chlorides, another series of experiments have been carried out by a method which Prof. Winkler states is in his opinion (and there can be none higher as regards work with the two metals in question) quite unimpeachable. The older methods based upon the electrolytic determination of the metals were found to lead to an error in the case of cobalt, owing to the fact that a small quantity of the hydrated oxide $Co_2O_3 \cdot 2H_2O$ is contained in the deposit upon the platinum electrode, while in the case of nickel no oxidation whatever occurs. This discovery was consequent upon another, namely, that a solution of iodine in potassium iodide of deci-normal strength is capable of instantly dissolving the deposited metal from the platinum terminal without in the slightest attacking the latter, producing a solution of the iodide of the metal. In the case of nickel the platinum is left perfectly clean, while deposited cobalt invariably leaves a stain due to about half per cent. of oxide. The electrolytically-deposited cobalt employed by Prof. Winkler was therefore all reduced in pure hydrogen before use; when subsequently dissolved in the iodine solution, no trace of oxide was ever left. The method of analysis consisted in determining, by titration with pure sodium thiosulphate, the excess of iodine left after solution of the pure metals to form the iodides. Two complete series of analyses, each consisting of a considerable number of individual determinations, were carried out with an interval of some months, in order to employ metals from totally independent mineral deposits. The results are most concordant, and lead to the final numbers, Ni = 58·72 and Co = 59·37, when H = 1 and I = 126·53. The atomic weight of cobalt must therefore be accepted as at least half a unit higher than that of nickel, a result likewise in accordance with the work of Prof. Winkler published a short time ago.

OUR ASTRONOMICAL COLUMN.

δ CEPHEI.—Further particulars of Dr. Belopolsky's spectroscopic study of this variable star (NATURE, November 1, 1894, p. 21) are given in the *Bulletin* of the St. Petersburg Academy of Sciences, November, 1894, and some of his numerical results are slightly changed. He has shown for the first time that orbital movement is as closely associated with this class of short-period variable stars as with those of the Algol class, in which the minima are produced by eclipses. Although the spectrum of δ Cephei is described as of Vogel's Class II.*a*, it is pointed out that it differs from that of the sun in many respects, some of the lines which are narrow and feeble in the sun being strong in the star, and *vice versa*. There does not appear to be any change in the character of the spectrum, other than a variation of intensity, as the light of the star changes.

The displacements of the lines with respect to the comparison spectra of iron and hydrogen indicate that the star has an orbital movement in a period corresponding to that of the light changes (5d. 9h.), and that the eccentricity of the orbit is 0·514. The form of the curve of velocities which is given, indicates that the major axis of the orbit must be very nearly directed towards the earth, and the system is approaching the earth with a velocity of about 12 English miles per second. With reference to the centre of movement, the maximum velocities of approach and recession are about 13 English miles per second; the star is receding for about a day after minimum, approaching for nearly 3 days more, and receding until minimum again. Periastron is the point of the orbit farthest removed from us, and is passed about a day after minimum.

The apparent semi axis major is about 818,800 English miles, so that the whole orbit is less than twice the sun's diameter. We are not aware that any attempt has been made to determine the parallax of the star, but unless it has a very high emissive power, its small size would indicate that it must be relatively near to us.

Notwithstanding that the time of a possible eclipse is a day after the minimum of the light curve, Dr. Belopolsky seems to be of opinion that the variation may be due to eclipsing. He appears to believe that further work may show that there is some systematic error, and that periastron may really coincide with the minimum. As the light changes appear to be going on continuously throughout the period, it is clear that the eclipsing cannot be of the simple kind with which we are familiar in the case of Algol.

THE VATICAN OBSERVATORY.—A day after the death of Father Denza, we received the fourth volume of the "Pubblicazioni della Specola Vaticana." Every annual report of the work done at the Vatican Observatory is more voluminous than the one preceding it. The volume which came to us last month, and to which Father Denza's death gives a melancholy interest, runs into more than six hundred pages, and is illustrated by forty-two plates. Among these are illustrations of the Dumb-bell nebula in Vulpecula, the Pleiades nebula, the Orion nebula after exposures of thirty minutes and of nine hours, two photographs of the eclipse of April 1893, a photograph of the sun with the big spot of August 1893, together with two enlarged pictures of the spot, and a map showing the direction of motion of the meteors observed on August 10–11 of the same year. Papers on the subjects of the illustrations make up the greater part of the astronomical section of the report. Altogether, ten photographs were taken at Rome during the eclipse of April 1893, and contact observations were also made. The numerous meteor observations made under Father Denza's direction in Italy, in August and November 1893, are catalogued and commented upon. It is to be hoped that the system of meteor-observation which the late Director instituted will not be allowed to lapse. In celestial photography we note that in addition to the work for the photographic chart and catalogue, 248 photographs were taken of various celestial objects, 150 being photographs of the sun. But the astronomical results by no means represent the total work carried out at the observatory. Meteorology and terrestrial physics come in for a large share of attention. To us it seems that the only thing wanting to make the Vatican Observatory a true astro-physical observatory is a section for spectroscopic investigations.

Many astronomers will be interested to know that a full and appreciative notice of Father Denza's life and work has been written by P. Armani, of the Collegio dei S.S. Biagio e Carlo. Another full notice appeared in *Cosmos* of December 22.

AN INDISPENSABLE ANNUAIRE.—This year is the centenary of the creation of the Bureau des Longitudes, the invaluable *Annuaire* of which has been received for 1895. It is quite unnecessary to remind astronomers of the merits of this veritable *vade mecum*, for they know its usefulness better perhaps than workers in the other branches of physical science to which it appeals. A few changes have been made since the previous issue. M. Berthelot has completely revised and corrected the tables relating to thermo-chemistry. M. Moureaux has inserted in the tables of the magnetic elements in France, the values determined directly by him in 1894, at nearly six hundred places. Prof. Glasenapp has added five new stars to his table of the elements of the orbits of double stars. The list of comets has been brought up to the end of 1893, and that of minor planets up to November 1894. There are five articles in the volume, the subjects and authors being: Lunar atmospheric waves, by M. Bouquet de la Grye; the Geodetic Congress at Innsbruck, by M. Tisserand; the Observatory on Mont Blanc, by M. Janssen; photographic photometry, by the same author; and a report on the proposition to unify the astronomical and civil days, by M. Poincaré (see the next note).

THE UNIFICATION OF CIVIL AND ASTRONOMICAL DAYS.—It will be remembered that in 1893, the Astronomical and Physical Society of Toronto invited replies from astronomers to the question: "Is it desirable, all interests considered, that on and after the first day of January 1901, the Astronomical Day should everywhere begin at mean midnight?" The result of the voting was noted in NATURE, April 5, 1894, p. 542; and to this may now be added the following resolution adopted by the Bureau des Longitudes upon the question (*Annuaire* for 1895):—"The Bureau des Longitudes is favourable, in principle, to the reform proposed by the Canadian Institute to change the time from which to reckon the astronomical day. The Bureau thinks that this reform, as has been observed by the Lords of the Admiralty, will be of little avail unless an understanding is come to between the Governments publishing the principal ephemerides. Finally, considering that the unification will not really be complete until the civil hour is reckoned from 0 to 24 hours, as is the case in Italy, the Bureau is of the opinion that this reform ought to be realised as soon as possible."