

nagged bureaus in the U. S. Army, Navy and Shipping Board to the point of asking the National Research Council for the appointment of a committee on the subject of "resuscitators." That committee met recently and made its report; and this report is about as adverse to "resuscitators" as is this article of mine.

So far so good. The various bureaus of the Federal Government will now be saved very considerable amounts of money, as well as the lives of many soldiers, sailors and marines. But that report is unfortunately "restricted" and will not decrease the mortality from asphyxia among the 130 million citizens of the United States, who will never hear of it.

THE CENTENARY OF THE CINCINNATI OBSERVATORY

By Dr. RAYMOND WALTERS

PRESIDENT OF THE UNIVERSITY OF CINCINNATI

THE commemoration in November, 1943, of the establishment in November, 1843, of the first astronomical observatory in America proved to be an occasion of national importance. Testimony to this importance was supplied in the felicitous letter of greeting received by the University of Cincinnati from the President of the United States:

The founding of the Cincinnati Observatory a hundred years ago was an event of great significance in the march of science and culture in this country.

The enormous advance in the science of astronomy since the venerable John Quincy Adams, former President, journeyed to Cincinnati to lay the cornerstone of the original building emphasizes the debt we owe to the Cincinnatians of a century ago whose vision and generosity made possible the establishment of the observatory.

May I, in extending hearty greetings, express the hope that the work of the observatory will go steadily forward and that the sphere of its influence will ever widen in the decades ahead.

As reported in *SCIENCE*, the American Astronomical Society held its seventy-first annual meeting at Cincinnati from November 5 to 7, in conjunction with the university celebration; and digests of the papers then read have been published in this journal.

Scientific and human aspects of what Dr. Harlow Shapley, president of the society, termed "this romantically founded civic enterprise" were presented before a large audience of scientists and citizens in three centenary addresses delivered by Dr. Shapley; Mr. Robert L. Black, a member of the board of directors of the University of Cincinnati; and Dr. Raymond Walters, president of the university.

The historic background of Cincinnati a hundred years ago and the personality of Professor Ormsby MacKnight Mitchel, of Cincinnati College, founder of Cincinnati Observatory, were sketched by Mr. Black. In vivid, picturing words, he described the laying of the cornerstone of the Cincinnati Observatory on "that chilly November day when a national salute of 21 guns fired from Mount Ida, re-echoing from the low, heavy clouds, roused the 50,000 odd

inhabitants of Cincinnati." The orator of the day was the illustrious John Quincy Adams, "small, neat, a quiet personage, still apple-cheeked in spite of his 76 years," who had endured rain, snow, cold and the rigors of a thousand-mile journey from Massachusetts to accept the invitation of Judge Jacob Burnet, one of the founders of Cincinnati College and president of the Cincinnati Astronomical Society.

Mr. Black depicted the scene: "Judge Burnet, tall, swarthy, austere," and Professor Mitchel, "a little terrier of a man, sharp-eyed, talkative, full of bounce," sat in the barouche with Mr. Adams as "the heavens opened, filling the streets with water." The long line of citizens paraded through the rain up to the top of Mount Ida, the location of the observatory-to-be. On a small stage there,

Judge Burnet introduced the "old man eloquent" to the auditory of umbrellas. Mr. Adams read his address rapidly; before he was done the manuscript was so defaced by the rain as to be scarcely legible.

Thereupon he laid the cornerstone, "invoking the blessing of Him, in whose presence we all stand, upon the building which is here to rise and upon all the uses to which it will be devoted.

Mr. Black then recounted the dramatic story of how it happened that a President of the United States, a judge and a professor thus met on a hilltop overlooking the Ohio River. The hero of the story was Ormsby MacKnight Mitchel, Kentucky-born son of Scotch-Irish folk, graduate of West Point, engineer, professor of mathematics and natural philosophy in Cincinnati College, and astronomer.

There was at that time no working telescope in America: Mitchel, lecturing on astronomy at Cincinnati, saw a vision. He "resolved to devote five years to the erection of a great astronomical observatory right here in the City of Cincinnati."

He had not a penny in his pocket, no future prospect whatever except his \$1,500 a year for teaching; he had little influence, political or social. "I will go to the people," he said . . . "I will plead the cause of science. . . . I am determined to show the autocrat of all the Rus-

sias that an obscure individual in this wilderness city in a republican country can raise here more money by voluntary gift in behalf of science than his majesty can raise in the same way throughout his whole dominions."

And *that* he did.

How Mitchel organized the Cincinnati Astronomical Society, sold \$6,500 worth of stock, went to London, then to Munich and there got an option on a \$9,000 telescope, a 12-inch glass exceeded only by the Pulkova telescope; how he returned home and finally raised the balance due; how he obtained land for an observatory site and personally superintended the erection of the building; how he began publication of an astronomical journal, *The Sidereal Messenger*—all this was stirringly related in Mr. Black's admirable paper.

The address of President Walters outlined the academic background of Professor Mitchel's Cincinnati College which, founded in 1819, continues within the University of Cincinnati to-day. In the decade 1835-45, Cincinnati College had a remarkable flowering. Its faculty included President William H. McGuffey, author of the school books which influenced American life for several decades; Dr. Daniel Drake, who headed a medical department as brilliant as any in America of that day; Timothy Walker and John C. Wright, who made the law school famous for their *Western Law Journal* and for their classic texts in American law; and E. D. Mansfield, professor of history and journalist. Professor Mitchel served in this era as a teacher of mathematics, science and engineering. He began at Cincinnati College in 1836 one of the first collegiate courses of civil engineering in the United States.

Touching upon Professor Mitchel's astronomical dream and achievement, the speaker said:

This little giant of Scotch Irish ancestry applied his powers of intellect, personality and character to fulfillment of St. Paul's dictum: "This one thing I do." Despite discouragement, obstacles and disaster, he accomplished the thing he set out to do, which was the establishment in America of an astronomical observatory to rank with those of Europe.

Then Professor Mitchel wrote, with quiet pride: "The building of the Cincinnati Observatory has forever settled the great question as to what a free people will do for pure science." That utterance had the same noble tone of faith in the people embodied exactly twenty years later in the address of Lincoln at Gettysburg, November, 1863, in the midst of a war in which the college professor and astronomer of Cincinnati was to serve as a general in the Union Army.

The speaker went on to say that "such faith in the people was validated by the way in which the citizens of Cincinnati in Mitchel's own and later generations have carried on the enterprise he established."

As an outcome of a proposed merger of the old Cin-

cinnati College, the newly created McMicken University and the Cincinnati Observatory, the University of Cincinnati was established in 1870. The Cincinnati Astronomical Society voted to merge with the university, and in 1878 the City of Cincinnati acted to maintain the observatory by taxation. In 1918 the city tax for the observatory was combined with that for the entire University of Cincinnati.

"The vital point is that the city tax continues to-day as the source of the observatory's income," Dr. Walters said. "Cincinnati is still fulfilling the faith of Ormsby MacKnight Mitchel as to what a free people will do for pure science."

"The Cincinnati Observatory has worked chiefly in sidereal astronomy and its long-continued studies of the proper motion of the stars have, in the words of Professor S. A. Mitchell, of the University of Virginia, 'made Cincinnati Observatory famous throughout the astronomical world.'"

We have confidence that, in the years to come, the high tradition established by Mitchel, carried on by Stone, Abbe, Porter, Yowell, and Elliott Smith will be advanced under Paul Herget, who is to return and become director of the observatory following termination of his present duties at the U. S. Naval Observatory.

To the advancement of the Cincinnati Observatory upon its fundamental ideals of scientific aspiration and popular support, I am privileged to pledge the cooperation of the University of Cincinnati and the people of Cincinnati.

Dr. Shapley began his address with felicitations to the University of Cincinnati upon the observatory centenary, and congratulations upon the appointment of Dr. Paul Herget as director to succeed the late Dr. Elliott Smith. Said Dr. Shapley:

About a hundred years ago a famous English scientist pointed out to the citizens of Cincinnati what they should do to become the zero-point of the Western Hemisphere. Cincinnati would be to America what Greenwich is to England. Actually the plan didn't come off, perhaps because Cincinnati didn't want to be zero in anything. But at about the same time there was much interest in Cincinnati concerning a new European theory that the center of the universe is in the bright star cluster called the Pleiades.

Dr. Shapley then outlined the contributions made during the century since the founding of the Cincinnati Observatory to "the questions of centers,—the center of the earth, the center of the solar system, the center of the Milky Way." He raised the question: "Does the universe itself have a center?"

As to the theory of Maedler, well-known astronomer at Dorpat a century ago, that the bright star Alcyone in the Pleiades is the central body of the sidereal universe, Dr. Shapley explained that, while Maedler's

arguments were good, "subsequent research has shown that the center of the galaxy is in the Sagittarius, almost diametrically opposite to the place where it was put by Maedler. The distance is not a few hundred light years but more than 30,000 light years."

Dr. Shapley went on to say that the motion of the sun that was recognized a hundred years ago is not a motion of rotation around a galactic center, but is the sun's own private random motion with respect to neighboring stars. The rotation around the Milky Way center is some 200 miles a second and takes with it all the neighboring stars. The central nucleus of the Milky Way galaxy is for the most part invisible and immeasurable.

Dr. Shapley referred to various dynamic, photometric and spectroscopic ways in which astronomers now "explore the half-seen central nucleus of our galaxy. The researches on stars in the direction of the Pleiades are used to find the distance to the anti-center, that is, the distance to the rim of our wheel-shaped galaxy."

The speaker reported on the progress of Harvard researches on the galactic nucleus and the galactic anti-center, as well as on the diameter and thickness of the Milky Way. Illustrative slides were shown.

But the center of our galaxy is not the center of the universe. The identification of the spiral nebulae as external galaxies has completely changed the concept of a universal center. Our own galaxy is found to be a few hundred thousand light years from the center of the local supergalaxy, or group of galaxies.

But far beyond the bounds of our own local group of galaxies, we have mapped the positions of 500,000 other great stellar systems, and the questions before us now are: Is there a boundary to this overall system, the metagalaxy? Is there at the present time a great central dominating galaxy or group of galaxies? Is our galaxy or some other recognizable system at or near a center from which the other galaxies are receding in the expanding universe?

Dr. Shapley said that "nowhere do we find one king of all galaxies, enormous in mass and superlative in brightness. In fact, we seek in vain for a metagalactic center." He concluded that "there is no very good evidence that the universe is infinite or that it is finite."

There follow biographical sketches of the founder and first director of the Cincinnati Observatory and of its third director, Cleveland Abbe, under whom the observatory initiated a system of daily weather reports and storm predictions which led to the establishment of the United States Government Weather Bureau.

ORMSBY MacKNIGHT MITCHEL

1809-1862

THE energy and perseverance of Ormsby MacKnight Mitchel accomplished the task of building and equipping an observatory by popular contributions, a century ago in Cincinnati. Mitchel was born in 1809 in Kentucky of pioneer stock. When he was seven years of age, his father died and his mother moved to Lebanon, Ohio. He was taught at home, and then entered a school conducted by his brother. On account of limited finances, he started to support himself at the age of thirteen. An appointment to West Point gave him the desired opportunity to study, and after graduation, he taught mathematics for two years. Assigned to duty at St. Augustine, Florida, he soon grew tired of the tedium of garrison duty, resigned his commission and went to Cincinnati. First he tried the law, but without success; then he became professor of mathematics and natural philosophy at the old Cincinnati College.

In 1842, Mitchel delivered a course of lectures on astronomy that aroused great interest; at the last lecture he proposed a plan to build an observatory. He would solicit subscriptions of stock at \$25.00 a share, and when 300 shares were subscribed, he would call a meeting of stockholders and organize a society. This he did; a constitution was adopted, and officers elected, including Judge Jacob Burnet as president and O. M. Mitchel as astronomer. Mitchel was sent to Europe to buy a telescope; finding nothing suitable in London or Paris, he went on to Munich, where he found a 12-inch glass, equal to Lamont's and inferior to the Pulkova telescope alone. Its price exceeded the funds in the treasury, but he ordered it and went home to raise the balance.

The building of an observatory was the next difficulty: Judge Nicholas Longworth donated four acres of ground on a hill east of the city, on condition that the building should be finished in two years; various citizens became stockholders, paying in cash or material or labor. The venerable John Quincy Adams was invited to lay the corner-stone—his interest in science was well known and, when President, he had recommended to Congress the founding of a national observatory. Though 77 years old, he accepted the invitation and traveled to Cincinnati by rail, by lake boat, by canal and finally by stage-coach. The city council met him at the city limits and escorted him to his hotel; the next day a parade, composed of military and civilian groups, conducted him to the hill, where he laid the corner-stone and delivered his address in spite of pouring rain. The city council named the hill Mt. Adams in his honor.

Mitchel promised to conduct the observatory for ten years without remuneration; when the college burned