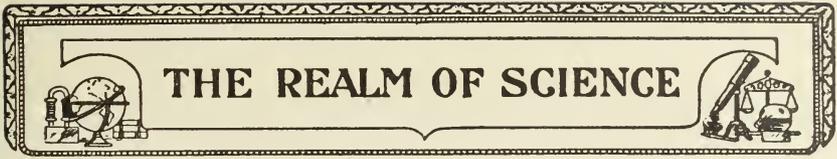


THE REALM OF SCIENCE

A decorative horizontal banner with a double-line border. Inside the banner, the title "THE REALM OF SCIENCE" is centered in a bold, serif font. On the left side of the banner, there is an illustration of a globe on a stand next to a telescope. On the right side, there is an illustration of a balance scale.

The California Meeting of the American Astronomical Society.



THE American Association for the Advancement of Science, the largest scientific organization in the country, which generally holds an annual meeting during Christmas week in some large city in the United States, decided upon calling an extra meeting in or near San Francisco during the time of the Panama-Pacific Exposition. Accordingly on Monday, August 2, 1915, at ten o'clock in the morning, the society was called to order in the Scottish Rite Auditorium, Van Ness Avenue and Sutter Street, San Francisco. There were four short addresses of welcome, by the mayor of the city, the first vice-president of the Exposition, the president of the University of California, and the chancellor of the Stanford University, and one response by an officer of the visiting Association. After this the president of the American Association, W. W. Campbell, the director of the Lick Observatory, delivered his formal address on Science and Civilization.

After this opening meeting, which was attended by about five hundred members, the association split itself up into its many sections with various rendezvous. Many affiliated societies also met at the same time, so that Section A, Mathematics and Astronomy, of the American Association, dissolved itself the next day into the American Astronomical Society, the Astronomical Society of the Pacific and the American Mathematical Society. It is of the first and second of these three, that this article proposes to deal at present.

Before the separation just mentioned there was a joint meeting of all these societies on Tuesday at 10 A. M. in the Chemistry Building of the University of California, in Berkeley, across the bay from San Francisco. C. J. Keyser of Columbia University, New York, read a long paper on the Human Signifi-



cance of Mathematics, after which George E. Hale, director of the Mount Wilson Solar Observatory, gave a most interesting address on his work and latest discoveries, illustrated by many fine lantern slides and experiments. From the doubling and tripling of certain lines in the spectra of sun spots, coupled with laboratory investigations, he has been able not only to prove that there is magnetism in these spots, but also to measure its intensity. He found that spots frequently occurred in pairs, and that they had opposite polarity. As these spots had long ago been shown to have a whirling motion like a terrestrial tornado, he explained their duplicity and opposite magnetism by an ingenious experiment. Suspending a very thick but flexible cord in water, and twisting its upper end by a small motor, he showed us that the lower and free end gradually took a horizontal position and even turned up like a horseshoe. As the two ends of the cord, seen from above, appeared to rotate in opposite directions, the experimental analogy of the double sunspot provoked a burst of applause.

In another experiment two oppositely-rotating puffs of smoke were blown close together under water in a large tank with glass sides. By illuminating these puffs with a narrow slit of light in various positions, the lecturer brought out further comparisons.

After the lecture the University of California generously offered a free lunch to its guests, and they numbered about two hundred.

In the afternoon the sectional meetings began in earnest, the American Astronomical Society and the Astronomical Society of the Pacific always remaining together. There were very few members of the first mentioned society from the Atlantic States, while the latter, of course, showed up well. There were about fifty persons at the meeting.

The first thing on the program was the presentation by the Astronomical Society of the Pacific of the Bruce Gold Medal to Prof. Campbell for his long and able directorship of the Lick Observatory and his astronomical labors, especially his

great discovery that a star's velocity is a function of its spectrum or, in popular language, that a star's speed increases with its age. (1).

Technical papers then followed each other in order, most of them destined only for professional astronomers. They dealt with improvements in apparatus, velocities of stars and nebulae, and results of observations of special objects. The most interesting paper was by Joel Stebbins, an Omahan by birth, and at present director of the observatory of the University of Illinois, in Urbana. He had already acquired an international reputation on account of his selenium photometer, with which he measured the varying brightness of stars. Even professional astronomers fairly gasped when he said that with his new photo-electric photometer an error of one two-hundredth of a magnitude would be an intolerable one, while they were glad to get the one-tenth.

A photograph was taken of the group of astronomers. It shows four professionals each from the Lick and Mount Wilson observatories, two from the Yerkes near Chicago, three from Ottawa, Canada; two from the University of California, one each from Allegheny, Pa., Washington, D. C., and the universities of Nebraska and Illinois and Arizona. Professor G. D. Swezey of Lincoln was also there. My faithful companion during the whole week was Father Miguel Selga, who had spent the preceding year as a professional astronomer at the Lick Observatory, and the eight months before that at the Lowell Observatory in Flagstaff, Arizona. He was preparing himself to take charge of the 19-inch telescope at Manila, to which he sailed the following week. If the time and means at his disposal will equal his ability, he will soon make a name for himself.

The next day, Wednesday, the whole Association, about five hundred people, were carried by a special train from San Francisco to Palo Alto, to visit the Leland Stanford Junior University. This university is most unique in that the whole capital was available at once and all its buildings could be de-

(1) See the Creighton Chronicle, Vol. V, No. 7, April, 1914.

signed and located according to one architectural plan. The architect has surely made good use of his opportunity. We had, however, very little time to inspect the interior of the buildings. After the address of welcome by Chancellor Jordan and the reply by Campbell, the president of the Association, we had to stand in the "bread line" for a long while for our lunch. The rest of the time was devoted to sectional meetings.

The papers were as technical as before, dealing with the motions of the stars in space, their spectra, and light variations. The most interesting paper was one by L. A. Bauer, chief of the Magnetic Division of the Carnegie Institution, who had been my traveling companion for two days from Denver to San Francisco. He spoke of the construction and voyages of the non-magnetic ship "Carnegie," whose purpose is to investigate the earth's magnetism everywhere on the oceans, and to correct the errors of our sailing charts. It has already traveled over a hundred thousand miles and has proved of immense service to navigation.

Thursday, August 5, found the astronomers back again in Berkeley, in what is called the Students' Observatory, since the Lick Observatory on Mount Hamilton, belonging to the same University of California, is devoted to special research work. This Students' Observatory had a lecture hall with about a hundred seats. It had several telescopes, the largest being about the size of the Creighton instrument. It had the same style and size of transit, minus its circles however. But the place was all overgrown with trees, so that the extent of visible sky was much curtailed. The director, A. O. Leuschner, has won renown by his rapid computation of orbits (2), and his students keep track especially of the twenty-two asteriods that Watson discovered and "endowed," that is to say, for which he left a fund to pay the computers.

The papers this day dealt with the distances of the stars, the sun as a variable star, and other technical points. A. E. Douglass, of the University of Arizona, showed us photographs

(2) See the Creighton Chronicle, Vol. IV, No. 2, November, 1912.

of the cross section of trees, and called attention to the spacings of the annual rings. He thought he might find a relation between the weather and tree growth and the eleven year cycle of sun spots. Some of his cross sections proved the connection clearly for long periods, some were very irregular and others negated it. He had to conclude that climate, position, and environment were equally potent factors in tree growth.

Father Selga presented a paper on the Orbit of the Spectroscopic Binary Sigma Scorpii, and showed that this star, like several others in increasing numbers, is an exception to the rule that astronomers had formulated for this class of stars.

My own paper on The Solar Eclipse of 1916, December 24-25, was illustrated by two lantern slides. It dealt with an eclipse exceptional in many ways, as for example in its tiny magnitude of only one and one-tenth per cent, and in its occurrence at Christmas midnight.

But the most memorable day of the meeting was Friday August 6, when the party of 46 astronomers, professional and amateur, went in a body to the Lick Observatory. Leaving San Francisco at 9 o'clock, we arrived at San Jose at 10:30. Eight automobiles then conveyed us over the long and dusty mountain road, twenty-six miles long, through Smith Creek, where we had lunch, to the top of Mount Hamilton, where we arrived at ten minutes after three o'clock. The director, W. W. Campbell, who had preceded us the day before, stood in the portal of the great observatory and welcomed us to his home.

After an inspection of the building and its equipment, in which Father Selga's guidance was of inestimable assistance to me, the members of the American Astronomical Society, met in the library and elected officers for the next term. As was only proper under the conditions, Prof. Campbell was elected first vice-president, since the post of president will be reserved as long as he lives to Edward C. Pickering, the director of the Harvard College Observatory, whom all the world recognizes at present as the greatest living astronomer, and whose absence we all regretted.

The view on Mount Hamilton is surely all that an astronomer could desire, although the life on this lonely mountain top, especially in winter, must make him sensible at times that the social part of his nature has been sacrificed for his love of the science. However, Mount Hamilton has grown until now there are 60 people living there, including the children who go to school as regularly as city children do.

About an hour before sunset the whole party partook of a buffet lunch with the director and his staff and their families in the open air on a spur of the same mountain about a half a mile from the observatory. The scene was surely poetic, with the great observatory and the surrounding mountain tops in the background, the yawning abysses in the foreground, and the guests at the rustic tables.

As the sun began to set the whole party hastened back to the observatory to enjoy the view. Far away in the distance we could see the fog rolling in from the ocean over San Francisco. Then, as it grew darker, lights began to appear in the Santa Clara valley, and to twinkle with unwonted splendor. The great 36-inch telescope was now at our disposal and turned to some of the most interesting celestial objects. Unfortunately, however, there was no moon and no planet to be seen, and the sky itself was not the purest, so that only a low power could be used on double stars and clusters. Some of the more professional met in the dome of the 12-inch telescope, to which Prof. Stebbins had attached his photo-electric photometer.

At 9:30 P. M. some of the occupants of our automobile were anxious to be gone. Prof. Campbell was there to bid us good-bye. The view in the valley, with the shimmering lights of its many cities and towns, rivalled that of the sky above and of the beautiful cluster in Hercules seen through the giant telescope. And the many windings of the road had almost as many surprises for us by night as they had had by day. By 11:15 we were again in San Jose. Friday August 6, 1915, will be a memorable day in the history of the Lick Observatory and in the lives of those that were then gathered in its walls.