice saw in Dr. Whitney was the *scientist,* whose enthusiasm for research was infectious.

Dr. Whitney's organization of the laboratory and his method of operating it were unique, and resulted from his many remarkable personal qualities. In organizing the laboratory, he proceeded in the same manner as he did in his scientific experiments. He began cautiously, on a small scale, feeling his way. In expanding, he always moved more slowly than his directors urged him to do.

One of the first qualities needed was tact, to induce experienced company managers to accept help from this college highbrow. Dr. Whitney's attitude of learner, which was genuine, soon won their confidence.

Sound judgment told him that the laboratory must, first of all, be made to pay. He personally directed high-temperature treatment of lightning arrester pellets, carbon brushes, and carbon lamp filaments, all of which produced useful improvements. Then came Coolidge's ductile tungsten, and the laboratory's success was firmly established.

Such success might have turned the head of a less idealistic man. To Whitney, it was just a necessary preliminary to the real purpose of the laboratory, as he saw it, which was fundamental research. He engaged Irving Langmuir and gave him freedom to work on anything that interested him. After three years, Langmuir was still deep in a study of heat conduction in gases. With no practical applications in sight, the board of directors questioned the advisability of keeping him. Dr. Whitney replied unhesitatingly and emphatically: "You leave Langmuir alone. He is doing good work." The results were soon to prove it.

Such personal modesty and confidence in human nature, which led him to allow those members of his staff whom he considered qualified to work on what interested them, were the most significant features of Dr. Whitney's direction and were in large measure responsible for the success of the laboratory. However, he didn't just leave these researchers alone. He made daily rounds of the laboratory, encouraging and suggesting, but seldom dictating or criticizing. He always had a stock of new suggestions for experiment, which he literally peddled from room to room, but seldom assigned.

Dr. Whitney was a pioneer in championing prompt and full publication of laboratory results, subject only to filing of patent applications. Such results always appeared in the name of the individual worker, for Whitney never allowed his own name to appear. Because of this characteristic modesty, his own contributions, which were great, will never be fully known. For example, he suggested and directed the research on hydrogen cooling of generators but insisted that all the credit should go to the man who did the work. Only two inventions he could not escape claiming: the "metallized" carbon filament, his early work; and the inductotherm, which he personally developed.

The most important factor in the success of Dr. Whitney's direction was the fine spirit of honesty, cooperation, and enthusiasm, which he was very careful to preserve as he gradually built up the laboratory staff. This spirit was part of himself, and it spread by contagion as he made his daily rounds. Discipline was unnecessary. As one employee expressed it: "The meanness or selfishness of our natures never had a chance to get out. We were ashamed to show it." His office door bore the sign: "Come in—rain or shine," and the janitor or office boy was welcomed with the same genuine interest as a department manager.

Dr. Whitney's most characteristic quality was his love of research, which he considered the "finest of sports." His standard greeting on his daily rounds was: "Are you having any fun?" Scientific curiosity, which he once defined as the most important quality of a research man, was a passion with him, and his leisure hours on his farm were filled with experiments.

A man's true personality can often best be understood from an observation

of his leisure activities. These may include fishing, hunting, golf, driving around the country, movies, television, and bridge. Dr. Whitney had none of these hobbies. His one consuming interest was the study of nature, for which his curiosity knew no bounds. He studied the habits of turtles, where they laid their eggs, where they spent the winter, and how often they returned to the same place, by marking them with the place and date; how mosquitoes knew what to bite, by counting the number that lighted on him, and on a quarter of beef beside him; what caused galls to grow on golden rod, by inserting a piece of iron wire and heating it with high frequency; what caused cockroaches to enter a trap, by counting the numbers caught in two bottles, one of which contained sugar. His occasional walks along the Mohawk River were devoted to a search for Indian arrowheads, which he could find when no one else could. He kept careful notes of these experiments and also of ideas that came to him in his reading and thinking.

Dr. Whitney spent all his days at the laboratory, where he was always the first to arrive in the morning. But his evenings were devoted to scientific reading. He was a voluminous reader, especially in physics, chemistry, biology, and the history of science; and the range of his knowledge and interest was correspondingly wide. Fittingly, the new library at the General Electric Research Laboratory has been named the Whitney Library.

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News of Science

National Aeronautics and Space Administration, Its Administrator and Deputy Administrator

In the matters that come before it, the Congress of the United States sees a variety of subjects ranging from the ludicrously insignificant to the critically important. The committees and the full bodies of the House and Senate can on one day ponder the implications of letting the Girl Scouts use Army equipment and on the next consider the problem of Presidential disability. The legislative hopper is commodious and indiscriminate. If the 85th Congress has had its share of "little" bills, it has also deliberated on many major measures that rank with the Atomic Energy Act and the National Science Foundation Act in the matter of far-reaching significance. The National Aeronautics and Space Act of 1958 constitutes such a measure in its import to both science and the national security. In its handling of the President's proposal for this act and his recommendations of men to fill the two top posts, Congress has moved quickly, intelligently, and with an unusual awareness of the implications of the legislation at hand.

National Aeronautics and Space Act

On 29 July the President effected Public Law 85-568 by signing a House of Representatives bill sent to him by the Congress. The law declares that "it is the policy of the United States that activities in space should be devoted to peaceful purposes for the benefit of all mankind" and that "the general welfare and security of the United States require that adequate provision be made for aeronautical and space activities." To accomplish these ends the law calls for the establishment of three new governmental units, an Aeronautics and Space Council, an Aeronautics and Space Administration, and a Civilian-Military Liaison Committee. The council, to be headed by the President of the United States, will have as members the Secretary of State, the Secretary of Defense, the Administrator of the NASA, the Chairman of the Atomic Energy Commission, and four other presidentially appointed persons, one from the Federal Government and three from among "individuals in private life who are eminent in science, engineering, technology, education, administration, or public affairs." The council will advise the President on the broad outlines, both present and future, of aeronautical and space activities in the country.

The Administration. The Aeronautics and Space Administration will have three major functions. As these appear in the law, they require that the administration shall: "(1) plan, direct, and conduct aeronautical and space activities; (2) arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles, and conduct, or arrange for the conduct of, such measurements and observations; and (3) provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof." For the performance of its functions the administration is granted many of the usual powers given to federal agencies and two unusual ones that are interesting in their departure from normal procedure. The first of these departures allows the administrator to appoint up to 260 scientific, engineering, and administrative personnel without regard to the civil-service laws, and to compensate them without regard to the Classification Act of 1949. This exemption allows the administrator to staff his agency with highly qualified men and women by enabling him to offer salaries of up to a limit of $19,000 a year, or up to a limit of $21,000 a year for a maximum of ten positions. A second significant departure authorizes the administrator to employ aliens without regard to statutory provisions prohibiting payment of compensation to such persons. This would seem to be a significant exemption in that it makes available to the administration the services of any European or other foreign scientist who might be interested in working on one or another of the projects that are undertaken in the future.

Jurisdiction. The significant matter of jurisdiction over projects as it relates to the new administration and the Department of Defense received detailed attention by the congressional framers of the act. It was recognized that activities which are peculiar to or primarily associated with weapon systems or military operations or to the defense of the United States (including the research and development necessary to make effective provision for the defense of the United States) should be under the jurisdiction of the Department of Defense, while all others should be under