daily change in the variation, somewhat analogous to the daily range of the barometer, although the daily minimum of variation at Washington occurs at about 8 a.m., and the maximum between 1 and 2 p.m. It is proposed to continue the publication of these curves on this Chart for at least three months, and any questions regarding them will receive immediate consideration and reply. The attention of masters of vessels is called to the form issued by this Office for the record of observations of variation at sea, and to the general importance of the subject in connection with vessels' compasses and the variation curves plotted on our charts."]

The Alpine Flora.

IN connection with this subject (see NATURE, vol. xliii. p. 581) it may be well to draw the attention of botanists to the fact that a young vigorous strawberry plant, in an exposed garden, will, during the winter season, place all its leaves in a perfectly horizontal position, some even close to and resting on the ground, in striking contrast to its summer habit of erect growth, whereby it is often damaged by strong winds.

Whether direct climatal conditions be the sole cause of this peculiarity, or whether inherited, I cannot determine; presumably, in its natural surroundings, the continual crowding and consequent struggle would not necessitate the adoption of dwarfing as a means of survival. J. LOVEL.

May 13.

Magnetic Anomalies in Russia.

THE magnetic disturbances in England and Wales as communicated to NATURE, vol. xliii. p. 617, by M. Mascart and A. W. Rücker, are of great interest, but the size of the disturbances between Charkov and Kursk in Russia is of much higher value. More than 150 stations with magnetic elements have proved that in the above region there are points where the declination differs by 86°, the inclination by 29°, and the magnetic total force by 0·39 el. un. The principal centres are distant from each other not more than 12 kilometres. The m. elements are :—

Principal centres of disturbance.	Decl.	Incl.	Total force, c. u.
Nepchaevo	+ 48° ...	+ 81° ...	0·84
Visloe	− 33 ...	+ 52 ...	0·65
Kisselevo	− 38 ...	+ 63 ...	0·72
Sobinino	+ 30 ...	+ 60 ...	0·75
Petropavlovka ...	− 20 ...	+ 76 ..	0·80
Belgorod	− 36 ...	+ 71 ...	0·64

The normal values are − 1° Decl. ; + 64° Incl. ; 0·48 total force. The districts are covered by sedimentary rocks.

St. Petersburg, April 30. A. DE TILLO.

THE REJUVENESCENCE OF CRYSTALS.[1]

VERY soon after the invention of the microscope, the value of that instrument in investigating the phenomena of crystallization began to be recognized.

The study of crystal-morphology and crystallogenesis was initiated in this country by the observations of Robert Boyle ; and since his day a host of investigators—among whom may be especially mentioned Leeuwenhoek and Vogelsang in Holland, Link and Frankenheim in Germany, and Pasteur and Senarmont in France—have added largely to our knowledge of the origin and development of crystalline structures. Nor can it be said with justice that this field of investigation, opened up by English pioneers, has been ignobly abandoned to others ; for the credit of British science has been fully maintained by the numerous and brilliant discoveries in this department of knowledge by Brewster and Sorby.

There is no branch of science which is more dependent for its progress on a knowledge of the phenomena of crystallization than geology. In seeking to explain the complicated phenomena exhibited by the crystalline masses composing the earth's crust, the geologist is constantly compelled to appeal to the physicist and chemist ; from them alone can he hope to obtain the light of experiment and the leading of analogy, whereby he may hope to solve the problems which confront him.

But if geology owes much to the researches of those physicists and chemists who have devoted their studies to the phenomena of crystallization, the debt has been more than repaid through the new light which has been thrown on these questions by the investigation of naturally-formed crystals by mineralogists and geologists.

In no class of physical operations is *time* such an important factor as in crystallization ; and Nature, in producing her inimitable examples of crystalline bodies, has been unsparing in her expenditure of time. Hence it is not surprising to find that some of the most wonderful phenomena of crystallization can best be studied—some, indeed, can only be studied—in those exquisite specimens of Nature's handiwork which have been slowly elaborated by her during periods which must be measured in millions of years.

I propose to-night to direct your attention to a very curious case in which a strikingly complicated group of phenomena is presented in a crystalline mass : and these phenomena, which have been revealed to the student of natural crystals, are of such a kind that we can scarcely hope to reproduce them in our test-tubes and crucibles.

But if we cannot expect to imitate all the effects which have in this case been slowly wrought out in Nature's laboratory, we can, at least, investigate and analyze them ; and, in this way, it may be possible to show that phenomena like those in question must result from the possession by crystals of certain definite properties. Each of these properties, we shall see, may be severally illustrated and experimentally investigated, not only in natural products, but in the artificially-formed crystals of our laboratories.

In order to lead up to the explanation of the curious phenomena exhibited by the rock-mass in question, the first property of crystals to which I have to refer may be enunciated as follows :-

Crystals possess the power of resuming their growth after interruption ; and there appears to be no limit to the time after which this resumption of growth may take place.

It is a familiar observation that if a crystal be taken from a solution and put aside, it will, if restored after a longer or shorter interval to the same or a similar solution, continue to increase as before. But geology affords innumerable instances in which this renewal of growth in crystals has taken place after millions of years must have elapsed. Still more curious is the fact, of which abundant proof can be given, that a crystal formed by one method may, after a prolonged interval, continue its growth under totally different conditions and by a very different method. Thus, crystals of quartz, which have clearly been formed in a molten magma, and certain inclosures of glass, may continue their growth when brought in contact with solutions of silica at ordinary temperatures. In the same way, crystals of felspar, which have been formed in a mass of incandescent lava, may increase in size, when solvent agents bring to them the necessary materials from an enveloping mass of glass, even after the whole mass has become cold and solid.

It is this power of resuming growth after interruption, which leads to the formation of zoned crystals, like the fine specimen of amethyst enclosed in colourless quartz, which was presented to the Royal Institution seventy years ago by Mr. Snodgrass.

The growth of crystals, like that of plants and animals, is determined by their environment ; the chief conditions affecting their development being temperature, rate of growth, the supply of materials (which may vary in

[1] The Friday Evening Discourse, delivered at the Royal Institution on January 30, 1891, by Prof. John W. Judd, F.R.S.