(7) The quality of service supplied to the community should be recognized both by the public and by the medical profession as the first and most important consideration in every plan for providing more efficient surgical service and making it available to all classes of the population.

SOME HIGH LIGHTS OF ASTRONOMY DURING THE PAST YEAR[1]

By Dr. HARLOW SHAPLEY

DIRECTOR OF THE HARVARD COLLEGE OBSERVATORY

THE year has been well illuminated astronomically. High lights appear in India, Switzerland, Austria, Italy, Germany, Princeton, Arizona, Pasadena, Cambridge, and on Mount Palomar in California.

(1) The most talked-of star in the universe at the present time is the fourth magnitude eclipsing binary Zeta Aurigae. During the past three months it has had more powerful machinery devoted to its eclipse antics than ever before in its history or ours. Guthnick of Germany called attention some months ago to the importance of the month-long eclipse which the star undergoes three times in every eight years. Nearly three thousand observations by Miss Swope on the Harvard plates have defined the light variations closely, and in a dozen observatories over the world photometric and spectroscopic measures were made from August to October of the remarkable secret-revealing phenomena that occur at the beginning and end of the eclipse of a very hot blue star by its gigantic reddish and cooler companion.

(2) Confirmation of the great antiquity of the earth's crust comes this year from Vienna through work by Miss Kroupa on the radio-active properties of ancient rocks from Canada; she confirms earlier work on related rocks of the pre-Cambrian in getting an age of 1,725,000,000 years; the forming of the crust must have been much earlier.

(3) A new theory of relativity, which takes care of Einstein's corrections to Newtonian theory, but does not abandon Newton so completely and does not demand an exploding universe, has been advanced by the chief judge of the High Court of Allahabad in India, the Honorable Sir Shah Mohamet Suleiman. The judge is also vice-president of a Moslem university and a Cambridge-trained mathematician of high ability.

(4) From Mount Wilson and Harvard come extensive contributions to knowledge of the distribution of galaxies, and from Harvard some interesting results on the diameters of galaxies and the properties of supergalaxies.

(5) Dr. Merrill of Mount Wilson has discovered a new puzzle, and thereby makes a most important contribution to knowledge of interstellar space through finding some wholly unexplained interstellar absorption lines in the spectra of stars; interstellar calcium and interstellar sodium have long been known, but this is as yet interstellar mystery.

(6) From Princeton, Harvard, Mount Hamilton, Mount Wilson, and Flagstaff come important contributions in spectrum analysis—the discovery of methane and ammonia in the atmospheres of the outer planets, sulfur in the sun, quadruply ionized neon, not only in planetary nebulae of our galaxy but in an external galaxy, triply ionized argon in the nebulae, and in the hotter stars doubly ionized neon and argon. Coupled with these observations are some brilliant interpretations of atomic and molecular structure and behavior.

(7) Wholesale aluminizing of astronomical mirrors, replacing silvering, has gone ahead this year, culminating in the aluminizing of the Lick Observatory Crossley reflector. Silvering, in a few years, will probably exist only on the historical shelf.

(8) Equipped with an aluminized mirror Cornell sent an expedition (last summer) up the San Francisco Peaks at Flagstaff and now reports on the photographing of spectra of ninety-seven stars far into the ultra-violet, using the results to get at stellar temperatures.

(9) The Pope's observatory has been moved from his garden in the shadows of Saint Peter's to his summer place, Castel Gandolfo, well out of town, and there equipped with many new instruments which make this institution, under the direction of Father Stein, perhaps the best equipped observatory in Italy.

(10) Less than two weeks ago the California Institute of Technology purchased land at an altitude of 6,126 feet on Mount Palomar, San Diego, California, nearly a hundred miles south of Pasadena, upon which will be erected the 200-inch reflector—an important step in the decade that I fancy to call a golden age in astronomy.

(11) The day before yesterday, in Cleveland, Ohio, rough grinding was begun on the 82-inch reflector for the McDonald Observatory in Texas. On Mount

[1] Abstract of remarks at the annual dinner of the American Association of Variable Star Observers, Hotel Continental, Cambridge, 9 P. M., Saturday, October 20, 1934.

Locke, in western Texas, the Yerkes Observatory has within the past two months started operations, photoelectrically, with a twelve-inch refractor, awaiting the arrival of the new mounting next summer and of the completed mirror perhaps before the end of the next calendar year. The big piers have already been erected on Mount Locke. During the annealing of the McDonald eighty-inch mirror disk last spring, a slight crack developed at the edge. The Corning Glass Company heated the mirror again, so that residual strains as well as the crack would melt away. Happily, the weight of the reliquefied glass spread out against the hot mould—stretched it, with the result that when again the mirror was cooled they found an eighty-two-inch disk, and not an eighty-inch.

(12) Perhaps the most startling of the high lights remains to be mentioned, and it comes from a high altitude, namely the Jungfraujoch in Switzerland. Three Swiss scientists, Meyer, Schein, and Stoll, have succeeded this past summer, for the first time in history so far as I know, in detecting and measuring the passage through our atmosphere of sunlight in the far ultra-violet, λ 2000 to λ 2400, about 800 angstroms further out into the short waves than has ever been reached heretofore. The work was cleverly conceived through a knowledge of the character of the ozone layer that shelters the earth from the extreme ultra-violet light. The instrument used in the high Alps is a photon counter—not an ordinary photographic plate. The radiation that is now found to get through our atmosphere is relatively very weak, because the oxygen of the earth's atmosphere blocks most of it out—blocks it completely at λ 1800. The three Swiss scientists have opened new possibilities for high-altitude observations of the radiation from sun and stars. Aluminized mirrors have extended our front from λ 3400, approximately, to λ 2900, and now, jumping over the impenetrable ozone absorption bands of our atmosphere, we have another interval of the spectrum and another important contact with sidereal radiation, which is our chief source of knowledge of the outside universe.

OBITUARY

THE WIDOW OF CHARLES S. PEIRCE

A BRIEF notice in the *New York Times* records the passing of Mrs. Charles S. Peirce. Her age is not stated; she must have been about eighty. Her later years were a pathetic epilogue to the tragedy of the truly great man to whose lot, with touching loyalty, she joined her own. For it is a tragedy that one who ranks in the elect galaxy of master minds should have found so estranged, so nearly excluded a place in the academic fold.

The tribute to Peirce's distinction is evidenced in the reprinting of a sheaf of his more general essays nearly a half century after they were written. Professor Morris R. Cohen brought them together under the engaging title, "Chance, Love and Logic" (1923). Below the author's name are the words, "The Founder of Pragmatism." Harvard University is publishing his philosophical and scientific works in several volumes. His contemporaries placed him "in the forefront of the great seminal minds of recent times."

Two years ago I paid a visit of respect to the widow of Charles S. Peirce, to whom I had been indebted, as were so many others, for guidance and stimulation in the logic of scientific discipline. Few remain of those who had personal contact with him in the Johns Hopkins days—his only and brief academic tenure. Mrs. Peirce lived in a spacious house on a roadside within the town of Milford, Pennsylvania. The house had been built by Mr. Peirce when he was still profitably occupied. It was ambitious in size, the top floor never completed. There, Mrs. Peirce explained after we had mounted by a disused stairway, it was planned to hold scientific conferences and house the guests who were to come to sit at the feet of the master.

I stepped carefully on treacherous floors; the sides of the building had long been open to the weather; it was all a lumber heap of unfulfilled ambitions. The entire house was shadowed in memories. Mrs. Peirce gazed at it with the pride in a life she had shared.

There were books everywhere and scientific instruments and the collections of European travel, now all covered with newspapers to keep off the dust. The furniture in the drawing-room, much of which Mrs. Peirce had brought from France, gave it the air of a deserted salon. What had been the dining room was partitioned off by a screen. In that smaller space was a bed and an iron stove, on which she prepared her frugal meals and received her only source of heat. Even in early September, the rooms were chilly. Mrs. Peirce, who had sprung from the French nobility, still retained in the midst of these ruins the dignity and distinction of an assured station in life. Her only companion was a French poodle, obediently performing his tricks when politely addressed in French; the rest, solitude and memories.

When I had inquired my way to the house, I gathered, from the gestures of the villagers, that this slight, foreign lady was considered harmless but a