Minor Contributions and Notes.

THE ASTROPHYSICAL JOURNAL.

In a paper bearing the above title, published in the first number of *Astronomy and Astro-Physics* (January, 1892), the reasons which had prompted the publication of a journal of astronomical physics were enumerated, and evidence was adduced to show that considerable support might be expected for such a venture. It had been my intention to establish a separate astrophysical journal, but the uncertainty of such an undertaking led to an acceptance of Professor Payne's proposal of a union with the *Sidereal Messenger*, and *Astronomy and Astro-Physics* was the result. The contents of the thirty numbers published during the three years which have elapsed since that time offer sufficient testimony to the usefulness of the composite journal. From the outset the editorial supervision of the departments of *General Astronomy* and *Astro-Physics* was kept entirely distinct. The policy of the latter department was determined by myself and my associates, Professors Keeler, Crew and Ames, while the selection of all other matter published in the journal was made by Professor Payne and those who were associated with him. No attempt was made to draw a hard and fast line between the two departments. Had this been done, and a strict definition of "astrophysics" adhered to, a large part of the matter published under *General Astronomy* would have appeared in the other department of the journal. It was thought best, however, to confine the scope of *Astro-Physics* to the more technical subjects connected for the most part with spectroscopic work.

In returning to the original idea of a purely astrophysical journal we are simply following out a long-cherished plan. Few who appreciate the true scope of astrophysics, and have its best interests at heart, will deny the advisability of devoting an entire journal to this, the most fascinating and at the same time the most rapidly advancing department of astronomical research. In spite of the existence of physical and astronomical journals of the highest class, the astrophysicist or spectroscopist is at a loss to know where to publish in order to reach the audience he desires. Should he choose an astro-

nomical journal, he will find that his paper will remain unread and unknown by a very large majority of physicists — the very men who are, perhaps, best competent to appreciate its true value. A purely physical journal is not less evidently an unsuitable place for papers treating of solar or stellar investigations, even though these investigations be prosecuted by the methods of the physical laboratory. Recent papers on the radiation of gases and the validity of Kirchhoff's law have all appeared in physical journals, but the subject is one not less interesting to the astronomer than to the physicist. The same might be said of scores of other papers dealing with spectroscopic, bolometric, radiometric, photographic and photometric researches conducted in the laboratory, but finding their most important applications in the elucidation of astronomical phenomena. The astronomer and physicist should be able to meet on common ground, and this only an astrophysical journal can supply.

During a recent visit to many of the observatories and spectroscopic laboratories of Europe the writer enjoyed an excellent opportunity to discuss with both astronomers and physicists the plan of founding such a journal. At Potsdam Professor H. C. Vogel, Director of the Astrophysical Observatory, and Professors Scheiner, Müller and Kempf were found to be heartily in favor of the proposed journal and ready to promise their support and coöperation. In a plan of publication formulated at Berlin it was decided that five Associate Editors be chosen to represent Germany, Great Britain, France, Italy and Sweden on the editorial staff, for it was felt from the first that unless the journal were made truly international in character it could not be a success. Professor Vogel readily consented to be the Associate Editor for Germany. In subsequent visits to Rome, Paris and London the plans of the journal were discussed at length with Professor P. Tacchini, Professor M. A. Cornu and Dr. William Huggins. Everywhere the most cordial assurances of support and coöperation were received, and before my return to America the general plan of the journal had been decided upon, and the European members of the Board of Associate Editors chosen as follows: Professor M. A. Cornu, École Polytechnique, Paris; Professor N. C. Dunér, Astronomiska Observatorium, Upsala; Dr. William Huggins, Tulse Hill Observatory, London; Professor P. Tacchini, R. Osservatorio del Collegio Romano, Rome; Professor H. C. Vogel, Astrophysikalisches Observatorium, Potsdam. Subsequently five Associate Editors were secured

in the United States: Professor C. S. Hastings, Yale University; Professor A. A. Michelson, University of Chicago; Professor E. C. Pickering, Harvard College Observatory; Professor H. A. Rowland, Johns Hopkins University; Professor C. A. Young, Princeton University.

Professor James E. Keeler, of Allegheny Observatory, whose association in the editorial management of *Astronomy and Astro-Physics* had done so much for that journal, agreed to join the writer in editing THE ASTROPHYSICAL JOURNAL. Professor Henry Crew, of Northwestern University, and Professor Joseph S. Ames, of Johns Hopkins University, will continue the valuable work they have hitherto carried on in connection with *Astronomy and Astro-Physics* as Assistant Editors of the new journal, and Professor F. L. O. Wadsworth, of the University of Chicago, Professor Edwin B. Frost, of Dartmouth College, and Professor W. W. Campbell, of the Lick Observatory, have promised to assist in the same capacity. In addition to this exceptional editorial coöperation—in itself quite sufficient to make THE ASTROPHYSICAL JOURNAL truly international in character—we are fortunate in having promises of assistance from many astronomers and physicists in Europe and America.

It must not be supposed that THE ASTROPHYSICAL JOURNAL will deal only with the astronomical applications of the spectroscope. On the contrary, the scope of the JOURNAL will be quite as broad as that of *Astronomy and Astro-Physics* has been, for while papers dealing only with questions of celestial mechanics and measures of the positions of the heavenly bodies will not fall within it, they will be replaced by articles treating of laboratory researches closely allied to the investigations of astronomical physics. Drawings, photographs, descriptions and theories of the Sun, Moon, planets, satellites, comets, shooting stars, star clusters, nebulæ and the Milky Way will all be considered as coming within the scope of the new journal. So too will observations of variable stars, photometric determinations of stellar magnitude and planetary albedo, measurements of solar radiation and atmospheric absorption, observations of the phenomena of lunar and solar eclipses, and the numerous applications of the spectroscope in astronomy. The importance of supplying a common place of publication for papers on both the observatory and laboratory applications of physical methods of research has already been pointed out. For this purpose much space will be devoted to articles on wave-length determinations of the lines in solar, metallic, and gaseous spectra, bolometric and radiometric work, spec-

tral photometry, experiments on radiation and absorption, photographic researches in the infra-red and ultra-violet, studies of the relations of the lines in different spectra, interference and diffraction phenomena, and theoretical work in certain branches of optics, heat, electricity and other departments of physics. In pursuance of the plan which seems to have met with favor in *Astronomy and Astro-Physics*, the series of papers on the modern spectroscope will be continued, and accompanied by articles on telescopes, heliostats, bolometers, photometers and other instruments and apparatus used in such investigations as those mentioned above. Astrophysical and spectroscopic observatories and laboratories will also be fully illustrated and described.

Special attention will be given to the reproduction of the latest photographs of astronomical and physical phenomena. By reason of their relations with the observatories and laboratories of Europe and America, the editors will always have the best photographs at their disposal.

Articles written in any language will be accepted for publication, but unless a wish to the contrary is expressed by the author, they will be translated into English.

In the department of *Minor Contributions and Notes*, subjects other than those named in the above list of topics, but belonging to closely related fields of investigation, may find a place.

It is intended to publish in each number a bibliography of astrophysics, in which will be found the titles of recently published astrophysical and spectroscopic papers. In order that this list may be as complete as possible and that current work in astrophysics may receive appropriate notice in other departments of the JOURNAL, authors are requested to send copies of all papers on these and closely allied subjects to both Editors.

These and other details of the plan of publication of THE ASTROPHYSICAL JOURNAL were decided upon at a meeting of the American members of the Board of Editors held in New York on November 2, 1894. Professors Young, Pickering, Rowland, Michelson, Hastings, Keeler and Hale were present. It was voted that a meeting of the Board of Editors be held annually, for the discussion of matters relating to the JOURNAL.

Astronomy and Astro-Physics has been purchased from Professor Payne by the University of Chicago, and THE ASTROPHYSICAL JOURNAL will be practically a continuation of it in a slightly different form.

The annual subscription price (for ten numbers) is $4.00 for the United States, Canada and Mexico. In other countries of the Postal Union the price is 18 shillings, Subscriptions should be sent to *The University of Chicago, University Press Division, Chicago, Illinois.*

All European subscriptions should be sent to the sole foreign agents, *Wm. Wesley & Son, 28 Essex St., Strand, London.*

All papers for publication and correspondence relating to contributions should be addressed to *George E. Hale, Kenwood Observatory, Chicago, Illinois.*

GEORGE E. HALE.

NOTE ON THE ARC-SPECTRUM OF COPPER.

Messrs. Crew and Tatnall publish in *Astronomy and Astro-Physics*, **13**, 740, a method for obtaining the arc-spectra of metals free from carbon lines,[1] and as a specimen they give the spectrum of copper between $\lambda=4000$ and $\lambda=3600$. In this region they find 41 new lines, which have not previously been published as lines of copper. In our copper spectrum Professor Runge and I have recorded only those lines on the photographs which we were convinced belonged to copper. A good many other lines, not appearing on all the plates, especially not on the weaker ones, were omitted as doubtful. Among these I find 23 of the lines measured by Crew and Tatnall, and thus it becomes more probable that these 23 lines really belong to copper. I give here a list of these lines as measured by us:

3976.12	6 very hazy	3800.55	5 hazy	3695.42	5 hazy
3964.40	6 very hazy	3800.06	6 hazy	3685.05	6
3947.09	6 hazy	3797.29	6 hazy	3644.20	5 hazy
3933.20	6 hazy	3780.14	6 very hazy	3632.65	5 hazy
3881.80	6 hazy	3764.90	6 very hazy	3629.91	6
3817.45	6 very hazy	3721.76	6 very hazy	3610.86	5 hazy
3813.62	6 hazy	3720.84	6	3609.39	5
3803.62	6 very hazy	3699.19	5 hazy		

The concordance of our measurements with those of Crew and Tatnall is very satisfactory, considering that all the lines are very faint and hazy, and that only a few plates have been measured in both cases. Of the line 3619.52 Crew and Tatnall say: "surely not copper." This is, in fact, a very strong line of nickel. The line at 3961.64 is

[1] It is certainly a great advantage to avoid the carbon lines, but I fear that Messrs. Crew and Tatnall's method will be of use only in cases where the high temperature of the carbon arc is not needed.