logue :—3860, 3966, 4119, 4281, 4538, 4667, and 4770. Probably Mr. Ellery at Melbourne, or Mr. Todd at Adelaide—both of whom are understood to be partially occupied with measures of the southern double-stars—may eventually clear up the uncertainties which characterise the results published by Gilliss.

While referring to the catalogue of stars observed at Santiago, it may be remarked that the majority of the large proper motions shown by comparison with Lacaille are proved to arise from errors of observation on his part, when we examine the particular cases with the aid of the valuable volumes which Mr. Stone is so regularly issuing from the Royal Observatory, Cape of Good Hope. When the volumes containing the observations made in 1876 (N.P.D. 135°–145°) and in 1877 (N.P.D. 125°–135°) are published, Mr. Stone will have placed in the hands of astronomers the means of investigating the proper motions of a large number of southern stars, which can hardly fail to lead to conclusions of much interest and importance. We are not justified in supposing that in Groombridge 1830 we have the case of largest proper motion in the northern hemisphere, and as to the proper motions of southern stars our knowledge is yet but very limited, and very conspicuous instances of rapid translation may remain to be detected amongst the telescopic stars of the southern heavens.

THE NEW COMET.—The telegram notifying the discovery of a new comet, and forwarded by the Smithsonian Institution to M. Mouchez, Director of the Observatory at Paris, is in these terms :—"Discovery, by Lewis Swift, of Rochester, of a large and faint comet, July 7, 1878, at 2h., in 17h. 40m. right ascension and 18° north declination, with slow motion towards the south-west; neither tail nor nucleus, but a central condensation. Query, is it the Tempel comet?" In communicating this telegram to the Academy of Sciences, on July 15, it was stated that the sky had been overcast at Paris, and therefore no opportunity had been afforded for verifying the discovery, and further that, notwithstanding an immediate intimation was given to the principal European observatories on receipt of the telegram at Paris on July 9, M. Mouchez had not heard of any observation elsewhere.

In this country several practised observers have failed to detect the comet, though the skies have been at times very favourable. The query in the American telegram, referring to Tempel's comet, might suggest that the declination of the comet was *south*, but, upon submitting the point to calculation, it does not appear that this change will afford an explanation of the want of success. If Tempel's comet were in perihelion about noon on August 11, its right ascension, at the time of Mr. Lewis Swift's discovery, would have been as he estimated it, but the declination would not be more than 7½° south. A large, faint, diffused nebulosity, however, is easily overlooked—the best chance of detection, when the position is not precisely known, being probably afforded with the "comet-seeker," by which we mean such an instrument as is (or was formerly) constructed by Pistor and Martins, of Berlin. Mr. Lewis Swift was already the independent discoverer of a comet, and is not likely to have been mistaken or misled by any optical illusion on this occasion.

[Since the above was written we learn that Prof. Winnecke re-observed the periodical comet of Tempel at Strasburg on July 20, the position obtained that evening indicating that the perihelion passage will not take place until September 6, or between five and six days later than the date fixed by M. Schulhof's calculations, which is, perhaps, as close an agreement as was to be expected, since the observations in 1873 did not suffice for the very accurate determination of the mean diurnal motion. The comet was from 2′—3′ in diameter, with nuclear condensation. When the mean anomaly is so corrected that the observed and computed longitudes for July 20 are made to agree, the latitudes differ only one minute, proving that M. Schulhof's other elements are very near the true ones. The following places for midnight at Greenwich may facilitate observations :—

| | Right Ascension. h. m. s. | North Polar Distance. ° ′ | Log. Distance from Earth. | Log. Distance from Sun. |
|---|---|---|---|---|
| July 26 | 15 24 48 | 97 7 | 9·8708 | 0·1518 |
| „ 30 | 15 30 25 | 98·48 | 9·8741 | 0·1476 |
| Aug. 3 | 15 36 50 | 100·30 | 9·8777 | 0·1438 |
| „ 7 | 15 44 2 | 102·14 | 9·8818 | 0·1402 |
| „ 11 | 15 52 0 | 103·57 | 9·8861 | 0·1371 |
| „ 15 | 16 0 42 | 105·40 | 9·8908 | 0·1343 |

The intensity of light does not sensibly vary during the above interval.]

## METEOROLOGICAL NOTES

TO the meteorologist the recent discussions in Parliament and out of it regarding the salubriousness or insalubriousness of the climate of Cyprus have been, if not instructive, at least amusing, the amusement arising from the circumstance that positive information was not forthcoming in support of the strong statements made on both sides. Thanks, however, to the Scottish Meteorological Society, we have trustworthy information on the subject, that Society having established there one of its foreign climatological stations in 1866, where, for about four years, observations were made by Mr. J. B. Sandwith, H.M. Vice-Consul, and the results regularly published in the Society's *Journal*. Summarising these results, we learn that the annual rainfall is about 14 inches, nearly the whole of which falls from November to April, notably in November and December, that no rain falls in June, July, and August, and only trifling amounts, but occurring rarely, in May and September. There is thus practically five rainless months in the year in Cyprus, the rainless summers being a feature in its climate common, as we have recently had occasion to remark, to the climates of the Mediterranean regions south of latitude 43° (NATURE, vol. xviii. p. 287). Comparing it with the coasts of Syria opposite, its winters are milder and its summers cooler; and the decidedly insular character of its climate is further apparent from the fact that the coldest month is February, with a mean temperature of 52°·8, being about equal to that of London in the middle of May, and that the mean temperature of August is nearly as high as that of July, both being about 81°·0, which is approximately the summer temperature of Algiers, Alexandria, Athens, and Constantinople. During these four years the highest recorded temperature in the shade during any of the months was 96°·0, except June, 1869, when, from the 21st to the 25th, the mean temperature at Alethriko, 3½ miles inland from Larnaka, reached 95°·5, being about the average summer temperature of the Punjab, rising on the 24th to a maximum of 105°·0. On the same day the temperature rose to 100°·0 at Larnaka, and to 103°·5 at Jerusalem, 2,500 feet above the sea, the period being characterised as one of unprecedented heat and drought over the whole of the regions bordering the Levant. It is obvious to remark that much may be done in mitigation of the effects of the summer heat, just as has been done in countries similarly circumstanced, by the establishment of sanataria among the mountains, and by carrying through agricultural improvements and engineering works, which would at the same time contribute to the material prosperity of the island.

PROF. LOOMIS, in a ninth Contribution to Meteorology, handles admirably a question of first importance in the practical bearings of the science, viz., the relations of the barometric depressions and storms of the Pacific States to the storms east of the Rocky Mountains. As regards the twenty-seven storms whose courses he has traced, it is probable that the great majority, if not the whole of them, were first formed over the Pacific Ocean. In each of the twenty-seven cases (with perhaps one single exception) the storm crossed the Rocky Mountains, and was thence tracked across the United States to the shores of the Atlantic, subject, however, in some cases to modification in its progress. It is scarcely possible to overrate the importance of these results in the practice of weather telegraphy and on questions affecting the general movements of the atmosphere. For we see here that an unbroken mountain-range of at least 6,000 feet in height does not stop the eastward progress of these barometric depressions and storms; neither do mountain-ranges of more than 10,000 feet in height, broken as in North America, present an insuperable obstacle to the onward course of these phenomena. The mountain-ranges between the Pacific and the Mississippi present obstructions to the formation of a system of winds of any great geographical extent; and hence, probably, barometric depressions are not so great over this uneven and broken region as over the vast plains of the Mississippi and eastern States, where there are no mountain barriers to interfere with the formation of a system of circulatory winds over areas 2,000 miles in diameter.

## *CHEMICAL NOTES*

Influence of Temperature on the Rotatory Power of Quartz.—Following up the researches of Lang and Fizeau, Sohncké has found (*Ann. d. Phys. Chem.*, N.S. III. p. 516) that the increase in rotary power in quartz, with increase of temperature, is not directly proportional to the temperature, but is less at lower than at higher temperatures. For the crystal he experimented on he determined the following formula:—

$$\phi = \phi^\circ (1 + 0{\cdot}0000999\, t + 0{\cdot}000000318\, t^2),$$

where $\phi^\circ$ = the rotatory power of the same crystal at 0°; and he further found that the relative increase of power in the plane of polarisation was the same for all colours up to 170°. To see whether the octahedral system presented the same phenomena he also examined common salt, and obtained similar but more strongly-marked results.

Change of Indices of Refraction in Mixtures of Isomorphous Salts.—M. Dufet, in the *Comptes Rendus*, lxxxvi. 881, gives a most interesting account of some experiments he has carried out on the above subject, partly in continuation of such work as that of Senarmont, Topsoë, and Christiansen (*Ann. Chem. Pharm.*, 1874). Instead of examining simple isomorphous salts the author has taken mixtures containing varying quantities of magnesium and nickel sulphates, but of known composition. Working with such bodies he has determined that "the differences between the indices of a mixture of two isomorphous salts and those of the component salts are inversely proportional to the number of equivalents of the two salts entering into the mixture." In his calculation, M. Dufet has taken as an equivalent the number 111 or one equivalent of $SO_4.7HO$. He considers the law of variation of the index as a consequence of Gladstone's law: the refractive energy $\frac{n-1}{D}$ of a mixture of two bodies with no chemical action on one another, being the sum of the refractive energy of the component substances. According to M. Dufet, isomorphous salts crystallising together, form mixtures presenting analogies to a certain extent comparable with liquid mixtures, where the physical properties are the mean of those of the components; this, however, is only true up to a certain point.

Allotropic Modification of Copper.—By the electrolysis of a solution of about 10 per cent. of copper acetate Schützenberger has obtained an allotropic variety of copper somewhat remarkable in its physical and chemical properties. During the electrolysis the surface of the negative platinum electrode which faces the positive copper electrode becomes covered with a layer of the allotropic modification of the metal, whilst the other side of the electrode is covered with a deposit of ordinary copper. The allotropic modification forms metallic glittering scales with roughened surfaces on the side next the solution; should the electrolysis be carried on long enough, beautiful tree-like forms are deposited on the edge of the negative electrode, which gradually ramify over to the positive electrode. The allotropic copper is less red than the ordinary variety, possesses surfaces without malleability, and can be reduced to an extremely fine powder. Its density, 8 to 8·2, is higher than that of the ordinary variety, which is about 6·9. It oxidises rapidly in the air, becoming at once iridescent, and finally of an indigo blue colour; when exposed to the air as a powder it becomes black, changing finally into the oxide. According to the author it becomes reconverted into the ordinary form of copper by heat, or exposure to certain chemical agents.

Saccharose.—M. J. Motten has recently brought forward a paper, entitled a "Contribution to the History of Sugar (Saccharose)," in which the author discusses the action of light and of a temperature of 100° Cels. on solid and dissolved sugar, proving that the light alone does not invert dissolved sugar, and also that a temperature of 100° does not alter dry sugar. On the other hand solid sugar imperfectly dried, and dissolved sugar are altered under the influence of that temperature; oxygen is then absorbed, and carbonic acid evolved, but more slowly than it was often supposed.

Heat Evolved in the Formation of Isomeric Bodies.—M. Berthelot has given several communications to the Chemical Society of Paris, relating to the above subject. He finds that in general nitro compounds and isomeric nitric ethers appear to be formed with the disengagement of very unequal quantities of heat; the transformation of ethers into nitro compounds disengage approximately thirty heat units, at the same time undergoing increase of density and rise in the boiling point. In the case of metameric acids, as butyric, isobutyric, valerianic, &c., combining with the same base, his numbers show that the heat disengaged is precisely the same in the various cases which he describes. Approximately equal numbers are also obtained in the case of the chloro and bromo derivatives of these acids. There is very little difference also in the heat disengaged in the transformation of isomeric alcohols into isomeric aldehydes. The general results of his experiments, covering about thirty compounds, including alcohols, aldehydes, fatty acids, and their salts, chloro and bromo acids, &c., point to the conclusion that isomeric bodies having the same chemical function are formed with nearly identical disengagements of heat, their reciprocal metamorphosis disengaging very little heat. Finally, the same approximations exist in the formation of their isomeric derivatives.

Chemical Changes Taking Place during the Ripening of Grapes.—From experiments lately made on the transformations of the grape, and the exchanges between it and the surrounding atmosphere, MM. Saint Pierre and Magnien conclude that grapes at the time of their maturation liberate carbonic acid both in darkness and in light, the quantity produced being always superior to the quantity of oxygen consumed, if the experiment be long enough. This liberation occurs as well in an inert