

'And There Was Light' But Man Measured It

Navy Lost Indifferent Gunner in Albert A. Michelson, Who Accomplished This Feat, but Science Gained an Outstanding Leader

By JOHN J. O'NEILL
Science Editor of The Eagle

In the beginning God made the universe. He made man. He separated the light from the darkness. Later He made Albert A. Michelson and Michelson measured the light.

And Michelson found that in light God has given man a measuring rod of the universe. He found it the fastest moving entity in the universe. And he used the light to reveal the glories of creation and the infinite wonders that are concealed in the handiwork of God.

He used the light waves to measure the smallest distances man has ever measured and he used them to span the diameter of the greatest stars and to tell us the answer in miles.

Broadened Man's Vision

And he has broadened the vision of man so that he can comprehend the infinitely small and the infinitely large—the microcosm of the atom and the macrocosm of the giant stars.

The achievement of Michelson, while an instructor at Annapolis, making his first measurement of the velocity of light, using apparatus which did not cost more than \$10, is indicative of the abilities of this scientist. He never let material obstacles stand in his way.

For his later experiments investments running well up in the tens of thousands of dollars were required. Financing his beautifully conceived experiments was almost as big a task as carrying them to completion. Yet so great was his reputation for achievement, and so high a value did the whole world place upon his work that he never lacked for funds.

Was Aided by Sperry

The late Elmer A. Sperry of Brooklyn made in his plant here a metal mirror that was a marvel of accuracy, and a searchlight of great intensity, rivaling the sun's rays. He turned them over to Michelson without cost.

In connection with this experiment the Government spent a large amount of money to accurately survey the distance between two mountain peaks. They were separated by 82 miles and the order of accuracy required prohibited an error of more than a fraction of a foot.

Difficulties almost insurmountable blocked the progress of Michelson experiments. In one of them it was necessary to reflect a beam of light to a mirror six inches square on top of a mountain 82 miles away and reflect it back to the rotating mirror from which it started, and catch the ray on a surface less than one inch square.

During the war the Germans considered it quite an accomplishment if they could hit any spot in the city of Paris with their Big Bertha from a distance of 75 miles. Science has its victories and its heroes.

Everyday Value of His Work

Persons with a pragmatic type of mind might ask: "What use is all this work? What has it got to do with automobiles?" One reply would be that mass production of automobiles would not be practical without the accurate measurements made possible by the creation of master gauges which in turn are measured in terms of wavelengths of light—a method made possible by Michelson's invention of the interferometer.

Einstein's theory of relativity has given science a new vision of the universe. The intellectual horizon of the civilized world has been extended by it. This theory had its origin in Michelson's effort to measure the drift of the earth through space by observing its effect in an interferometer on light beams that had traveled at right angles to each other.

Invented Harmonic Analyzer

He invented the harmonic analyzer, a mathematical instrument for separating any curve into its component simple curves. It has been said that by means of this instrument a mathematician could write the equation for the curve shown by the profile of a person's face.

He measured the tides in the earth. At the time of his death he was engaged in an experiment for still further refining the measurement of the speed of light, using a vacuum tube—a pipe line—a mile long.

No man has done more to solve the mysteries of light than Michelson, yet when he was graduated from Annapolis and was offered a position as instructor in physics he found it necessary to study the theory of light during the Summer in order to start teaching it in the Fall. This story is told by his friend Robert A. Millikan.

Reprimanded as Gunner

It is said also that the superintendent at the Naval Academy told Michelson that if he would give less attention to his scientific experiments and more to his naval gunnery there might come a time when he would know enough to be of some use to his country.

There has been a peculiar way of settling aside the judgment of experts. It Michelson had become a good naval gunner America would have lost its first Nobel prize winner and the world would have lost a scientist whose value to the progress of mankind is beyond all calculation.

In the passing of Dr. Michelson civilization has lost its apostle of light. Into his 79 years on earth he crowded a brilliant record of accomplishment.

Death Claims Dr. Michelson

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associate of the Carnegie Institution of Washington.

The end came too soon for Dr. Michelson. He had hoped to round out a hundred years.

But it found him serene in the knowledge he had completed his greatest experiment—his final race with light to compute its speed. Only a few tests remain before the result can be proclaimed.

"When the universe no longer holds any amusement for man," he had observed not long ago, "then it is well nigh time for him to die. I am still amused by many things. Science amuses me. So do my other diversions—painting, tennis, playing the violin and billiards."

Said Science Was a Lot of Fun "I should like to live to be a hundred years old, and I will unless my health goes back on me."

Students and faculty at the university recalled him as a shy but benign little man, his eyes always twinkling, with humor; one never too busy to stop for a chat.

"Science is a lot of fun," was his creed. He made it that for those who came to study under him. Too feeble to move, Dr. Michelson this week called Prof. Francis G. Pease to his bedside. Dr. Pease of the Carnegie Institution Washington staff, was carrying on the final work of the last Michelson experiment with the vacuum tube.

He had come to tell the scientist that all experimental work was completed and all that remained was the recheck of instruments and recheck of measurements to derive the final figure of the speed of light.

In a voice barely audible, with two watchful nurses nearby, Dr. Michelson started dictating. Dr. Pease bent over to catch the words. Page after page of lucid scientific analysis was set down.

The keen dark eyes of Dr. Michelson and the weak voice, seemed all that was alive. His frail form otherwise was still. Then he ceased, and smiled. Thus was written the introduction to his formal report. The key word for the world of science from the man who had been in the vanguard for more than 30 years.

His work was done. The scientist then went to sleep, smiling. Then came the brain hemorrhage that destroyed the mind.

Created New Physics

Darwin gave the world a new biology; Freud, a new psychology. It remained for Albert Michelson to create a new physics.

For it was Michelson who started Einstein on the train of reasoning that evolved the theory of relativity—a new conception of time, space, motion and reality itself.

Had he not done this, he would still have been one of the world's outstanding physicists. He was literally the first man to turn the light upon light.

The greater part of his life was devoted to measuring the speed with which light travels. Half a century ago when he was teaching physics at the Naval Academy of Annapolis he made a measurement more accurate than any that had ever been made before.

But Michelson wasn't satisfied. He kept at it. As a result of the most meticulous experiments ever made anywhere, he announced in 1926 that the result indicated light speed was 186,173 miles a second.

Yet he was disquieted because he still might be a few miles out of the way. There were more experiments in 1928 and again last fall. The checking of data is not yet complete, but Michelson died in the assurance that his earlier estimates have been found correct.

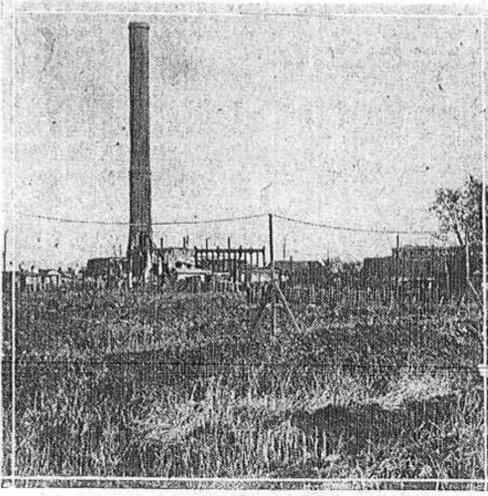
This alone would have meant the junking of the physics text books which for years had given light speed with dogmatic finality as 186,000 miles per second.

Supreme Test of Einstein Theory

But there was something more than the mere measurement of light involved in these last experiments. They were intended to put the Einstein theory to a supreme test. The report Michelson dictated shortly before his death is being awaited breathlessly by the scientific world.

There was nothing in Michelson's early life to indicate the heights to which he was to attain. He was not a precocious child. In his boyhood, Sir Isaac Newton made water clocks and sun dials. Mozart was compos-

STACK CALLED HAZARD TO FLIERS



This brick chimney, 225 feet high, reader-pilot says is a dangerous obstacle in night flying. It is located approximately 1,600 feet from the boundary of Floyd Bennett Field, the city's municipal airport at Barren Island. Posts in foreground mark boundary of the field. The photo was taken from the edge of the airport.

225-Foot Stack Menaces Fliers

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neighborhood of \$30,000 for permission to do so and negotiations were dropped.

Long Considered Hazard
"We have long considered it as a hazard and have done our best to have it removed," Mr. Keller said today. "It is the only stack near the field. However, it is a couple of thousand feet away from the airport and outside the flying area. It is on private property and there is no law which requires the owners to knock it down if they don't want to do so. We have given it lots of thought and will do our best to get rid of it."

Not Used in Years
The stack, which is 225 feet in height, is part of the old Barren Island incinerator plant. It has not been used for many years. It was a smaller steel stack also located on the property was included in the plans for clearing the approach to the field. This stack is approximately 60 feet high. Both are located on what is known as the old White estate. The large stack has been a landmark on Barren Island for many years. It is only 1,600 feet distant from the boundary of the flying field.

Stanford Willis, supervising inspector of the Department of Commerce at Roosevelt Field, said no government action could be taken to eliminate the structure although its marking as a hazard could be asked by writing the Aeronautics Branch, Department of Commerce, in Washington.

The name of the owner and a description of the obstacle should be given in calling its attention to department officials, he said.

In view of the fact that the incinerator has been there long before the airport, there is nothing we can do about it. It is a State problem and lies within its jurisdiction," he added.

At the office of the New York Sanitary Utilization Company, an attendant acknowledged that negotiations had been started with the city to do away with the stack.

"We made a price to the city but have not heard anything about it since."

While it was said the plant has not been used for some time, the attendant said he saw no reason why it should be torn down unless the amount asked of the city was paid.

Rites for Clivette, Artist, Conducted

Funeral services for Merton Clivette, artist, were held yesterday at his home, 92 5th Ave., Manhattan, the Rev. Edward H. Emmet, pastor of the Manhattan Congregational Church, officiating. Former Governor William Sulzer and former Assemblyman Phelps, both close friends, spoke at the service, and Mildred Emerson, opera singer, and Princess Atalie, a full-blooded Indian, also close friends, sang.

The body was taken to Fresh Pond Crematorium. It was Mr. Clivette's wish that his ashes be strewn from the Statue of Liberty.

Became Famous Overnight
Michelson, then 26, was instructed to prepare a series of lectures on light to be delivered to the cadets. In connection with these lectures he made his first light velocity experiment and became internationally famous overnight.

It was not until then he himself seemed to realize that his destiny was to become a physicist and not a naval officer. He resigned from the Navy, and went to Europe to study at Berlin, Heidelberg and Paris.

In going to Berlin, he was returning to the land of his birth. He was born in Strleino, Germany, in 1852, and was only two years old when his parents emigrated to this country, trudged across the prairies before there was a railroad west of Chicago and finally settled in Virginia City, Nevada. The boy was sent to San Francisco for his high school education.

Naval Graduate in 1873
It was in 1873 that he was graduated from the Naval Academy and 1881 when he returned from his European studies to accept the chair of physics in the Case School, Cleveland. He held this post until 1889, when he became professor of physics at Clark University, Worcester, Mass.

Three years later he went to the University of Chicago, where his most notable work was done. Honor after honor was heaped upon him. Half a column would be necessary merely to list the degrees and honors that have been bestowed upon him. He was the first American to

JOINS THE DEAD



E. Stillman Doubleday

E. S. Doubleday, Veteran of Civil War, Dies at 91

Was Proud of Fact That He Spoke With Lincoln—Served as Court Clerk

E. Stillman Doubleday, 91, Civil War veteran, who was proud of the fact that he had talked with Abraham Lincoln, died yesterday of the infirmities of age at his home, 978 Bergen St.

Mr. Doubleday, who retired 15 years ago after 25 years service as a clerk in the Supreme Court in Brooklyn, was born in Savits, N. Y., Jan. 19, 1840, and served in an up-State regiment during the Civil War. It was while in the service that he met the Emancipator and talked with him.

Mr. Doubleday had lived in Brooklyn for 50 years. He was always keenly interested in current events and wrote many interesting letters to The Eagle on topics of the day. He also was the author of several books, including "Just Plain Folks" and "Lost Opportunities."

He is survived by his wife, a son, Robert Doubleday, a publisher, of Tacoma, Wash., and three grandchildren, Mrs. Edward Riehl of Hempstead, Miss Myrtle Berry of Brooklyn and Duane Berry. Services will be conducted at 8 p.m. Monday at the home, the Rev. Dr. Stanley Durkee, pastor of Plymouth Church, officiating.

TROLLEY KILLS BOY

An unidentified boy, about 14, was killed by a street car in Jamaica just before noon yesterday. The accident occurred in a private right-of-way of the New York and Queens County Railway Company behind the Teachers' Training School, Alfred Morgan of 160-12 Fifty-ninth Ave., said the first knowledge he had of the accident was when he heard a scream.

My Gosh! Is Heaven A Public Nuisance?

Now Wait a Minute, Is That Heaven in Sayville, L. I., That Sort of Place? Well, the Trial of Cult Leader May Answer the Question

Special to The Eagle
Sayville, L. I., May 9—Is "Heaven," the new cult center of the Rev. Major T. Divine, a public nuisance or not?

This is a question which has this quiet South Shore community all agog following the indictment of the colored cult leader yesterday by a Suffolk County grand jury at Riverhead.

But of far greater interest to those who have watched the new cult "flourish like a bay tree" under the aegis of a new religion, is: "Who is putting up the money for operating expenses?"

In scores of homes this question has been asked for the last 12 years and no satisfactory answer has ever been forthcoming as to the identity of the "angel" or "angels" who are underwriting the undertaking.

Didn't Mind at First
If the secret source of the cult leader's funds is not revealed at his trial then it will be considered a flop by the irate neighbors who have complained of the "goings-on" within the confines of the Divine "Heaven."

For years neighbors have been tolerant of this "heaven" within their midst. They didn't mind at first the peculiar forms of worship practiced there, but recently the exhortations and vociferations therein have been getting more and more hectic.

So 27 of those who live nearby decided things would have to quiet down within the "heavenly gates."

Spends Thousands
When these complainants were questioned yesterday if curiosity as to the source of the cult leader's finances had any connection with their charge they denied it, but usually added:

"It is strange, isn't it, though? He toils not, neither does he spin." The storekeepers here may be a bit curious but they certainly admit that the Rev. Mr. Divine is one of their best customers.

It is common knowledge that he spends thousands of dollars a year aiding the poor, getting new clothes for novitiates in his cult whether they are black or white, helping the sick and in other charitable work.

When released on \$1,000 bail Friday pending arraignment in County Court this week, the cult leader declared he would make no effort to defend himself, adding:

"Material things mean nothing to me. I have no need of them." Those who have attended some of the meetings at "Heaven," to which any one is invited, declare there is never any effort to take a collection and that everything in the way of refreshments are gratis.

Local Carnegie Men Enter Fraternities

Special to The Eagle
Pittsford, Pa., May 9—Three Brooklyn students at Carnegie Institute of Technology here have been elected to honorary campus fraternities, announcement was made today. They are:

Charles Schactvet, 221 77th St., elected to Delta Skull, junior class honorary.
Richard Turner, Hotel St. George, Alpha Tau, of the college of industries.
Harry P. Miller, Jr., 175 Steuben St., Theta Tau, in the college of engineering.

DROWNED FROM PIER

Police last night were seeking the identity of a man about 50 who fell from a dock at the end of Webster Ave., Astoria, yesterday afternoon and was drowned in the East River. The body was dressed in a gray suit, white shirt, blue socks and dark shoes.

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