Science

Giant Star Eye

Early last spring twelve scientist-observers, each equipped with a specially designed four-inch telescope, set out from the California Institute of Technology, at Pasadena, to record atmospheric conditions at nearly a score of locations in Southern California, at Catalina Island, in Mono County, in northern Arizona.

Reason: They were seeking that place nearest Pasadena where the skies are clearest, where temperatures are steadiest, storms fewest. When they had found it, it would be the site of the world's largest Star Eye, the 200-inch telescope for the California Institute of Technology, the construction of which has been made possible by financial backing from the International Education Board.

Last week, eight of the twelve scientist-observers having returned and eight proposed sites having been abandoned, indication was that the selection of the site for the giant telescopic eye had narrowed down to two locations in Southern California. The locations: 1) At Table Mountain, 90 miles northeast by trail from Pasadena, in the Angeles National Forest, at an altitude of 7000 feet; 2) at Pleasant Valley Ridge, 75 miles by trail northeast of Pasadena, north of Mt. San Antonio (Old Baldy), the last ridge adjacent to the desert, at an altitude of 8000 feet.

Now under construction are two twelve-inch telescopes. When their construction is completed they will be installed at Table Mountain, at Pleasant Valley Ridge. For two long years scientists will continue observations at the two points, attempt to discover any obscure disadvantages of the locations. When the two-year observations are at an end, and final selection of the permanent site is made, erection of the giant Star Eye will begin.

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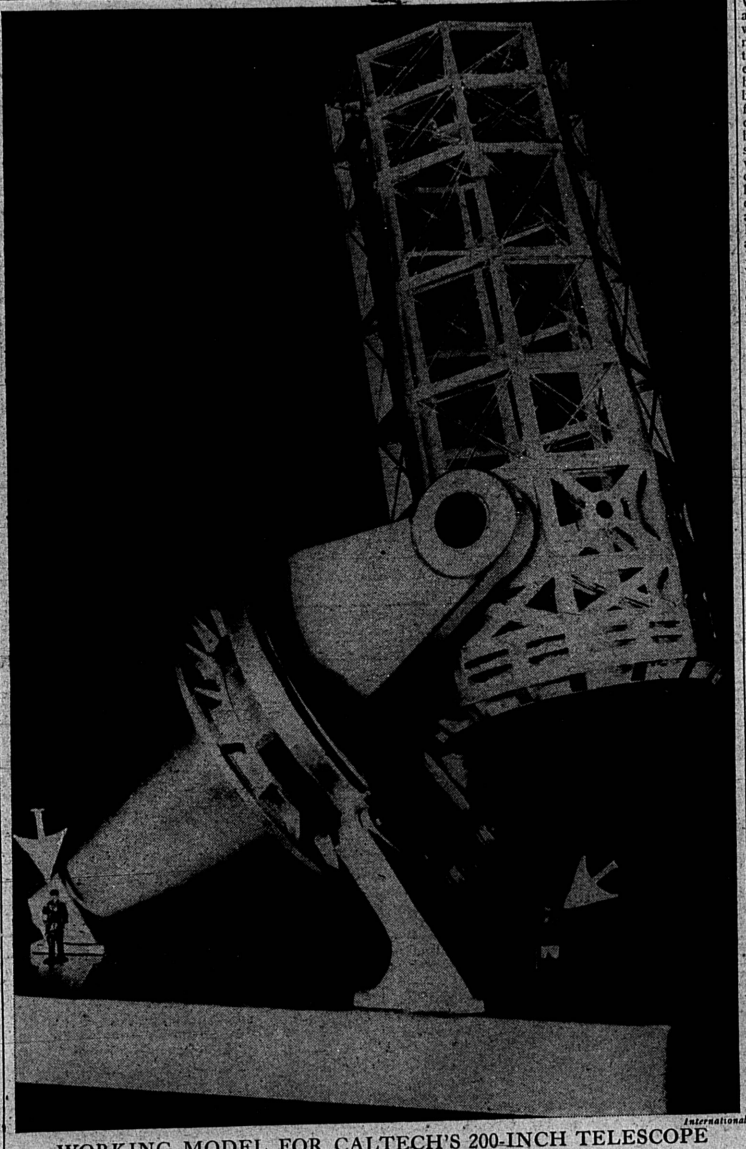
Fully ten times as powerful as the 100-inch Mt. Wilson Observatory telescope (now the world's largest) and capable of penetrating three times as far into space will be the giant 200-inch Star Eye of the California Institute of Technology. Compared to the pupil of the human eye (about a fifth of an inch in diameter) the Star Eye's "pupil" will be nine feet in diameter. Endowed both with magnifying power and with the cumulative capacity of the photographic plate —which forms a visible image by adding up during long exposures the invisible rays of feeble celestial objects—the 200-inch telescope will be able to penetrate millions of light-years into space, reveal more than a thousand million stars in the galactic (Milky Way) system, and hundreds of thousands of "island universes" beyond the Milky Way.

Chief obstacles in the construction of the telescope: the building, transportation, and final erection within the observatory of the 200-inch mirror, which will be sixteen feet in diameter, large enough to completely cover the floor of an unusually large living room.

The 100-inch mirror (reflector) of the Mt. Wilson instrument is made of glass, but no glass mirror will be the giant reflector of the 200-inch Eye. Reason: Glass changes dimensions with changes in temperature. One rod of glass, one mile long, when heated one degree centigrade, measures exactly five-eighths of an inch longer than the original mile. The 200-inch reflector will be one-three-hundredths of a mile in diameter and the variation when affected by one degree of temperature would be one-three-hundredths of five-eighths of an inch. This would bend the whole surface; the glass would be blurred, hazy. Therefore glass is inadvisable for use.

Possible substitutes for glass: 1) Steel, a 200-inch reflector of which would weight 100,000 lbs., and therefore would eliminate it because of transportation difficulties; 2) fused quartz, expensive to produce and "worth its weight in gold" but one-sixth lighter in weight than ordinary quartz which is lighter than glass. Fused quartz —which is synthetically produced by heating common quartz to 1400 degrees centigrade, at which point it becomes fused quartz—is favored principally because it expands very little when heated, because of its light weight.

Not yet proved as the best of materials to be used, however, is fused quartz. Dr. J. A. Anderson, executive officer in charge of the telescope's design, last week declared that he and his associates are conducting experiments with other materials, notably the metals.



International.

WORKING MODEL FOR CALTECH'S 200-INCH TELESCOPE

The average man (arrows) would be insignificant beside it.

Education

Immoral?

Back in the days of ancient Rome lived a dramatist by the name of Terence. He wrote many a popular play, was lionized by Roman playgoers. Among his works acted out on the stage, few have endured so long or caused so many bursts of laughter as the comedy "Andria." When it was played in Rome, centuries ago, the Romans liked it, thought of it as modern Southern California playgoers think of the plays produced by Henry Duffy—clever but clean.

Almost two thousand years later, last week, the shades of old Terence were upon the stage of the theater at California Institute of Technology at Pasadena. The wit of Terence's "Andria" still appealed to Caltech students; they began rehearsals on the old Roman play.

Financially responsible for the performance, the specially appointed Caltech business manager wrote letters to many other educational institutions, sold many of them blocks of seats for the performance of "Andria." Among these schools who bought seats was Long Beach High School. But an officious official at the Beach City high school, curious, read the play in the meantime. When he had finished he thought of all the points, remarks, in the play. Then he thought of his students. Then he sat down and wrote Caltech the following letter: "Please cancel our order for 25 tickets to 'Andria.' I read the play. It is too immoral for the students of Long Beach high school. Their moral welfare depends upon me."

Caltech students were angry. In the first place they lost the money for 25 seats. Then they caustically remarked that such an attitude on the part of high schools was probably responsible for the asserted provincialism and narrowness of American college students.

In Caltech's official student publication appeared an answer to Long Beach High School's accusation that the play "Andria" was immoral when, editorially, it reminded Long Beach and the general public that past productions of classical comedies and tragedy, carried out by Caltech students, had brought only favorable comment.

New Curriculum

The San Diego State Teachers' College, originally endowed as a teachers' training institution exclusively, has for many a year operated under such a charter. The San Diego College for years progressed, prospered. Recently the first shovelful of dirt was shoveled in preparation for a new group of buildings (News Review, Nov. 11-17).

And along with the new building program came, last fortnight, the announcement from the office of President Edward L. Hardy that the curriculum was also to be improved, enlarged. But, under the original charter, in the opinion of Hardy, to enlarge the curriculum would entail danger of exceeding the powers originally given to the college. Therefore, to avoid legal infringements, the college has been allowed to grant a new type of degree. Students not majoring in education, the main course of the college, but who have completed some four-year course successfully, may finally obtain teachers' credentials by taking a master of arts degree. This would take an additional year.

Aviation

Eagle for Eagle

Every employee in Lockheed-Vega's Burbank plant from manager to errand boy temporarily stopped work last week. For months they had contemplated the event which was about to take place; for months they had toiled secretly to complete the new, extraordinary plane which was about to take the air for the first time. It had been built expressly for Colonel Charles A. Lindbergh and his wife, and it embodied every principle that was new in aviation. Last week it was given its first test in the air.

Also there to watch the initial test of the new Lindbergh plane was many an observer, newsman. When Lockheed flunkies fumbled at the latch of the huge doors which had thus far kept hidden the new ship, swung them open, spectators saw a plane unlike anything ever built previously, for it had been specially designed by Lindbergh and Lockheed engineers. As flunkies wheeled the plane from its covering, spectators saw a long, black, streamline body cigar-shaped, tapering smoothly off toward the tail, containing two cockpits, lined with shiny black leather upholstering, equipped with every known navigation instrument, also equipped with a dual control. But most striking in the appearance of the plane were the wings. Painted a bright vermillion they were attached to the lower part of the body, giving the ship both a colorful and trim appearance, unlike anything ever seen before in this country. Also striking were the coverings over the wheels (pants).

The test: Every spectator was tense as Lieutenant Carl Harper stepped into the forward control seat, warmed up the motor, gave his parachute a last minute inspection. Those who had designed and built the plane had no doubt that it would perform well. Those who were merely spectators wondered if the plane would go up and come down safely, successfully. At the signal, Harper puller back the throttle, the crowd saw the plane glide along 600 feet of runway, and then gracefully float from the ground and quickly upward. As prettily as it had taken off it soon landed again. Another test soon after proved the plane's capability of carrying a heavy load. Its huge tanks (capacity, approximately 500 gallons) were completely filled with gasoline, a weight of approximately 1½ tons. Even with this great load, the plane did not hesitate or balk, took off, handled easily, landed lightly, was brought to a stop with specially installed brakes operated from the forward cockpit.

Fliers & Flying

Women's Record. First it was not official because the official timing instrument of Joe Nikrent, National Aeronautical Association representative, was out of order, when Amelia Earhart (first woman to fly across the Atlantic) flew over a prescribed course (at Burbank) at what unofficial timers said was a speed of 185 miles per hour. This was 29 miles an hour faster than the women's world's record set last summer by Louise Thaden. But, not to be cheated of official recognition of her feat, Miss Earhart waited until Nikrent's official instrument was put in order; then she brought out her plane again, a Lockheed-Vega with a Wasp motor, flew it as fast as it would travel. When she landed, Nikrent told her she had made a high speed of 197.8 miles per hour and an average speed, for the prescribed course, of 184.17 miles per hour. Miss Earhart now holds the world's airplane speed record for women.

Reversible Propellor. Probably most astounding of all aeronautical exhibits at the recently held Western Air Show was the reversible propellor (News Review, Nov. 18-24). Explanatory exhibitors explained to Air Show patrons that this new propellor made it possible to taxi the plane backwards on the ground. Last week Famous Flier Art Goebel made further experiments. Flying low above the field of the Aero Corporation of America, Goebel reversed the propellor pitch (turned the vanes the opposite way) by means of a manual control in his cockpit. Result: Instantly the plane slowed its speed to such an extent that Goebel was compelled to return the propellor to its normal pitch to keep his plane from falling. Other tests showed that slight changes of propellor pitch increase the rate of climb, increase the absolute ceiling of the ship.