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Samuel D. Clegg, J. M. D. D.

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PREFACE.

with this is a list of the principal serial works from which extracts or quotations are to be found in the volume.

Fifth, an extremely minute alphabetical index of authors and subjects.

Sixth, a systematic and analytical table of contents, by means of which reference can readily be made to whatever the volume contains, bearing upon any particular line of inquiry.

Seventh, in compliance with a generally expressed wish, the names of the authors of the different portions of the Scientific Summary are given for the first time in the present volume of the *Record*, in connection with their respective communications, all of them men occupying the front rank in America as authors and investigators. Other collaborators not contributors to the first division of the volume are Professor C. F. Himes, of Dickinson College, Carlisle, Pa.; Professor F. W. Clarke, of the University of Cincinnati; Professor E. D. Cope, of Philadelphia; Professor F. V. Hayden; Major J. W. Powell; Lieutenant George M. Wheeler, U. S. A., and several others who prefer to remain unmentioned.

It will be readily understood that the present volume is prepared for the general public, who desire to become acquainted with the more prominent steps of advancement during the year, without the trouble of resorting to the sources of original information concerning the same. Specialists may find little or nothing in it to merit their attention, and, indeed, they may naturally be inclined to criticise the work for not being more complete. It must be borne in mind, however, that the work is limited in extent, and that, in view of the enormous subdivision of labor at present in the line of scientific investigation, any attempt at exhaustiveness would involve a vast increase in the size of the book. At the present time there is scarcely a branch of science which is without one or more journals as its organs and an annual record devoted exclusively to its history; and to these reference should be made for more minute information. It is hoped, however, that but little of general or popular interest has been overlooked.

PREFACE.

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In the selection for the Scientific Bibliography the editor has been chiefly guided by the commendatory notices which have appeared in the more prominent scientific journals of the day, and references to the pages of the journals wherein the works catalogued and reviewed are given. As the journals in question are generally easily accessible, the reader is thus furnished with a trustworthy guide in his selection of books.

SPENCER F. BAIRD.

SMITHSONIAN INSTITUTION, WASHINGTON, March 1, 1877.

chased. This last is the result of thirty-four years' work, and contains about 34,000 craters and an equal number of hills, besides other objects. It is to be explained by a suitable text. Work upon Birt's map, formerly prosecuted by aid of the British Association's funds, is for the present suspended. It is to be hoped that this may one day be completed. —12 A, *May* 18, 1876.

SUPPOSED OBSERVATION OF AN INTER-MERCURIAL PLANET.

M. Weber, of Peckeloh, observed on the 4th of April, 1876, about 4^h, a round spot on the sun which was not there on the morning of that day, and which had disappeared on the morning of the 5th. It is somewhat curious, as pointed out by Dr. Wolf, of Zurich, who communicates the observation to Le Verrier, that this observation is 6219 days = 148×42.02 days after that of Lescarbault, as 42 days seems to be the period indicated by former observations (?) of this supposititious planet. Thus the observations of Steinhübel (1820), Pons (1823), Stark (1826), Capocci (1845), Schmidt (1847), Olrt (1857), and Lescarbault (1859), seem to indicate a period of 42 days, the separate results ranging from 42.07 to 41.95. From Lescarbault's observation alone Le Verrier deduced a period of about 19 days. —6 B, *Aug.* 28, 1876, 510.

GLASS DIVIDED CIRCLES FOR THE MEASUREMENT OF ANGLES.

Mr. Lewis M. Rutherford publishes in the *American Journal of Science* for August, 1876, an account of a circle divided on glass which he has had fitted to his spectrometer. It is ten inches in diameter, divided to ten minutes of arc, and read by two microscopes magnifying seventy-five diameters to single seconds. A second on such a circle is about one forty-thousandth of an inch, but such was the fineness of the lines of division that the probable accidental error of pointing was considerably less than half a second of arc. Mr. Rutherford is of the opinion that on glass circles so divided and of fifteen inches in diameter, more accurate work could be done than upon the metal circles (thirty-six inches and upward in diameter) now in use in large astronomical instruments. "The advantages of this system are obvious: perfection of surface, permitting a line of any desired fineness; facility of illumination, permitting the extension of the

power of the reading microscopes to several hundred times; smallness of dimensions, and consequent cheapness; and avoidance of almost all the questions of flexure and local effects of temperature."

CINCINNATI CATALOGUE OF NEW DOUBLE STARS.

The Cincinnati Observatory has just published in a neat octavo form a catalogue of fifty new double stars, discovered with the 11-inch refractor, by H. A. Howe, with the places of the stars for 1880.0. The pages are well arranged, every thing relating to the *position* of the star being on the left-hand page, and the *position-angle*, *distance*, and *magnitudes* of the doubles, with the date of discovery and remarks, being opposite, on the right-hand page.

The stars are mostly small, and all are below the sixth magnitude; but, on the other hand, the pairs are close, no less than twenty-one out of the fifty pairs being two seconds of arc or less in distance, and none greater than eight seconds. Most of them are also very far south, in a field comparatively unworked before.

LIST OF LATITUDE STARS EMPLOYED IN THE COAST SURVEY.

It has heretofore been the custom in the Coast Survey to determine the latitudes of the various astronomical stations by means of pairs of stars selected from the catalogue of the British Association, for observation by Talcott's method. These pairs were observed in the field, and the note-books sent to Washington, where the final reductions were made. The declinations for the observed stars were obtained from a comparison of good modern authorities, such as the publications of the observatories of Greenwich, Washington, Radcliffe, and Armagh. In many cases the observatories of Washington and of Cambridge, Mass., have determined the declinations specially. The Coast Survey has selected from the "Durchmusterung" all stars between the declinations of $+88^{\circ} 40'$ and $-1^{\circ} 48'$, and above the 5.9 magnitude, 2164 in all, and has published in its report for 1873 a list of these, with the approximate places for 1880.0.

It is further intended to publish shortly accurate places of all these stars, so that a complete working catalogue of nearly all the naked-eye stars of the northern hemisphere will be

available. The list was selected under the direction of Assistant C. S. Peirce, who has also given much attention to the determination of the magnitudes. This list has been carefully compared with the catalogue of Heis, with the result of detecting a very large number of errata, a list of which forms a supplement to the catalogue of great value. The catalogue has seven columns: 1. The current number from 1 to 2164; 2. The number in the B. A. C.; 3. The usual designation by constellations; 4. The magnitudes as assigned by Mr. Peirce; 5 and 6. The approximate R. A. and δ for 1880.0; and 7. Synonyms and references to other authorities than the B. A. C.

SPECTRUM OBSERVATIONS OF THE STARS.

M. D'Arrest, the Director of the Observatory at Copenhagen, writes that he continues to devote the powers of his large telescope to celestial spectroscopy. His "Durchmusterung," or spectroscopic examination of the stars in the northern heavens, continues to increase the number of stellar spectra which belong to the third class in a far larger proportion than any other of Secchi's four divisions. The stars of this type afford remarkable objects for investigation, and are pretty numerous and uniformly distributed throughout the heavens. Only a few other spectra have striking similarities among themselves. In some the position and the groups of dark absorption bands are, as Secchi and Vogel have stated, in complete accordance. Groups occur in which even the various intensities of the bright lines are sometimes alike; these lines being, in general, brightest near the red end, although frequently exhibiting uniform brightness throughout the spectrum. But there is a remarkable uniformity in all the spectra. Out of 11,000 stars whose light has been thus examined, only eighty spectra offer characteristics worthy of special mention, and only five new stars are found whose spectra belong to the fourth class. On the average, therefore, where there is one star of the third class for every 140 stars examined, there is but one star of the fourth class for every 1000; and this holds throughout for all stars brighter than the eighth magnitude. In bright stars of the third type, dark absorption bands have several times been perceived. Only once, says D'Arrest, has he found a

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