CSWP GAZETTE

A Newsletter of the Committee on the Status of Women
in Physics of the American Physical Society

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Foreword to our readers;

CSWP is initiating an attempt to assist physicists to benefit from attending APS meetings by researching and organizing child care availability at the locations of the meetings. Our initial attempt will be for the March meeting of the APS, which will take place in Detroit, Michigan. Anyone interested in the service should contact me and supply the information indicated in the accompanying box. Any suggestions would be most appreciated. Persons residing in the areas of future meetings (including the Detroit meeting) who know of reliable babysitters, childcare centers with possible temporary openings, and worthwhile tours for children can perform an invaluable service by sharing this information with CSWP.

Our feature article for this issue is one which was prepared in celebration of the 75th anniversary of the erection of the Maria Mitchell Observatory. This article and a companion article "Comets Over Nantucket" were published, along with some historic photographs, by the American Association of Variable Star Observers in commemoration of that event. The booklet can be purchased for $2.50 (including postage) from the AAVSO, 187 Concord Avenue, Cambridge, MA 02138.

CSWP is grateful to the author, Dr. Dorrit Hoffleit of Yale University Observatory, and AAVSO for permitting us to publish this abridged version. We hope you all enjoy it as much as your editor did.

Sincerely,
Irene M. Engle, Editor

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MARIA MITCHELL'S FAMOUS STUDENTS

It has often been said that the purpose of one's life is to do something with it that will outlive it. In the case of a fine teacher it is frequently the students who provide that goal.

Maria Mitchell (1818–1889) was America's first and foremost woman astronomer. At age 47, in 1865, when America's first liberal arts college for women first opened its doors, she became the first woman professor of astronomy and the first woman director of an observatory. She taught at Vassar for 23 years, earning the love and admiration of many scores of students. Numerous of their tributes to her are extant. One wrote, "Her influence upon her pupils who were her daily companions has been permanent, character-moulding, and unceasingly progressive." At her funeral services, Vassar President James Monroe Taylor concluded his eulogy thus: "She has been an impressive figure in our time, and one whose influence lives." Helen Wright in her biography of Maria Mitchell, "Sweeper in the Sky," notes that 25 of Maria Mitchell's former students have been listed in "Who's Who in America." They represent almost all academic and scientific fields as well as social reform movements. Here, however, we shall be concerned only with the professional astronomers.

Among the many students who came under Maria Mitchell's influence, four are particularly noteworthy, although the youngest of them was only a freshman the last year before Maria Mitchell retired. They were Mary Watson Whitney, Vassar 1868, Margaretta Palmer 1887, Antonia C. de P. P. Maury 1887, and Caroline E. Furness 1891.

Mary Whitney (1847–1921) was a member of Maria Mitchell's first class of six students—called "The Hexagon"—of whom Mary Whitney was outstandingly the ablest and best. She was also versatile, becoming the president of the math club, the croquet club, and the chess club; participated in undergraduate drama, contributed to the college student publications, and wrote verse. Her classmates called her "Pallas Athene, Our Goddess of Wisdom." She graduated with honors in three years and the following summer joined Miss Mitchell and other former Vassar students in a trip to Burlington, Iowa, to observe the total solar eclipse on August 7, 1869. This opportunity was to be repeated for the eclipse of July 29, 1878 in Denver, Colorado, but the first was judged the more spectacular.

Being a woman, after graduation Miss Whitney could not readily find a job compatible with her advanced training for those times—better training under Miss Mitchell, in fact, than male graduates of Harvard had gotten in astronomy. So she studied at home, in Waltham, Massachusetts. At Miss Mitchell's instigation, Miss Whitney had the unprecedented good fortune to be invited by Benjamin Pierce, one of the most noted mathematicians of the time, to attend his lectures at Harvard—without official credit, of course. However, Vassar did give credit toward an M.A. degree for home study, and Mary Whitney received the degree in 1872.

Meanwhile, Maria Mitchell felt the need of an assistant and Miss Whitney returned to Vassar for a few years to help determine the latitude of the observatory, work partly financed by Maria Mitchell personally.

From 1873 to 1876 Mary Whitney studied mathematics in Zurich, Switzerland, where her sister was studying medicine. Then followed five years of frustration with no work available in astronomy. In 1881, at the urging of Maria Mitchell, whose health was apparently failing, she returned to Vassar where she helped with teaching and routine tasks, but without official standing (ranked simply as a graduate student!) and with no opportunity for research or independent work with the 12-inch refractor. A replacement for her was found and for a short time Miss Whitney was employed at Harvard Observatory as assistant to Professor Searle in routine astrometric reductions. This was soon interrupted, at Christmas 1887, by Maria Mitchell's resignation, effective the following June with Miss Whitney's appointment as her successor.

Miss Mitchell had always held a "dome party" for her students at the close of each college year. There was no observing on the night of the dome party; instead, poetry by Maria and her students, singing and refreshments. The party in June 1888, however, had an overtone of sadness, for it was Maria Mitchell's last.

During the first years of Miss Whitney's directorship, teaching, administrative tasks, and personal problems (the care of an ill and aging mother and invalid sister) were very time consuming. She chafed at the lack of opportunity for research. She needed an assistant, but the college could not afford to hire one. So, like Maria Mitchell who had hired her years before, Miss Whitney herself provided the funds for an assistant, hiring an able former student who also became part of her household. Thus in 1894 began 16 years of dedicated collaboration with Caroline Furness, who ultimately became her successor as director of the observatory.

In 1894, then, they were working on comets and asteroids. They planned work on variable stars, for which, however, the time was not yet ripe, as no finder charts or sequences of comparison star magnitudes were as yet available. Later, the appearance of Nova Persei 1901 was to rekindle interest in variable stars and by 1906 enough material had been accumulated to warrant giving a course on this topic—probably the first college course on variable stars ever offered anywhere. This became the basis for Caroline Furness' monograph on variable stars in 1915.

Miss Whitney was also called upon to collaborate with astronomers at other institutions. In 1896 Professor Harold Jacoby at Columbia needed help in the measurement and reduction of astrometric plates. Miss Furness was recommended, and this led to her ultimately attaining a Ph.D. degree at Columbia. In collaboration with Professor J. C. Kapteyn at Groningen, Holland, Miss Whitney began photography for his Plan of Selected Areas. The overall results of this international collaboration among many observatories is still useful and valued to this day, the better part of a century later. To implement the meticulous measurements on these plates, Miss Whitney's Vassar class at her 40th reunion made a gift of $1,000 toward a Zeiss comparator. The instrument when completed actually cost more, but characteristically, she herself paid the difference.

During the 24 years of Professor Whitney's

tenure as director, 104 articles were published in various astronomical journals, 43 by herself, 18 by Miss Furness, 32 jointly by both, and 11 by their students—a really remarkable record, quite apart from the fact that they were pioneering women in a man's world.

For Miss Whitney her greatest interest was always research; but others considered her teaching as her contribution of most lasting value. Certainly in her teaching she stimulated much research interest. Years before, Maria Mitchell had scoffed, "Star gazing is not astronomy," and she evidently disapproved of what later became known as either popular or descriptive astronomy. Her courses were mainly mathematical, as were also Miss Whitney's until the numbers of students in astronomy declined. Then Miss Whitney introduced "descriptive astronomy" classes as an inducement to those afraid of mathematics, thereby gaining many recruits as well as many more young friends. This was an important step toward better public understanding and appreciation of the work of astronomers.

Meanwhile, in 1902, the Nantucket Maria Mitchell Association was founded by relatives, friends, and Vassar alumnae and staff who had known Maria Mitchell. Miss Whitney was chosen as the Association's first president, a post she held for nine years. It was to be another six years before the Association's Maria Mitchell Observatory was erected, next door to Maria's birthplace, to house the 5-inch Alvan Clark telescope that had been given Maria Mitchell in 1859 by "the Women of America." Here, in 1908, Ida Whiteside, Vassar 1904, M.A. 1906, a Wellesley instructor, was appointed the first "observer" for a span of three weeks in the summer. At that time there were no funds for a full time astronomer. One of Miss Whitney's first priorities, with the help of Harvard's Annie J. Cannon, Chairman of the Association's Observatory Committee, was to raise funds for an astronomical fellowship. Under this, a young woman was to be employed full time, mainly for research, partly for teaching, with provision that she spend several months of every year for study at a larger observatory. This fund raising goal was achieved by the end of Miss Whitney's presidency. In 1912 Margaret Harwood, Radcliffe 1907, was appointed the first Fellow, and in 1916 her title was elevated to Director and the title "Fellow" ceased to be used.

In 1910 Professor Whitney became seriously ill and had to curtail her work, although she retained the directorship at Vassar until 1912. Eight years later she died. In her will she left $5,000 to Vassar to be devoted purely to research. Toward her end, she said, "I hope when I get to heaven I shall not find the women playing second fiddle."

Caroline Furness described Miss Whitney as a teacher who "gave out such a bright glow that it brightened all who came within her sphere." Antonia Maury, who had studied under both Maria Mitchell and Mary Whitney, conceded that Mary Whitney was "a wonderful teacher; but she lacked that certain spark that Maria Mitchell had." Pleasantly reminiscing when she was about 80 years old, Miss Maury commented that all the successive directors at the Vassar observatory were wonderful, outstanding and able teachers, yet sadly she felt that not one of the four she had known was quite as brilliant as her immediate predecessor! (The fourth was not a Vassar graduate.) Miss Maury was no longer around when Vassar chose its first male director of the observatory.

Margaretta Palmer (1862–1924) graduated from Vassar in 1887. The diaries of Maria Mitchell (at the Maria Mitchell Library on Nantucket) indicate that Miss Palmer was in Miss Mitchell's Astronomy III class of 25 students in the term starting September 1885; and in her class of 10 students in Astronomy IV (the "advanced" class) starting September 1886. There seem to be no further comments in the diaries on how well the student did, or what impressions she made on her professor. After graduating, Miss Palmer spent one year as an assistant in the Vassar Observatory, and the following year (1888–89) as an instructor in Latin at Vassar. She then went to the Yale Observatory as an assistant, and in 1892 entered the Yale Graduate School, earning her Ph.D. in 1894.

For her thesis Miss Palmer recomputed, on the basis of all available observations, the orbit of Comet 1847VI, the one whose discovery had catapulted Maria Mitchell to fame. The previous most definitive orbit for this comet had been determined by G. Rümker in 1857, according to which the comet was of greatest interest as belonging to a comparatively rare class (by the standards of those times) showing a distinctly hyperbolic orbit, meaning the comet was headed out of the solar system, never to return. A redetermination of the orbit was justified by the fact that greatly improved star and sun positions had become available, and that the early computations had not taken perturbations into account. More recent observations than those that Rümker had used were, of course, out of the question. Miss Palmer's thesis confirmed that the comet was indeed travelling in a hyperbolic orbit. Besides the technical reasons, Miss Palmer found additional more philosophical reasons for having undertaken her study, stating, "To the woman, however, who turns her attention to astronomy this comet is conspicuous as one of the few that have been discovered by a woman, and probably the only one that has ever been discovered independently by two women." The other was Madame Rümker, wife of the Director of the Hamburg Observatory. Moreover, she continued, "But the student whose first knowledge of the heavens has been gained under the direction of Maria Mitchell has an added reason for regarding with especial interest the course through space of that body whose discovery brought before the astronomical world the young Nantucket comet-seeker, the first American woman to gain such notice."

It is noteworthy that Margaretta Palmer earned her Ph.D. degree, possibly the first ever accorded a woman, 31 years before Radcliffe College awarded this degree for an astronomy thesis to Cecilia Payne in 1925; and even longer, 35 years, before Harvard awarded any Ph.D. in astronomy.

Later Miss Palmer also computed the orbits of three of the eight comets discovered much earlier by Caroline Herschel, those of 1786, 1788, and 1797. This work showed decisively the influence of Maria Mitchell's training in mathematical astronomy. This basic training is also evident in her attempted analysis of the motions of Jupiter's satellites. During the Jupiter opposition from July 1891 to January 1892, the satellites had been extensively observed with both the Yale and Cape heliometers. By 1894 Miss Palmer had compiled all the available observations, setting up 1128 equations of condition in 13 unknowns, according to the Annual Report of the Director of the Yale Observatory, W. Lewis Elkin, but the equations were not yet solved. Unfortunately in his subsequent report of June 1895 Elkin remarked, "Owing to the long and serious illness of Dr. Palmer, considerable work yet remains to be done on the Jupiter satellite series." Evidently this colossal computing job was never completed. Would that she had had our modern high speed computers!

Another massive undertaking, started under Elkin by Miss Newton, and continued jointly with Miss Palmer, was an Index to all the positional catalogues in which any "Bonner Durchmusterung" (BD) star occurs. (The Durchmusterung was the principal source for finding moderately high accuracy positions of stars to about 9.5 visual magnitude.) There are four volumes of the BD, still widely used, for the northern stars and one for southern stars to −23° (the SBD) giving the positions for some 457,000 stars. Elkin had started this index as being important to his work on stellar parallaxes and other astrometric, positional investigations. Two sets of the four BD volumes and one of the SBD were interleaved and all of the references to positions determined from 1750 to 1900 were written in with meticulous care and neatness. These volumes are still in the possession of the Yale Department of Astronomy, although their usefulness has been superseded by a later German publication, the "Geschichte des Fixsternhimmels," 48 volumes (1922–52), which took over 50 years for their compilation.

Yale Observatory has, since Frank Schlesinger became Director in 1920, been the chief clearing house for stellar parallax determinations. The first "General Catalogue of Trigonometric Stellar Parallaxes" came out in 1924 under the authorship of Schlesinger, Margaretta Palmer and Alice Pond. It contained parallaxes for 1870 stars. (A fourth edition now being compiled by W. van Altena, will contain over 7400 stars.) This was the last major contribution by Dr. Palmer, who died as a result of an automobile accident in 1924.

Other of her interests and activities include cataloguing in the Yale University Library, 1918–20; and religious (Episcopalian) and educational concerns relative to which she wrote "Teachers' Notes on Church Catechism," and "Teachers' Notes on Our Book of Worship."

Unlike Mary Whitney, Margaretta Palmer did find opportunities for research unhampered by formal teaching and administrative duties. Her work output is impressive and, for its era, important. But over the years she has become less well remembered now than either Miss Whitney or her own classmate, Antonia Maury.

Antonia Maury (1866–1952), Vassar class of 1887, entered astronomy from a family rich in scientific tradition and astronomical achievement. Her grandfather, John William Draper, and her uncle Henry Draper, were both prominent physicians as well as advanced amateur astronomers pioneering in celestial photography. Dr. John William Draper was the first to obtain a daguerreotype of the moon (1840), while Dr. Henry Draper was the first to have photographed the spectrum of a star showing absorption lines—of Vega in 1872.

At the age of four, little Antonia is reputed to have helped her uncle in his laboratory by handing him the test tubes he asked for in his chemi-

cal experiments. At nine her father had her reading Vergil in the original. By the time she entered Vassar she was probably better prepared for science than any other student. Of the 24 semester courses that were required for graduation, she took 8 semesters of astronomy, 8 of physics, 5 in English composition, 2 in philosophy, and one in history. She graduated with honors in astronomy, physics and philosophy.

The diaries of Maria Mitchell indicate that Antonia Maury was one of 19 students in Maria's junior class in 1886–7. One of the course assignments was for each student to deliver a lecture to the class. "These lectures were mostly written and were all grave and carefully considered papers; they were well listened to; the period was 40 min." Antonia Maury lectured on comets.

Employed at Harvard Observatory in 1888 under the Henry Draper Memorial, then recently established by his widow for the continuation of work in Draper's favorite astronomical topic, stellar spectra, Antonia's background, education and abilities augured well for a successful career. She was entrusted with the classification of the spectra of the northern stars obtained with an 11-inch Alvan Clark telescope that had originally belonged to Henry Draper. Unfortunately she was too painstaking and deliberate to please an employer anxious for quick results of mainly statistical value. Not satisfied to adopt an already established system of classification that did not take into consideration all the myriad details she recognized in the spectra, she set up an entirely new system, more complicated but more definitive than the old. The work naturally took much longer than Professor E. C. Pickering, Director of the Observatory, anticipated. His impatience, as well as his skepticism about her system being preferable to the one he himself, together with Williamina Fleming, had previously inaugurated, led to friction which slowed the work still more. In the long run, however, her system, even though it was not adopted by other investigators, led directly to a better understanding of the constitution of the stars. In 1905, the great Danish astronomer, Ejnar Hertzsprung, discovered that stars of the same color showed a diversity in intrinsic luminosity. This, he reasoned, should be reflected in the spectra of the stars. But the almost universally adopted Pickering-Fleming system, as perfected by Annie J. Cannon, did not reveal any differences between Hertzsprung's stars of high luminosity and those of lower luminosity but the same color. In Miss Maury's catalogue, on the other hand, published in 1897, Hertzsprung did find that she had added the suffix *c* to the basic classes for his stars of high luminosity. Ordinary spectral classes, representing the most prominent features of the spectra, are directly correlated with temperature; Miss Maury's additional sub-groups, $a-c$, represented luminosity, which in turn depends on the density and pressure in the stellar atmospheres. Miss Maury's careful analysis thus opened the door to important astrophysical interpretations. The current dean of stellar spectroscopists, Dr. W. W. Morgan of the Yerkes Observatory, who dedicated the latest version of his atlas of spectral classes to her memory, evaluates her as, "for me, the single greatest mind that has ever engaged itself in the field of the morphology of stellar spectra."

In 1889 Pickering discovered the first spectroscopic binary, Mizar, a star whose spectrum shows alternately single and double lines. Somewhat later the same year Miss Maury discovered another beta Aurigae. Spectroscopic binaries are double stars whose components are too close together to be seen visually as double. Their spectra, however, reveal the duplicity. Unless the orbit of the pair is oriented at right angles to the line of sight, one component will be receding from the earth while the other is approaching. According to the Doppler principle, the lines from the approaching component will be shifted toward the blue in the spectrum, while those of the receding component will be shifted toward the red from their normal positions.

Miss Maury was the first to find the period of revolution of the first two spectroscopic binaries, 104 days for Mizar, 4 days for beta Aurigae. The training she had received under Maria Mitchell she put to good use when she was the first to compute an orbit for a spectroscopic binary. These stars then became her chief interest in astronomy and she determined the orbits of several. Her most consuming interest was in the bright star beta Lyrae whose spectra showed a well nigh unfathomable wealth of puzzling detail. Over the years she collected over 300 plates and published her analysis in 1933, but continued through 1948 to examine new spectra to check on the accuracy of her predictions. The complexities, however, defied definitive interpretation in her time, and even now are not completely understood.

Between 1888 and 1948 Miss Maury worked at Harvard only intermittently. From 1891 to 1894 she taught science at the Gilman School in Cambridge, Massachusetts; from 1896 to 1918, physics and chemistry at the Castle School in Tarrytown, New York. After her retirement from Harvard in 1935 she was for three years the curator of the Draper Museum in Hastings-on-Hudson, New York, the former home and original observatory built by Henry Draper in 1860.

Miss Maury had wide cultural interests, including art, literature and philosophy. She was an enthusiastic ornithologist, an all-round naturalist, and an outsopken conservationist of historic sites and artifacts, and of natural resources. During World War II, when lumber was in great demand, she fought hard for the preservation of the endangered western Sequoia forests. The advancement of modern astronomy intrigued her right into her latest years. Marvelling at the vast expanse of the known universe, she wistfully philosophized, "But the human brain is greater yet, because it can comprehend it all."

In an obituary in the Vassar Alumnae Magazine a classmate wrote, "At college her work in mathematics was impressive enough to lead Maria Mitchell to say that Christine Ladd Franklin, Mary Whitney and Antonia Maury were a triumvirate of her best pupils."

Christine Ladd (1847–1930), Vassar 1869, LLD 1887, a mathematician, psychologist and logician did not become an astronomer. Her specialty became color vision.

Caroline E. Furness (1869–1935) entered Vassar in 1887, the last year that Maria Mitchell taught and when Maria, herself, was already aware of failing health. Consequently Caroline Furness came to consider Mary Whitney "as the most valued influence" in her entire career; and reciprocally Miss Whitney is said to have considered Caroline Furness as her best and favorite student. As a freshman, however, Caroline must surely have received inspiration from the elderly dean of all women astronomers, and there is no question but that she carried forward the traditions established by Professor Mitchell.

After her graduation in 1891, Miss Furness taught high school mathematics in West Winstead, Connecticut, for a year, and then for two years in the high school in Columbus, Ohio, at the same time studying mathematics at the State University in Columbus. In 1894, however, she was recalled to Vassar where Miss Whitney personally paid her assistant's salary. Together they used the 12-inch telescope for observing asteroids and comets, publishing their results in the *Astronomical Journal.*

Professor Harold Jacoby of Columbia University had received from Helsingfors, Finland, a series of astrometric plates of the North Polar region, to be reduced for accurate star positions. He contacted Miss Whitney for assistance in the measurements, and she recommended Miss Furness, who then spent 1898–9 at Columbia. This led to a thesis, "Catalogue of Stars within 1° of the North Pole and Optical Distortion of the Helsingfors Astro-Photographic Telescope," for which she was awarded the Ph.D. degree in 1900. This work was continued in a 1905 publication including 408 stars within 2° of the pole.

Another unique opportunity arose in 1908 when J. C. Kapteyn contacted Miss Whitney for assistance in measuring plates for the determination of proper motions for his *Plan of Selected Areas.* Miss Furness then spent a semester training under Kapteyn in Groningen, and at his suggestion Vassar acquired the necessary measuring machine. Miss Furness' work at Columbia had admirably prepared her for such painstaking astrometric work.

Meanwhile Nova Persei 1901 rekindled interest in variable stars. A wedge photometer for the 12-inch was purchased, and henceforth (for at least 12 years) variable stars constituted the chief research work at the Vassar Observatory. When Miss Whitney became ill in 1911, Miss Furness was first made Acting Director, then, in 1913, Director of the observatory, a post she held with distinction until her own death 23 years later. Although interested in many phases of astronomy, the variable stars were her prime research love. In 1913 she published both her own and Miss Whitney's variable star observations, a total of 4797 observations dating back to 1901. This was followed in 1915 by a treatise, "An Introduction to the Study of Variable Stars." At the 1933 Century of Progress Exposition in Chicago, this book was honored by the National Council of Women as "among the one hundred best books written by women during the past one hundred years," Miss Furness had provided E. C. Pickering, Director of the Harvard College Observatory, observations of variable stars prior to the organization of the American Association of Variable Star Observers (the AAVSO) in 1911. Leon Campbell, for 38 years the Recorder for that organization, said, "It was always the hope of Professor Pickering that some day an association of amateurs would cooperate in this work." Miss Furness continued to support the AAVSO all her life and encouraged her students to do likewise. She usually brought several of her undergraduates with her to the annual meetings at Harvard. Nowhere was her book more appreciated. In one annual report of the AAVSO we read, "How grateful we all are to her for that splendid contribution to our work, perhaps the only book in

the language treating the subject so comprehensively." Another, much later, described it as "A gold mine of information" on how to observe variable stars. Now, largely outdated, it nevertheless remains an excellent introduction for the novice observer. In 1921 and again in 1929 Miss Furness was hostess at the spring meetings of the AAVSO at Vassar, and in December, 1923, to the American Astronomical Society. At the latter she introduced a session "where those engaged in the teaching of astronomers got together in an experience meeting, and made plans for the better instruction of astronomers of the future."

It is rare indeed for a permanent observatory to lie directly on the path of totality of a solar eclipse. The year 1925 was probably unique in that three observatories were so situated: Vassar, Yale, and the Maria Mitchell Observatory on Nantucket Island. Miss Furness fully appreciated her responsibility to science, to the college and to the public. In *Popular Astronomy* (Vol. 33, p. 324, 1925) after the event she wrote, "To be in charge of an observatory situated in the direct line of totality of a solar eclipse entails a great and varied responsibility upon its director. The problems presented are far different from those which astronomers have to deal with who go on eclipse expeditions, and have only some particular astronomical question to handle.

"First of all, we must consider the equipment of the observatory and decide how well it is suited to eclipse work of real scientific value. Then there are plans to be made for the students in the department of Astronomy who wish to share in the work and must be trained for special tasks. Next there is the much larger group of faculty, students, and alumnae who have an intelligent interest in the event and need well written and comprehensive directions for observing the various phenomena which can be seen. Finally there is the neighborhood, which may be as extensive as one wishes to make it. For us it included the city, the county and even the school children of the state. For these a different kind of publicity is required. The event is so unique, and of such extraordinary beauty as a spectacle of nature, that a vigorous effort should be made to interest everyone within reach."

For her scientific program she consulted an ace eclipse observer, Dr. J. A. Miller of Swarthmore, who helped plan the necessary attachments to the 12-inch for photography of the eclipse, and sent Dr. Dean McLaughlin (husband of a former Vassar graduate) to take over the supervision of the project. Funding for this was provided from the income of Mary Whitney's research bequest. Miss Furness recalled, "In 1869 Professor Maria Mitchell took a party of eight graduates of the college to Burlington, Iowa, for the eclipse of Aug. 7, among whom was Mary Whitney. In 1900 Prof. Whitney and myself went to Wadesboro (N. Carolina), but this time the whole College formed the 'Eclipse Party!'"

Caroline Furness was a versatile and socially conscious educator and researcher. Her publications in fields other than those already cited, included observations of asteroids and comets, the orbit of Comet 1886III, and the determination of the longitude of the observatory. She was active in church, health, and child welfare groups. Throughout her life she was an ardent ornithologist. In 1918—19 she spent a sabbatical semester in the Orient, which inspired two articles, "Medical Opportunities for Women in Japan," and "Impressions of Japanese Women."

In 1935 she took an extended enjoyable automobile tour of the States. Visiting the Mount Wilson Observatory, her early interest in the solar spectrum was revived and she planned for a new spectrohelioscope for Vassar. Alas, nothing came of her solar research plans, for she died soon after her return east.

Perhaps the best summary of her goals as an educator are given in her own words: "College education should not put students into a separate class, superior to others, but ought to make them understand where they fit into the general scheme of things and their obligations to the rest of society."

Caroline Furness is probably the last of the Vassar astronomy students who had come under the direct influence of Maria Mitchell and who later became famous. However, their own students in turn have continued to carry on the tradition of offering higher education for women equal to that available to men. For undergraduate studies and training in astronomy they have in some instances significantly surpassed the offerings then available to the men in the large men's universities. Maria Mitchell would have found reason to be gratified that her own goals have been achieved.

Of the four outstanding women astronomers who most immediately followed in Maria Mitchell's footsteps, three were influential in the early administration of the Maria Mitchell Observatory on Nantucket. Miss Whitney, as first president (1902—11) of the Nantucket Maria Mitchell Association was also on its Research Fellowship Committee; Caroline Furness was on the Observatory, the Library, and the Research Fellowship Committees; and Margaretta Palmer was on the General Science Committee. Three of the four were also early members of the American Association of Variable Star Observers: Caroline Furness, Margaretta Palmer, and Antonia Maury. This article has been written to commemorate the 75th anniversary of the building of the Maria Mitchell Observatory, which is being celebrated at the Nantucket meeting of the AAVSO in October 1983. The two organizations appropriately have many research as well as educational and historical interests in common.

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Partial References

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for Antonia Maury:
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for Caroline Furness:
Maud Makemson, Popular Astronomy, 44, 233, 1936.

CHILD CARE AT APS MEETING

Name(s) of
Parent(s) _____

Address:

_____

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Business telephone

_____

Home
telephone_____

Location of meeting

_____

Date of
Arrival _____

Date of
Departure _____

Name(s) and Age(s) of

children_____

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Please indicate all options which you find of possible interest. Indicate order of preference if you like.

_____ Exchange/cooperative babysitting

_____ Group cooperative babysitting

_____ Group Education/Fun Tours for Children

_____ Individually contracted babysitting

_____ Other (suggestions most welcome)

Send the particulars to:
Dr. Irene M. Engle
Physics Department
U. S. Navy Academy
Annapolis, MD 21402

or call her at 301-267-3486 or FTS 930-3486.

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