that science is an end in itself, and have failed to make it a part of the world's work. We have been too often content to be either recluses or cogs in the machinery of industry. We have left too much to others the conduct of the state or even of our own village. We need to work more with others and not simply for others.

In "Arrowsmith," that realistic novel of research in medicine, Sinclair Lewis portrays vividly the obstacles that beset the path of one who hitches his wagon to the star of research. Every worker in science can find in this story his own weaknesses and also those of the benevolent though misguided persons who hinder the progress of truth. But we can not all devote our lives to abstract and fundamental researches. There is a glory and a satisfaction also in lesser service. To me there is a distinct sense of disappointment that in his struggle for the opportunity for pure research, Martin Arrowsmith failed to realize or grasp his opportunities on the way. "It is not alone the goal that counts, but also the path by which we travel."

If anywhere we should expect a high devotion to the ideals of the service of science, it is in the government laboratories, supported by the funds of the people, who naturally and rightly expect some definite returns. In such work there is in addition a need for vision, to prevent the demands for information of immediate value from hindering or entirely interrupting the study of fundamentals, the type of study that has been aptly called "the fountain-head of science." Whether such devotion and such vision are found among your public servants may best be judged by those with better perspective. At least it may be said that the government scientist who is not upheld by an abiding sense of service "is of all men most miserable," for then he has indeed little visible means of support!

The world expects great things of science; it expects science to "give new leases on life, and new tools, and wider visions." The historian may recount the past, but can not change it; the poet may paint the future, but can not bring it to pass; the scientist alone can make his dreams come true. He can not only harness the powers of Niagara, but can at the same time increase its grandeur; he can make the desert and the swamp alike fruitful; he can bring music and poetry through the air to the invalid. He can not only meet the needs of humanity, he can also satisfy desires that science itself has created.

You will recall the story of the visitor who asked several laborers about their work. One said, "I am cutting stone," another "I am carving wood," but a third answered proudly, "I am building a cathedral." If science is as important to humanity as its devotees have been telling the public, then when asked about our work instead of saying, "I am running carbon determinations," "I am synthesizing rubber," or "I am measuring the orbits of the electrons," we should be able to say in all humility, "I am making the world better."

We have seen much of "science for industry's sake"; we have heard much of "science for science's sake"; we need more of "science for humanity's sake."

WILLIAM BLUM

U. S. BUREAU OF STANDARDS

JOHN HOWLAND—1873–1926

DR. HOWLAND died in London, England, on June 20, at the age of fifty-three. Last February, in Baltimore, he had an illness which was regarded as mild encephalitis, but completely recovered. In accordance, therefore, with a plan formed some time previously, he sailed for Europe on March 30 in company with Mrs. Howland and Dr. and Mrs. James Gamble, of Boston. His object was to visit the European clinics, and at the same time to obtain rest and pleasure. He first went to see his brother, Mr. Charles Howland, of New York, who was at the time in Greece, and then traveled on to Budapest, Zurich, Strasbourg, Paris and London. From Paris he wrote that he was entirely well, but Mr. Abraham Flexner reported that he looked pale and thin, and complained of fatigue. On his arrival in London he was taken acutely ill and shortly afterwards had two hemorrhages, apparently of gastric or duodenal origin. An operation was performed on June 15 under the impression that the condition was duodenal ulcer. Death occurred a few days later. Howland had always been in robust health, scarcely ever missed a day's work on account of illness, had always taken excellent care of himself and was free from all habits injurious to health. The news of his death came as a great shock.

Dr. Howland was born in New York City on February 3, 1873. His father, Judge Henry E. Howland, of New York City, a New Englander by birth and descent, was a man of great personal charm, and distinguished for his wit as an after-dinner speaker; he was an extremely well-known figure in the life of the city. Though moving in fashionable circles, Judge Howland retained a freshness and simplicity of character which he handed down to his son. Howland's mother was Sarah Louise Miller, of a well-known New York family. She was an unusually accomplished pianist and gifted with a remarkably clear and vigorous mind. An ancestor was John Howland, of the Mayflower company.

Howland spent his boyhood in New York City and

at the family summer homes in Long Island and Walpole, New Hampshire; studied at the Cutler School in New York City and at King's School, Stamford, and was finally prepared for Yale at Phillips Exeter Academy, graduating in 1890, and entering Yale in the class of 1894. He was said to have been "a hearty, wholesome boy, better than the average, developing slowly and each year a little better than the year previous"; he gave little indication of the important career before him. At Yale he made no effort to distinguish himself as a student, though he graduated in the upper fourth of the class, but did win great distinction as an athlete and in the social life of the college. He was intercollegiate tennis champion, substitute stroke on the university crew, an editor of the college paper and a member of the much sought after society, "Skull and Bones." He was one of the most popular and influential men in his class.

On graduation from Yale Howland was but twenty-one years old and was ranked by tennis experts among the first half dozen players in the country. Most men under the circumstances would have yielded, for a time at least, to the temptation of following tennis as a career. Howland, however, had always, even from boyhood, felt the desire to go into medicine, and realized that success in tennis and success in medicine, such as he would have been satisfied with, were incompatible. On taking up his work in the medical school, with characteristic self-control and obedience to reason, he abandoned tennis absolutely. As throwing light on his qualities of mind and body, he once said to the writer that he could not bear the thought of deteriorating in tennis, preferring, if he could not continue to play in championship form, not to play at all, that he was never conscious, as a match progressed, of the slightest fatigue and in tournament play expected to lose the first two sets, basing his hope of winning on his superior endurance in the concluding three sets. Later, as a means of physical exercise, Howland took up golf, a game in which he had no tradition to support, and in which he soon excelled.

In 1895 the College of Physicians and Surgeons of New York City and the Cornell Medical School took steps to lengthen their required course of study from three to four years. The education in medicine offered by the schools in New York City at that time was exceedingly poor; its value consisted largely in opening the door to the degree of doctor of medicine. The education of practical value began with the hospital interneship. Against the advice of his friends, among whom was Dr. Walter B. James, Howland determined to save a year of study by entering New York University Medical School, which still adhered to the three year curriculum. He relied on the well-known private quiz conducted by Dr. Ellsworth Eliot, to furnish him with the knowledge necessary to obtain an interneship at the competitive examination at Presbyterian Hospital. This feat he successfully accomplished three years later in 1897. On the expiration of his interneship at the Presbyterian Hospital in 1899 he became interne for a year at the New York Foundling Hospital and there came in contact with children and the most progressive and stimulating personality in pediatrics of the time, Dr. L. Emmett Holt. Completing his service at the Foundling Hospital, Howland left for a year's study in Berlin, but soon abandoned Berlin for Vienna, where he took the regular courses in pathology and clinical medicine offered to Americans. On his return to this country in 1901, Howland became the assistant of Dr. Holt and thus definitely embarked on a pediatric career. He rose rapidly to a position of prominence as a practitioner and consultant and became assistant visiting physician to St. Vincent's Hospital, attending physician at the Willard Parker Hospital, pathologist and assistant attending physician to the New York Foundling Hospital and instructor and associate in pediatrics at the College of Physicians and Surgeons. In 1908 he was appointed head of the children's clinic at Bellevue Hospital, which offered the most important children's service at the time in New York City. A lucrative practice and a great reputation as a consultant were assured; a career of great success in the generally accepted definition of that term was visible before him. Such a career, however, was not his ambition. He confided to the writer at that time that what he would like best was a small hospital service and laboratory at Yale which would furnish means of support and opportunity for study and investigation. He little realized how soon and how literally his wish was to be answered, not in New Haven, but in Baltimore.

In 1910 he accepted a call to the reorganized Medical School of Washington University, St. Louis, and in preparation left for Europe for a year's study under the most distinguished pediatrician of the time, Czerny, in Strasbourg. This year of contact with Czerny was most profitable and furnished Howland with the foundation of his ideas in infant feeding and the nutritional disorders of infancy. Returning to America in 1911 he assumed his duties in St. Louis, but remained only one year. In 1912 he accepted a call to succeed Von Pirquet as professor of pediatrics at the Johns Hopkins Medical School and held that important position until the time of his death.

Howland's scientific career began not long after his return from the first period of study in Europe. Following a publication in 1904 of a study of the lesions of dysentery, many papers on a variety of

subjects came from his pen. At first his interests seem to have been mainly clinical and pathological, but soon turned with the current of the time to the chemical aspects of disease. Among his most noteworthy contributions were those on the effects of chloroform poisoning on the liver, the measurement of the chemical and energy metabolism of sleeping children, the acidosis accompanying "intestinal intoxication" and numerous studies on infantile tetany and rickets. His investigations in regard to diarrhoeal acidosis, tetany and rickets represent his most important scientific work. Czerny had advanced the hypothesis that there was an acidosis associated with "intestinal intoxication." Howland and Marriott, applying the conceptions of Lawrence Henderson, proved the existence of an acidosis in intestinal intoxication and showed that it was not an acetone body acidosis. In infantile tetany Howland and Marriott showed that the calcium of the blood was diminished and made the treatment with calcium chloride a routine procedure. Howland's great contribution to rickets, in which Kramer also participated, was the discovery that the disease was characterized by a diminution of the inorganic phosphorus of the blood. Previous investigators had thought of the disease as dependent upon an abnormal metabolism of calcium. The discovery by others that rickets could be produced in rats through varying the calcium and phosphorus in the diet led Howland and Kramer to perceive the principle that the deposition of lime salts in the body is dependent upon a solubility product relationship between the calcium and phosphorus in the circulating fluids. With the writer Howland proved the effectiveness of cod liver oil in rickets. The most recent papers of Howland represent a study of the principles governing lime salt deposition in bones.

Howland was twice accorded the honor of being the lecturer before the Harvey Society of New York City. His last Harvey lecture on the "Etiology and Pathogenesis of Rickets" was a noteworthy contribution to that subject. He was a member of the Board of Scientific Directors of the Rockefeller Foundation for Medical Research, of the Council of Pharmacy and Chemistry of the American Medical Association, a director of the Russell Sage Institute and a member of numerous societies and medical organizations.

As a teacher Howland was exceptionally gifted. He loved teaching and was at his best when employing the Socratic method. He liked to lead the student near pitfalls and was greatly amused if he fell in, and pleased to the same extent if bright enough to escape. There was nothing of the sarcastic or mean in his nature. Information was always to be obtained at his clinics; during the nine years, in which the writer was his assistant, he can never remember attending a single clinic given by Howland in which he did not learn something unknown to him before. Howland was extraordinarily sane as a teacher. He never followed strange gods, and was never carried away from the truth by the bizarre. He preferred to demonstrate several cases in succession, touching only the salient points, rather than to treat a single case exhaustively. He never taught in a systematic manner and he never seemed to have his responsibility as a teacher on his conscience. He was extraordinarily successful as a teacher of his staff by knowing more than they did or by a superiority in his judgments.

As a diagnostician Howland was equalled by but few. A splendid observer, gifted with a most unusual memory and a rich endowment of native shrewdness, he was almost always as close to being correct as was humanly possible. He frequently made brilliant diagnoses, never foolish ones; he took "long shots" when he felt that he could hit the mark, never otherwise. He never suffered from feelings of inferiority which made him leap beyond his premises; he was never afraid to say that he did not know. He did not arrive at a diagnosis by a process of logical ascent—the writer never saw him but once make a careful complete examination of a patient—he seemed to sense the truth.

His relations with patients were marked by unusually great conscientiousness and consideration. No one ever knew him to do anything or to allow anything to be done which might possibly injure a patient. The interest and feelings of obligation excited by ward patients and private patients were the same. In his treatment he was always conservative; he accepted new forms of treatment only after their value and freedom from danger had been proven by others.

As an investigator Howland brought to bear an extraordinary amount of common sense and critical judgment. He almost never worked alone. Others with superior technical knowledge more or less led the way; with his extraordinary judgment of values, however, he knew which problems were worth while; he knew, also, when to begin and when to stop. He was most industrious and himself made the measurements ordinarily left to technicians.

Howland never read a great deal in the years in which the writer was associated with him and rarely worked evenings, but the salient points in his reading were always remembered. He gained a very large part of his great knowledge on a variety of subjects through conversation with those specially informed. He wrote with ease in a style simple and clear. Unlike his father, who spoke in public with great fluency, he spoke with great difficulty and usually wrote out what he intended to say and familiar-

ized himself with it beforehand. He regarded himself as a poor executive and was a poor executive in the sense that he was not methodical. In reality, however, he was a remarkably successful executive in that his ability to choose the right man was so well-nigh perfect and his judgment in regard to things in general so accurate that no direction seemed to be required.

As a man and companion Howland was delightful. He had a great sense of humor and an unusual gift at mimicry. He had known interesting people and had had interesting experiences; he remembered everything. His conversation was full of amusing and interesting anecdotes; his ideas arrested attention. He was a positive character, outspoken in his likes and dislikes and entertained no half way opinions on any subject. At the same time he remained extraordinarily boyish and simple. He was interested in all sorts of sports and contests and could give their histories. He was greatly interested in battles and knew by heart the history of the American Revolution and the Civil War. Life itself as well as diagnosis and investigation were to him games. Though not especially fond of music, he was devoted to Wagner's operas and could recite from the librettos. He was not contemplative, but loved activity out of doors. He was devoted to his family and was never happy when separated from them for any long period. He was a delightful host and had great numbers of friends.

To Howland's own mind the development of his clinic at Johns Hopkins, with all that that development entailed, was his greatest accomplishment. He accepted the call to Johns Hopkins when the salary offered was only $4,000 and the departmental budget proportionately small. The Harriet Lane Home had just been completed and for a long time the number of patients in the wards did not exceed twenty. In the fourteen years of his leadership he saw his clinic grow to be the foremost in the country and the first pediatric clinic, in the true sense of the term, which the country ever possessed. The children in the hospital wards were skillfully cared for; the students splendidly taught; on every side were encountered devotion to duty, enthusiasm for science, the spirit of sacrifice for the ideal; from the wards and laboratories came forth one valuable contribution after another to the science of medicine and from Howland himself went forth one assistant after another to head other departments and to assume positions of responsibility elsewhere, Gamble and Blackfan in Boston, Ross in Montreal, Tisdall in Toronto, Marriott in St. Louis, Casparis in Nashville, Higgins in Cincinnati, Kramer in Brooklyn, Sato in Tohoku, Powers, Shohl and the writer in New Haven. He took the greatest pride in the success of his pupils.

Howland was a leader, not by virtue of any volitional coercive power, but as the result of the superiority of his mind. He was a most remarkable example of extraordinary all-round development. He was one of the four or five great figures in medicine in this country at the present time, and in the history of the Johns Hopkins Medical School should be numbered among its distinguished creators, Halsted, Welch, Osler, Mall, Howell and Abel. His loss to pediatrics, to the country at large and to Johns Hopkins is irreparable.

Dr. Howland is survived by his wife, Susan Morris Sanford, whom he married in New Haven in 1903, and by their four children, Katherine, John, Louise and Elihu; he is also survived by his brother, Charles P. Howland, and his sister, Frances L. Howland, of New York City.

E. A. P.

SCIENTIFIC EVENTS

THE AUSTRALASIAN ASSOCIATION

THE Australasian Association for the Advancement of Science will hold its eighteenth annual meeting in Perth, Western Australia, during the week beginning on August 23. It is stated in *Nature* that Western Australia is making special efforts to secure a good attendance of members from other states and from New Zealand. Private hospitality in Perth during the meeting is being offered to all visiting members. The state government has granted £1,200 towards defraying the cost of printing and publishing, and is giving free transit to visiting members over the W. A. Government Railways, whilst the Australian Commonwealth Government has granted for the Perth meeting the sum of £750, out of which traveling allowances will be made to members coming by the Transcontinental Railway. As the various countries bordering on the Indian Ocean have many scientific problems in common, the Perth local committee has sent invitations to representative scientific men in those countries to attend the meeting, hoping thus to make it an informal Indian Ocean Science Congress, and thereby to inaugurate closer intellectual cooperation amongst the Indian Ocean peoples. To anthropologists, botanists, geologists and zoologists, Western Australia offers features which are unique, even for Australia; and a series of excursions has been arranged to enable visitors to study these as well as the economic resources of the state in mining, agriculture, fruit-growing, forestry, etc.

The retiring president of the association is Lieutenant-General Sir John Monash, whilst the president-elect is Professor Edward H. Rennie, of the University of Adelaide, who has chosen as the title of his