MINOR CONTRIBUTIONS AND NOTES.

THE DEDICATION OF THE YERKES OBSERVATORY.

The astronomical and astrophysical conferences held in connection with the dedication of the Yerkes Observatory were opened on Monday, October 18, at 2:30 P.M. in the Observatory library. Professor Hale announced that the afternoon session would be devoted to the fourth annual meeting of the Board of Editors of the Astrophysical Journal, at which the visiting men of science were invited to be present. Professor Pickering then took the chair. A communication from Professor Schuster, regarding the mode of printing maps of spectra and tables of wave-lengths, was presented.

A general discussion followed the reading of this communication. The views of several members of the Board have already been printed in the Astrophysical Journal. They were considered at some length, and expressions of opinion were also invited from the astronomers and physicists who were attending the conferences held in connection with the dedication of the Observatory. Professor Runge thought that the mode of printing tables and the mode of printing maps were two distinct questions. The occurrence of line series in the spectra of the elements had an important bearing on the first question. In a table beginning with short wave-lengths the uncertain lines are at the top, which is an inconvenience. In the lower spectrum the lines are not doubtful. On the other hand, it is generally more convenient to have the numerical values in a table increase towards the bottom. A map can easily be turned end for end when it is necessary to compare it with another printed in the reverse direction. He did not think the subject an important one, was prepared to accept a decision in favor of either method, but thought harm was done by making a rule.

After some further discussion the following resolution was adopted: Resolved: That the Editorial Board adhere to the present practice of beginning tables with the short wave-lengths and of printing maps of the spectrum with the red end on the right, except in cases where a

To be published in a subsequent number of this Journal.
wish to the contrary is expressed by the author of any contributed paper. It was also resolved that an announcement of this decision should be printed in the standing notice in each number of the Journal.

Professor Schuster's suggestion regarding the position of the decimal point in wave-numbers (the number given being the number of wave-lengths in the centimeter) was generally approved. A discussion of a scale of intensity brought out the fact that all present were in favor of representing increasing intensities by increasing numbers. It was felt, however, that the time had not yet come to adopt a uniform scale of intensity, applicable to all classes of spectra.

The meeting annually held by the Board of Editors for the discussion of current investigations was merged in the general sessions of the conferences. The first paper presented was by Sir William and Lady Huggins, and dealt with some of the results obtained in their recent photographic studies of stellar spectra. At the conclusion of the discussion of this paper the meeting adjourned.

The evening was partly cloudy, and it was consequently impossible to carry out the full programme of work with the forty-inch telescope, which included demonstrations by Professor Wadsworth of the application of interference methods to astronomical and astrophysical measurements, and observations of double stars by Professor Burnham. It was nevertheless found possible to show a few double stars after the adjournment of the second session of the conferences, at which Professor Pickering gave an account, illustrated by photographs and diagrams, of the variable star work of the Harvard Observatory.

The third session of the conferences was opened on Tuesday at 9:00 A.M., with Professor Runge in the chair. Professor Crew described his investigations of the flame of the rotating arc, which persists for an appreciable time after the current has been cut off. Photographs of the arc, taken under various conditions were exhibited. Professor Comstock followed with an account of recent work at the Washburn Observatory, including determinations of stellar parallax and investigations of the lunar atmosphere. He also exhibited a Steinheil double-image micrometer. At the conclusion of the discussion of this paper the meeting adjourned to the large dome, where Professor Hale and Mr. Ellerman exhibited various solar phenomena with the forty-inch telescope and solar spectroscope.

*See page 322. It is expected that the other papers presented at the conferences will be published in full or in part in subsequent numbers of this Journal.*
The afternoon session was called to order at 3:00 p.m., Professor Runge in the chair. Professor Hale gave an address on the aim of the Yerkes Observatory. The meeting then adjourned to the laboratories and shops, where various demonstrations were made. In the optical laboratory Mr. Carl Lundin, of Alvan Clark & Sons, showed the method employed by his firm in testing telescope objectives. Professor Wadsworth exhibited in the adjoining spectroscopic laboratory an interferometer designed for the measurement of wave-lengths in infra-red metallic spectra. Professor Crew showed his rotating metallic arc in the physical laboratory, and exhibited its spectrum with a large plane grating spectroscope. The ten-foot focus concave grating was mounted in the adjoining room. In the northeast dome Professor Lord exhibited the stellar spectrograph of the Emerson McMillin Observatory, attached to the twelve-inch equatorial. Both the instrument and optical shops were in operation. In the former Mr. Lorenz showed a large heliostat and a mounting for a two-foot reflector in process of construction. Mr. Kathan exhibited the parts of a spectroheliograph which he is building for the forty-inch telescope. Mr. Mors showed a partly completed ruling-machine for optical gratings, and explained Rowland's method of grinding a perfect screw. He also exhibited a device for cutting a very long and perfect nut to exactly match a corresponding screw. In the optical shop Mr. Ritchey demonstrated the operation of a large grinding-machine carrying a five-foot glass disk for a speculum, and tested a two-foot mirror by Foucault's method. It had been expected that Dr. Humphreys would demonstrate with the concave grating the effect of pressure on wave-length. But unfortunately the pressure arc, which had been kindly loaned for the occasion by the Johns Hopkins University, did not reach the Observatory until after the conclusion of the conferences.

In the evening the sky was overcast, and a session of the conferences was substituted for the proposed observations with the forty-inch telescope. Professor Runge was in the chair. Professor Keeler exhibited with an electric lantern, kindly loaned for the occasion by the Colt Co., some photographs of the spectra of stars of the third type recently made at the Allegheny Observatory. Professor Lord followed with a talk on the stellar spectrographic work of the Emerson McMillin Observatory, with lantern illustrations. The next paper was by Pro-

1 See page 309.
Professor Wadsworth, on the application of diffraction phenomena to astronomical and astrophysical measurements. At the close of the discussion it was announced that as the sky had partly cleared, Professor Barnard would exhibit nebulae with the forty-inch telescope. Later in the evening the Board of Editors of the Astrophysical Journal held a special meeting.

On Wednesday the conference was called to order at 10:00 A.M., with Professor Rees in the chair. Professor Runge gave his reasons for supposing oxygen to be present in the Sun, and stated that Mr. Jewell had withdrawn his objections to the evidence previously offered. Dr. Humphreys exhibited a large number of original negatives taken at the Johns Hopkins University for the purpose of measuring the shifts of spectral lines due to pressure. Professor Doolittle gave an account of the latitude work of the Flower Observatory. The last paper of the session was by Professor Rees on the variation of latitude and the reduction of the Rutherford photographs. All the papers were fully discussed.

The afternoon session was called to order at 3:00 P.M. by Professor Van Vleck. Father Hedrick spoke on the photochronograph, and exhibited the instrument used at the Georgetown College Observatory, together with photographs obtained with it. Professor Pritchett spoke on personal equation in longitude determinations, giving the results of his own extensive observations. Professor Poor described a new form of mirror for reflecting telescopes, and sketched a convenient style of mounting for it. Professor Newcomb discussed the problem of determining the distribution of the stars, and dwelt upon the great importance of measuring with the spectroscope the motion of the solar system in space. Father Hagen described his forthcoming atlas of variable stars, specimen sheets of which were exhibited. Professor Myers concluded the afternoon session with a paper on the system of β Lyrae. As usual, the papers were fully discussed.

As the evening was cloudy the sessions were continued, with Professor Van Vleck in the chair. Mr. Yerkes had come out from Chicago on the afternoon train, and was present when Professor Barnard gave an account of his work in astronomical photography, illustrated with lantern slides. The only other paper of the evening was by Professor Pickering, who continued his illustrated description of the work of the Harvard Observatory.

The final session of the conferences was opened by Professor McGee.
Harkness on Thursday at 9:30 a.m. Dr. Laves presented a paper giving his theoretical researches on the minor planet 334. After the discussion Professor Hale described his solar investigations, and showed a number of lantern slides. The last paper was by Professor Wadsworth, on a photographic meridian circle. At its conclusion the conference adjourned. Additional papers had been presented by Professors Riccò, Safford, Very and Hull, but time did not permit them to be read.

The Trustees, members of the Faculties and guests of the University, numbering about 700, arrived from Chicago at noon, on two special trains kindly furnished for the occasion by the Chicago & North Western Railway Co. The dedicatory exercises were held in the great tower, where a platform for the speakers and chairs for the guests had been provided on the rising floor, which stood in its lowest position. The programme of the exercises was as follows:

1. The Invocation. Dean Eri B. Hulbert.
3. Address: "The Importance of Astrophysical Research and the Relation of Astrophysics to other Physical Sciences." Professor James E. Keeler, Sc.D., Director of the Allegheny Observatory.
5. Presentation. Mr. Charles T. Yerkes.
6. Acceptance on behalf of the Trustees. The President of the Board of Trustees, Mr. Martin A. Ryerson.
7. Address on behalf of the Faculties. The President of the University.

Professor Keeler's address is given on another page.¹ Mr. Yerkes' remarks were as follows:

"MR. PRESIDENT, LADIES AND GENTLEMEN:

"After five years of patient waiting and incessant labor, we are brought together to perform the agreeable duty which has been in our minds during the whole of that period, namely, the dedication of this Observatory.

"It was in October of 1892 that Dr. Harper and Professor Hale arranged for the manufacture of the telescope and building the Observatory, and since that time the work has been incessant. Before this, however, three years had been spent in preparing the rough glass, making eight years in all which was required to produce what we now

¹See page 271.
have before us. The anxiety of those who were so deeply interested in the work can scarcely be imagined, for as they followed it step by step from its incipiency to its finish, many doubts and fears naturally crossed their minds. As no glass had ever been made of the size of this there was no criterion to go by, and it was necessary to leave everything to the future. Then again, there was the risk of accident, and when the glass was safely lodged in its final resting place, the hearts of many who are now present beat much more freely and with greater satisfaction than they had since the projecting of the work. A priceless gem to these gentlemen was at last in safety, and when we consider what would have been the result in case of accident — six years of sincere work being thrown away and six years more would surely elapse before the same results could be obtained — we can imagine something of their feelings of satisfaction when they saw the final accomplishment of their labors. That we have done a good deed and one which will revert to our satisfaction we have no doubt.

"The science of astronomy, while being the oldest extant, has been, we may say, the most neglected. It is in no way commercial, and that may be one of the chief reasons. Its promulgation has always been confined to a class of enthusiasts who felt an interest in their work and gloried in the achievements which they attained.

"Five thousand years ago astronomy was studied, but it was not until six hundred years before the Christian era that any progress had been made in it. Greek mythology used it as a romance, with but little idea of its truthfulness, and up to the beginning of the seventeenth century, when the telescope was invented by Hans Lippershay and applied by the great Galileo, but little was known of the science. From that time on through the work of Newton, Lagrange, Laplace, Dominicus Cassini, Flamsteed, Bradley, Herschel, Bessel, and others equally celebrated, good progress was made, and during the last half century there have been greater advances than ever before. This is owing to the fact that we now have the ability to determine correctly by instruments which are late inventions, matters that were never dreamed of. It is to the great telescopes that the ardent workers look for encouragement for their labors. Accurate means have been devised for recording the observations, while the photographic plate, together with the spectroscope, have been applied with the most astonishing results.

"As I said, one reason why the science of astronomy has not more
contributors, is on account of its being entirely uncommercial. There is nothing of moneyed value to be gained by the devotee to astronomy; there is nothing that he can sell. Compared with electricity and other sciences of like character, there is the greatest difference; consequently, the devotee of astronomy has as his only reward the satisfaction which comes to him in the glory of the work which he does, and the results which he accomplishes.

"These are some of the reasons why you are gathered here today and why this edifice and its contents have been erected.

"That the work will produce good results, I am, after a thorough examination, fully satisfied, and my satisfaction is still more intense when I learn of the great and enthusiastic men which the University of Chicago has gathered around it for the purpose of taking charge of the work to be performed in this Observatory. I therefore with the fullest feeling of satisfaction and pleasure, turn over to you this structure with all its contents, feeling satisfied that it is now in the best of hands, and that the labors here will be serious, conscientious, and thoroughly done. I feel that in your attempts to pierce the mysteries of the universe which are spread before you by our great Creator, the enthusiasm of your natures will carry you to success."

Mr. Ryerson expressed the thanks of the Board of Trustees to Mr. Yerkes for his gift, and dwelt upon the satisfaction they felt in the fact that the University would now be able to make further contributions to knowledge. "While recognizing fully the great practical services which astronomy has rendered to the world, I still feel that its proudest claim to recognition and appreciation must dwell in its tendency to establish and maintain in the feelings of mankind the conviction that, amid the services of science, the increase of knowledge for the sake of knowledge is not the least." In his address on behalf of the Faculties, President Harper reviewed the events in the history of the Observatory since its inception in 1892. In recounting the various gifts that have been received, he made the first public announcement of the recent gift, by that generous patron of astronomy, Miss Catherine Bruce, of $7000 for a ten-inch photographic telescope, with building and dome. He concluded by tendering to Mr. Yerkes the appreciative thanks of the Faculties of the University.¹ A very cordial letter sent for the occasion by Professor Vogel, together with congratulatory cablegrams

¹The addresses of Mr. Ryerson and President Harper are given in full in the University Record for October 22, 1897.
from the Vatican Observatory, Professors Tacchini, Geelmuyden, Josef and Jan Fric, Schuster and others were received.

At the conclusion of the exercises luncheon was served to the University's guests, after which an opportunity was given them to inspect the Observatory. The return to Chicago was made at 4:00 P.M.

On Friday, October 22, the visiting men of science assembled at the Ryerson Physical Laboratory of the University of Chicago, where Professors Michelson and Stratton conducted them through the building, and showed a number of interesting experiments. Among the instruments exhibited were a large interferential comparer for the production of standards of length, and a new form of harmonic analyzer. The effect of a magnetic field on radiation was beautifully shown with the aid of an interferometer.

At 1:00 P.M. the visiting men of science and other guests were entertained at luncheon by the President of the University. At 3:00 P.M. a large audience assembled in Kent Theater, where Professor Newcomb delivered his address on "Aspects of American Astronomy." At the conclusion of the address Professor Hale said a few words of thanks to the men of science and official representatives of institutions for their presence at the various exercises held in connection with the dedication.

A 7:00 P.M. Mr. Yerkes gave a banquet at Kinsley's Restaurant to the visiting men of science. Toasts were responded to by Mr. Ferdinand Peck of the Board of Trustees, Professor Pickering, Professor Rees, Mr. Brashear, Professor Comstock, Professor Harkness, Professor Michelson and Professor Hale. In response to a general call, Mr. Yerkes made a few concluding remarks, in which he expressed his great satisfaction at the kindly interest in the welfare of the Observatory which had been manifested by the visiting men of science.

A list of the astronomers, astrophysicists and physicists who took part in the conferences is given below. It should be added that M. Deslandres of the Paris Observatory, and Professor Schuster of Victoria University, Manchester, visited the Observatory with the intention of taking part in the exercises, but were unable to remain, owing to the postponement of the dedication.

Professor E. E. Barnard, Yerkes Observatory, Williams Bay, Wis.
Professor N. E. Bennett, Wilmington College Observatory, Wilmington, Ohio.

1 See page 289.
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Mr. John A. Brashear, Allegheny Pa.
Mr. William R. Brooks, The Observatory, Geneva, N. Y.
Professor S. W. Burnham, Yerkes Observatory, Williams Bay, Wis.
Professor Hugh L. Callendar, McGill University, Montreal, Canada.
Mr. E. Colbert, Chicago, Ill.
Professor W. H. Collins, Haverford College Observatory, Haverford, Pa.
Professor George C. Comstock, Washburn Observatory, Madison, Wis.
Professor Henry Crew, Northwestern University, Evanston, Ill.
Professor S. J. Cunningham, Swarthmore College Observatory, Swarthmore, Pa.
Professor C. L. Doolittle, Flower Observatory, Philadelphia, Pa.
Mr. Ferdinand Ellerman, Yerkes Observatory, Williams Bay, Wis.
Mr. A. S. Flint, Washburn Observatory, Madison, Wis.
Professor Edwin B. Frost, Shattuck Observatory, Hanover, N. H.
Miss Caroline E. Furness, Vassar College Observatory, Poughkeepsie, N. Y.
Rev. J. G. Hagen, S. J., Georgetown College Observatory, Georgetown, D. C.
Professor George E. Hale, Yerkes Observatory, Williams Bay, Wis.
Professor Asaph Hall, Jr., Detroit Observatory, Ann Arbor, Mich.
Professor William Harkness, United States Naval Observatory, Washington, D. C.
Rev. John T. Hedrick, S. J., Georgetown College Observatory, Georgetown, D. C.
Professor G. W. Hough, Dearborn Observatory, Evanston, Ill.
Professor G. F. Hull, Colby University, Waterville, Me.
Dr. W. J. Humphreys, University of Virginia, Charlottesville, Va.
Professor Leslie H. Ingham, Kenyon College, Gambier, Ohio.
Professor James E. Keeler, Allegheny Observatory, Allegheny, Pa.
Dr. Kurt Laves, University of Chicago, Chicago.
Professor F. P. Leavenworth, University of Minnesota, Minneapolis, Minn.
Professor H. C. Lord, Emerson McMillin Observatory, Columbus, O.
Mr. Carl A. R. Lundin, Cambridge, Mass.
Professor C. H. McLeod, McGill University, Montreal, Canada.
Mr. F. R. Moulton, University of Chicago, Chicago.