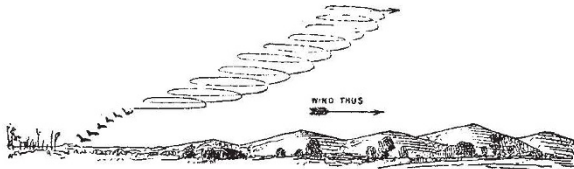


round again nearly to the same place. With gun or rifle against a tree-stem, I have often been able to spot the intersection with my aim beforehand, lap by lap; the drift is to leeward.

I take it the explanation is, that in passing round *with* the wind, and by slightly falling, great impetus is gained, which is slowed down by turning to meet and rise on the wind *like a kite* (if near, this is *seen*). I have seen the albatross and gulls floating, but this case or these cases exemplify a major problem of rising as well steadily and without effort; it is also a clearer problem, the solution of which more or less solves the minor problems of mere flotation.

The line of flight is thus:—



Sapakati, Sibsagor, Asam

S. E. PEAL

Regelation

IT is stated in NATURE, vol. xxii. p. 589, that Faraday gave the name of *Regelation* to the phenomenon of two pieces of ice freezing together. Surely this is an error? It was in 1856 when Sir Joseph D. (then Dr.) Hooker, Professors Tyndall and Huxley, and the present writer were in Switzerland together. Prof. Tyndall asked us to suggest a suitable term for the process; and it was Sir Joseph Hooker who said he could think of none better than *Regelation*. Prof. Tyndall instantly accepted it as exactly conveying the meaning he required.

Agassiz, however, in writing upon the difficulties of ascertaining the temperatures of glaciers by introducing thermometers into borings, alludes amongst others to "la difficulté d'extraire les fragmens détachés qui se *regelait* constamment" ("Études sur les Glaciers," p. 203). This shows that a similar expression had occurred to him as suitable for this phenomenon, as early as 1840, in which year his "Études" were published.

GEORGE HENSLOW

JOHANNES RUDOLF VON WAGNER

WE have already briefly alluded to the loss suffered by chemistry in the sudden death from heart-disease of Prof. von Wagner, which occurred at Würzburg, October 4. Johannes Rudolf Wagner was born February 13, 1822, at Leipzig. As a student in the university of his native city he made choice of chemistry as a profession, and supplemented the then somewhat limited advantages of the Leipzig laboratory by a course of study at Paris, whither students from numerous countries were attracted by the brilliant lectures and investigations of Dumas. His residence there was followed by a lengthy journey to the various centres of scientific interest in France, Belgium, Holland, and Germany, after which he returned in 1846 to Leipzig to accept a position as assistant in the chemical laboratory of the university. In 1851 he was appointed Extraordinary Professor of Technical Chemistry at the Nürnberg Polytechnic. In 1856 he accepted a call to the Chair of Technology at the University of Würzburg, a position which he occupied until the time of his death. During this same time he also filled two important offices, that of Director of the Technological Conservatory at Würzburg, and (until 1868) that of Royal Examiner of the establishments for Technical Instruction in Bavaria. His peculiar abilities and wide range of experience led to his being frequently sent abroad by the Bavarian Government on scientific missions, notably in 1858 to England and Holland, and in 1861 to Paris. The same reasons led to his being called upon to play an important rôle in the International Exhibitions of the past twenty years. He was successively appointed on the juries for chemical products at the Exhibitions of London (1862), Paris (1867), and Amsterdam (1869). At Vienna (1873) he was the Chief Commissioner of Bavaria,

and at Philadelphia (1876) he was a leading member of the German Commission. The marked services which he rendered in connection with the Vienna Exhibition were recognised by his sovereign, who raised him to the nobility, and decorated him with the Order of the Crown. Prof. von Wagner was the recipient likewise of numerous decorations from most of the European countries.

The career of Wagner has been one of unusual and varied activity. Apart from the multifarious duties of an executive character which we have briefly enumerated, he found time to render to pure chemistry, and especially to applied chemistry, services of incalculable value. Like Poggendorff in physics and Kopp in pure chemistry, his inclination led him towards the literary side of his favourite studies, and it is on his accomplishments as an author that his fame chiefly rests. Still, as an investigator Wagner possessed remarkable and many-sided aptitudes, and his name is associated with numerous researches, the majority of which aim at the practical application of scientific facts, or seek to ascertain the chemical nature of important industrial products. One of his first investigations (1847) was on yeast, and included a thorough study of its nature and growth, and especially of the influence exercised by the presence of foreign bodies on the phenomena of fermentation. In 1849 he commenced a research on the oil of rue, which was carried on at various intervals, and to which we owe much of our knowledge of the constituents of this important essence. In 1850 he assigned to the alkaloid conine the structure of a dibutyl-amine, a formula verified long after by Schiff's synthesis (1871) of paraconine, and by Michael and Gundelach's brilliant synthesis a few months since, of methyl-conine. Among other noteworthy theoretical results, mention may be made of his extensive monograph on polymeric isomerism (1851), and his experiments in the same year establishing the nature of mercur-ammonium compounds as substituted ammonias—mercury replacing hydrogen—by a distillation of the well-known "white precipitate" with amyl-mercaptan, which yielded sulphide of mercury and hydrochloride of amylamine. Shortly after he showed that the compounds imperatorin and peucedonine obtained from the roots of sulphur-wort and allied plants were identical, and established their chemical nature as angelate of the hydrate of peucedyle. One of Wagner's most important researches, commenced in 1850 and taken up several times since, had for an object the colouring-matters of fustic. In its course he discovered morin-tannic acid, which in company with morin gives to fustic wood its tinctorial properties. He studied carefully its reactions and its derivatives; and among the latter discovered pyrocatechin, the product of the destructive distillation of the acid. In 1853 he undertook a thorough examination of the oil of hops, separating the different chemical components, and finding amongst them quercitrin and morin-tannic acid. At this epoch he succeeded in obtaining the remarkable alloy formed by the union of four parts of potassium with 2½ parts of sodium, which is liquid at ordinary temperatures, and resembles mercury in appearance. In 1867 he contributed an interesting research on the rapid increase of solubility of carbonates in water containing carbonic acid under various pressures. At the same time he broached a theory of the formation of deposits of a graphite, in which he attributed it to a decomposition of cyanides in nature analogous to that occurring in the manufacture of soda. Among his more important analytical researches were the determinations (1860) of the quantities of oil present in the nuts and seeds of many forest trees. As an able deviser of analytical methods Wagner exhibited numerous proofs. Among these mention may be made of the use of the iodine reaction for analysing chlorides of lime (1859), the use of iodine likewise for the determination of the alkaloids (1861), the volumetric deter-

mination of tannic acid by means of sulphate of cinchonia (1866), the test for wool in silk fabrics by using nitro-prusside of sodium to show the presence of the sulphur contained in wool (1867), the application of ammonium vanadate to detect the presence of tannin in red wines (1877), and other tests for detecting methyl-eosine in the presence of eosine, nitrobenzene in the oil of bitter almonds, paraffine in bees-wax, stearic acid in paraffine, &c. Equally numerous were the improved methods of preparing chemical compounds and products introduced by him, including the preparation of pelargonate of ethyl, used extensively in perfumery, of finely-divided copper, of rufigallic acid, of calcium iodide, of precipitated alumina, of chloride of mercury, of arsenate of sodium, of benzoic acid, &c.

Among Wagner's purely technical researches reference may be made to the application of pyrocatechin for photographic purposes (1855), the determination of densities for technical use (1859), the method for purifying water for tinctorial purposes (1863), the use of paraffine for preserving sodium, and his important research (1877) on the reactions of vanadium compounds with a large variety of organic commercial products, in the course of which he obtained several important tinctorial results.

As an author Prof. von Wagner has manifested a degree of talent and a fertility surpassed by but few of his scientific contemporaries. An easy, lucid style, an intimate familiarity with the entire range of subjects touched upon, a fulness of detail united to a logical, systematic treatment of the matters in question, and a happy adaptation to the wants of even elementary knowledge, have rendered his works universal favourites. This is especially true of his "Handbook of Chemical Technology," which has survived a twelfth edition in Germany, and has been rendered accessible to French and English-speaking students by the masterly translations of Gautier and Crookes. It is doubtful whether in any other branch of applied science a manual exists which is so widely disseminated and has met with such practically universal success. Among Wagner's other works are: "Die Chemie" (1860; sixth edition 1873), "Theorie und Praxis der Gewerbe," 5 vols. (1857-64), "Die chemische Fabrikindustrie," second edition (1869), "Regesten der Sodafabrikation" (1866), and "Studien auf der Pariser Ausstellung" (1868). The technical journals of the past thirty years contain numerous monographs from his pen on individual branches of chemical manufacture, full of valuable information and statistics obtained by Wagner from private sources, and replete with those fruitful suggestions natural to a mind familiar at once with the facts of science and with their widespread applications. Unquestionably Wagner's chief literary achievement is his celebrated "Jahresbericht über die Leistungen der chemischen Technologie." Started eight years after the appearance of Liebig and Kopp's well-known "Jahresbericht" for chemistry in all its departments, this work of Wagner's has for a quarter of a century kept the industrial and scientific world promptly, thoroughly, and accurately informed of the progress made in every branch of applied chemistry. In its fulness and exactness it is an admirable type of the annual review, now regarded as indispensable for every branch of human activity by the German mind; and the vast influence which it has exercised upon the development of chemical industries is impossible to measure. The "Jahresbericht" for 1879, recently issued, forms a portly volume of 1,300 pages, with over one hundred woodcuts, and in its reviews evidences at every step a critical spirit able to cope with the scientific and practical questions constantly evoked.

Personally Prof. von Wagner was of a most attractive disposition, admired by his students not only for his rare talents as a lecturer, but also for his amiable character. His loss is felt as severely in a widespread social circle as in the world of science.

T. H. N.

JAPAN¹

II.

MISS BIRD'S work on Japan, as we have said, is cast in quite a different mould from that of Sir Edward Reed. With the exception of one or two chapters, she devotes her two volumes entirely to a record of her own experiences, casting them as in her well-known books on the Sandwich Islands and the Rocky Mountains, into the form of a series of letters. These have evidently been written in the midst of the experiences which they record, and this gives them a reality and a freshness which they could not have otherwise had. Her "Unbeaten Tracks in Japan" has all the best characteristics of her book on the Sandwich Islands. Indeed it seems to us that for the majority of readers it will have far more of novelty and quite as much interest as any of her previous works, while we doubt if any other book on Japan yet published gives so full and real an insight into the everyday life and the condition of the bulk of the people. Her work well deserves the title it bears. Many of the districts into which she, amidst all sorts of difficulties, succeeded in penetrating were certainly never before visited by a European woman, if indeed by a European of either sex. Sir E. Reed speaks of the people along parts of his route rushing out to see the "Chinese" pass; but so strange and literally uncouth did Miss Bird's appearance seem in some districts that the people could only set her down as an "Aino." She of course saw all the usual sights in the usual tracks, all that Sir Edward Reed saw; and for this her intimacy with Sir Harry Parkes and his universally beloved lady procured her every facility. The result is not the almost unmixed admiration which we find in Sir Edward Reed's volumes; but then it should be remembered that she was not the guest of the Japanese Government, but practically of the representative of the English Government; and although Miss Bird is a thoroughly independent observer, still her opinions may have taken somewhat of their colour from her special surroundings. She states fully both sides of the question of Japanese progress, and while giving full credit to the Government for the best intentions, and admitting that vast progress has been made in recent years, still she has many drawbacks to point out. And no wonder; we fear that she, like some others who write on Japan, look for too much, and expect to find a Europe in the East, instead of a country struggling out of the bonds that swaddled it till only fifteen years ago. Still her criticisms are wholesome, and charitable, and good-natured, and we trust that they will come under the notice of those to whom, if taken in good part, they might be greatly beneficial. Miss Bird has much to say on the work of missionaries in Japan, but that is a subject into which we cannot enter here. She spent much of her time in the great centres among missionaries, and had ample opportunities of seeing the nature of the work they are doing. And her observations are of the greatest interest, and must be instructive to those who are hoping that the Japanese will ultimately put on the religious habiliments which have been shaped for centuries to the people of the West. One unfortunate result we may mention, and that is the deterioration of the manners of those who have been long under missionary influence. Surely this is not necessary.

Of course the great interest of Miss Bird's book is connected with her solitary journey, quite unhampered by official guidance, north through the centre of the Main Island, and most of all her sojourn in Yezo among the strange remnant of people known as Ainos. Her journey

¹ "Japan: its History, Traditions, and Religions, with the Narrative of a Visit in 1879." By Sir Edward J. Reed, K.C.B., F.R.S., M.P. Two vols. With Map and Illustrations. (London: John Murray, 1880.) "Unbeaten Tracks in Japan." By Isabella L. Bird. Two vols. With Map and Illustrations. (Same Publisher.) Continued from vol. xxii. p. 674.