mere exercises of the fancy. Indeed, the use of the expression 'structure of molecules' is in such cases quite unwarranted."

There is undoubtedly a sense in which the last statement is true, but there is another sense in which it is not true. We may know a great deal about the chemical conduct of a compound, — enough, indeed, to warrant us in partially expressing its structure in a formula, without positively knowing its molecular weight. The reason why "conclusions regarding the structure of the molecules . . . are very apt to degenerate into mere exercises of the fancy," is not so much that the molecular weights are unknown, but rather that the true signification of structural formulas is not understood, and formulas are frequently constructed on an entirely inadequate basis of facts.

Taken all in all, the book is deserving of the highest praise, and its influence can only be beneficial. It will arouse opposition, but it will at least cause those who oppose it to think; and, if it should do this, it would be of value, though every word were false.

NOTES AND NEWS.

MR. H. L. BIXBY of Chelsea, Vt., is taking steps to introduce a system of weather warnings throughout his state by means of blasts from factory-whistles. The signals are as follows: after the first long, unbroken blast, usually given at about seven A.M., a single five-second blast indicates fair or probably fair weather for the day; two blasts, foul weather; three, fair changing to foul; four, foul changing to fair; five, doubtful or irregularly variable. After any of these, five short blasts signify a cold wave or unseasonable frosts. The managers of the *Free press* at Burlington undertake to send the necessary telegrams on payment of a small fee. Randolph is the first town to adopt the system: the signals are regularly given there now from a ten-inch steam-whistle.

— Herr J. Brautlecht has been experimenting on the transfer of bacteria from the soil to the atmosphere. Ignited sand, gravelly soil, and a moderately clayey garden-soil, were moistened with liquid containing bacteria, and covered with glass bells. In a few hours microbia of the same kind as those contained in the liquid were found in great numbers in the moisture condensed on the sides of the bell. It will be remembered that Angus Smith was one of the first to point out that aqueous vapor condensed on the walls of rooms contains micro-organisms.

— The Nitrate owners' committee of Tarapaca have determined to offer a prize of a thousand pounds for the best essay on the employment of nitrate in agriculture, so as to supplant other fertilizers. The essay is to be published by the committee in all modern languages. Moreover, five hundred tons of nitrate, subscribed by the manufacturers, are to be shipped to Europe and the United States, to be employed in experiments at the expense of the committee. A fund of four thousand pounds has been formed to carry out these various schemes, the object of which is to promote a demand for the nitrate.

— Dr. Edward Divers, principal of the Imperial engineering college of Tokio, Japan, writes to the *Chemical news*, informing the editor of a serious accident which threatens to deprive him of the sight of one eye. He is anxious to put chemists and others on their guard. A bottle containing phosphorus trichloride had done duty for many years as a specimen for the lecture-table. Dr. Divers was carefully warming the neck of the bottle to liberate the stopper, when the bottle burst in pieces with great violence, the cornea and iris of the right eye being extensively wounded, and the aqueous humor discharged.

— A sensation has been caused in Australia by the discovery of the gold-field at Mount Morgan, near Rockhampton, in Queensland. The mine, it is estimated, contains gold enough to yield, after working, a profit of nine million pounds. The curious fact is that the locality is not one which a geologist would have pointed out as likely to contain gold. The theory put forward to account for the presence of gold there is that it is a secondary formation. The gold is not in the original matrix. Nature has already mined it, chemically treated it, sublimated it, and redeposited it. The discovery is likely to give a stimulus to 'prospecting' in Queensland, and also in the other colonies.

— Professor Woldrich, at a recent meeting of the Vienna anthropological society, read a paper on the latest prehistoric remains found at Prerau. Several cartloads of bones had been found there while workmen were levelling for an orchard, and taken to the Olmütz museum. They were principally bones of mammoths, cave-bears, foxes, hares, etc.; but mingled with them were flint weapons, and some of the bones bore traces of being worked and cut. Charcoal was also found in the surrounding earth.

— The board of commissioners in charge of the lights on the coast of Scotland suggest that in cases of fog, when a light cannot reach its usual distance, the beam from a powerful source, such as electricity, might be depressed so as to concentrate the intensity on the near-hand sea by slightly moving the flame out of the focus of the apparatus, and supplementing it by the use of suitable reflectors. They also look upon the question of the relative absorption of electric light by fogs, compared with that of light from other sources, as yet undetermined, and requiring strict investigation.

— The brewers' journal, published in Nuremberg, the *Allgemeine brauer- und hopfenzeitung*, celebrates its twenty-fifth anniversary by offering prizes for two essays on, 1°, The culture of hops; 2°, Barley as brewing-material: the best essay to receive a prize of fifty pounds; the essay, in German, to be sent in to the editor before May 1, 1886.

— The effect of magnets upon artificially incubated hen's eggs formed the subject of some very interesting experiments, of which an account was given by Professor Carlo Naggiorani in a recent paper before the Academy dei lincei. During the hatching-process he kept one set of eggs under the influence of powerful magnets, while another set was incubated away from all such influence. Cases of arrested development were very numerous among the first set, and after birth the rate of death among these was four times as great as in the naturally incubated chickens. Only six chickens out of a hundred and fourteen eggs arrived at maturity. Of these, two were cocks of a splendid stature, and endowed with an insatiable reproductive appetite. With the four pullets the case was quite the reverse. One of these never laid at all, and the three others generally produced very minute eggs without yolks, without germinal spot, and, in a word, sterile.

— An experiment is being tried in the Jefferson physical laboratory, which promises to be successful. An ordinary seconds clock, with a wooden pendulum, is controlled by the signals from the Harvard college observatory, with no other mechanism than a fine spring connecting the pendulum to the armature of a telegraph instrument in the circuit. If the signals are interrupted during the day or night, the error of the clock, which seldom exceeds half a second in that time, will generally be rectified within an hour of their recurrence. The rate is in no way affected by the irregular signals caused in storms by the interference of the wires, and the regular impulses conveyed at intervals of two seconds increase but slightly the swing of the pendulum. The attachment can easily be made to any seconds clock at the cost of a few dollars, and may be of interest to those intolerant of the rates charged by companies for the use of electric dials.

— Aside from the munificent charities of the Salem East India marine society, extending over an unbroken period of eighty-six years, there is a scientific history covering a less extended period, which at this late day is by many persons forgotten, and to the younger generation is unknown. One visible result of this scientific work, although incidental to the more important objects for which the society was formed, is the rare ethnological collections now in the custody of the Peabody academy of science. When the museum was transferred to the trustees of the academy in 1867, such old catalogues and manuscripts accompanied the specimens as were supposed to relate to the collections. These were laid aside for a time, and forgotten. An examination of the various papers referred to, clearly shows that an earnest spirit of scientific research pervaded the early work of this society. The act of incorporation places charitable objects of the society first, and 'the promotion of a knowledge of navigation' second: the museum followed as incidental to the latter. Upon the foundation of the society, blank journals were immediately distributed, under the by-laws, to "every member bound to sea, . . . in which he shall enter the occurrences of his voyage, and particularly his observations of the variations of the compass, bearings and distances of capes and headlands, of the latitude and longitude of ports, islands, rocks and shoals, and of soundings, tide and currents, and on his return shall return the same for the use of the society." This latter clause was in reality meant for the benefit of the commercial interests of the country, which at that time largely centred in Salem. Many of the journals are beautiful examples of neatness and fine penmanship, and are embellished here and there with diagrams, maps, drawings of coasts, and even with sketches of native craft.

— The 'age of horn' is a term applied by Mr. G. Kaiser to the period of certain relics which he has found in his investigations of the Forel and Cortaillod stations on Lake Neuenburg in Switzerland, where he has been excavating under the auspices of the historical society of Neuenburg. The *Neue Zürcher zeitung* of Jan. 15 states that he found a stratum at a depth of from 1.20 m. to 1.30 m., which contained various horn objects, — such as amulets, cups, knives, daggers, mattocks, rings, buttons, bracelets, shield-studs, etc., — all of which were engraved either with dots or with straight lines; and he concludes that they are older than the bronze or stone implements found in similar localities. But some implement, presumably of stone or metal, must have been employed in cutting the horn; and certainly a single find hardly gives ground for such a wide generalization.

— Two important expeditions are now in progress by Russian travellers, — that of Prjevalski in northern Thibet, in part to discover the sources of the Yellow River; and that of Potanin to north-western China and south-eastern Mongolia. A large number of barometrical observations have been taken, which are to be worked up by Col. Scharnhorst.

— A full account by Lieut. Gordon, of the proceedings of the Hudson-Bay exploring expedition of 1884, with a track-chart of the steamer Neptune, and a report on the geology, etc., of the district visited, by Dr. Robert Bell, who accompanied the expedition in the interests of the Geological survey of Canada, have just been published in an appendix to the annual report of the Canadian department of marine.

— Among recent deaths we note the following: Professor Lauritz Esmark, director of the zoölogical museum of the university of Christiania, at Christiania, in December, 1884; Searles V. Wood, geologist and paleontologist, at London, Dec. 19; Dr. Philipp von Jolly, physicist, at Munich, Dec. 24, in his seventy-fifth year; Rev. James Buller of New Zealand; Alexander Murray, director of the geological survey of Newfoundland; Alfred Tylor, anthropologist and geologist, at London, Dec. 31; Dr. Friedrich von Stein, professor of zoölogy in the university of Prague, at Prague, Jan. 9, in his sixty-seventh year; Major-Gen. K. Sonklar von Instädten, at Innsbruck, Jan. 10; Dupuy de Lôme, engineer at Paris, Feb. 1, at the age of sixty-eight; E. H. von Baumhauer, secretary of the Société hollandaise des sciences; E. C. Rye, librarian of the London geographical society, Feb. 7, aged fifty-two; and S. G. Thomas, metallurgist at Paris, Feb. 1, aged thirty-four.

— At a united meeting of the Victoria and New South Wales geographical societies it was resolved that they should in future call themselves 'The Australian geographic conference,' for the purpose of discussing (periodically) important matters affecting the interest of geographic science of Australia. The governments of Victoria and New South Wales have each placed a thousand pounds at the disposal of the general society, and it is intended in the first place to undertake a thorough exploration of New Guinea.

— The emperor of Germany has conferred the 'Ordre pour le mérite' for science and arts on Sir Joseph Lister. Commenting on this recognition of an English surgeon whose name has furnished a new verb to the German language since the beneficent results obtained by his antiseptic method during the Franco-German war, the *Lancet* observes, "Not only is Sir Joseph Lister to be congratulated on this act of the venerable and most illustrious emperor, but the profession of the United Kingdom will recognize in the act a generous recognition of the claims of British medical science, which, it is only fair to say, is not new on the part of Germany. The discoverer of vaccination has been more honored in Germany than in his own country, in accordance with the scripture that 'cannot be broken.' The quiet evolution in surgery, involving the practical abolition of pyaemia, hospital erysipelas, and gangrene, and an infinite diminution in the calamities of surgery, which we owe to Sir Joseph Lister more than to any other single man, is a service to mankind not quite on the same scale as the discovery of vaccination, but of very far-reaching consequence. Through the slightly discordant notes of diplomacy it is refreshing to notice the harmony of international grace in the higher regions of science and of humanity."

— Some interesting experiments, according to the Journal of the Iron and steel institute, have recently been made for the purpose of determining the respective values of wet and dry coal for the evaporation of water. The results showed that small coal, containing eighteen per cent of water, and nine and nine-tenths per cent of coal-dust, evaporated five and seven-tenths pounds of water per pound of fuel; while the same amount of coal, containing three per cent of water, evaporated from eight to eight and a half pounds of water per pound of fuel. The figures showed that the employment of wet coal gave rise to a loss of from fifteen to twenty-five per cent.

— The programme for the Sheffield scientific school lectures to mechanics for 1885 is as follows: Feb. 12, Norway and the midnight sun, Rev. Dr. C. C. Tiffany; Feb. 17, Science and the supernatural, Professor DuBois; Feb. 19, The present commercial crisis, Mr. A. T. Hadley; Feb. 24, The Asiatic cholera, Professor Brewer; Feb. 26, The sensation of color, Professor Hastings; March 3, Cobwebs, Mr. J. H. Emerton; March 5, Lafayette, Prof. A. M. Wheeler; March 10, The patent law of the United States, Professor Robinson; March 12, Commemoration of the birthday of Bishop Berkeley, President Porter; March 17, The surface life of the Gulf Stream, Professor Verrill; March 19, Map projection, Professor Phillips; March 24, An hour at the Louvre, Prof. D. Cady Eaton. This course has now been in existence twenty years. A fee of one dollar is charged, that the audiences may be the better controlled.

— Sir John Lawes suggests (*Health*) that it will be more profitable to throw sewage into the sea than to apply it to the land. His grounds for saying this are that it will supply the enormous quantities of phosphate of lime, potash, and nitrogen which are necessary to the existence of fishes, but which exist in the sea only in small quantities. Tons of these compounds are taken from the ocean each year in our fisheries without due return. If, then, enough or more than enough to make up for that annually taken out could be returned to the sea in the form of sewage, there is little doubt that increased prosperity may accrue to the fisheries. Even after defecation, much of the nitrogen and mineral constituents would remain; and, indeed, this defecation, or else greater dilution, is absolutely necessary, in order to prevent the destructive work which sewage naturally does in absorbing the oxygen which is necessary to the existence of fishes.

— From the Journal of the Iron and steel institute we learn that Mr. Fayol concludes, from his experiments reported in the *Comptes rendus* of the Société de l'industrie minérale, that the rise of temperature accompanying the absorption of atmospheric oxygen by finely powdered coal is the chief cause of its spontaneous combustion. He finds that only a low temperature is needed to ignite powdered coal; lignite igniting at 150° C., and anthracite at 300° C., and the ordinary varieties of coal at intermediate temperatures. The avidity with which the oxygen is absorbed increases with the rise of temperature, which finally becomes sufficiently high for ignition. An important part in spontaneous combustion has been ascribed by many authorities to finely divided pyrites. The author, however, on subjecting this mineral to the same experimental conditions as the coal specimens, found a less energetic action of the atmosphere. When gradually heated up to 200° C., pyrites and coal behaved exactly alike till a temperature of 135° C. was reached: from this point the temperature of the pyrites remained the same, while the coal-powder rapidly became hotter till the igniting-point was reached.

— Dr. Harrison Allen has republished in a neat pamphlet (Philadelphia, *Blakiston*) his essay on the palategraph, a new and ingenious instrument of his own design, by which the motions of the soft palate may be recorded. The instrument is a straight rod eight inches long, which is passed into the nose so that one end rests upon the upper surface of the palate; just in front of the nose a wire loop encloses the rod, the wire being suspended from a band passed around the head; the loop acts as a fulcrum, so that, when the palate is raised, the free end of the rod moves down, and these movements are recorded upon a paper moved by clockwork (*kymographion*). The

fact that the soft palate is raised during articulation, swallowing, and coughing, can thus be readily demonstrated, and the length of its periods of ascent and descent measured. The palate is seen to be raised once only for some words, twice for others, three times for others. The numbers of these motions are invariable within a narrow range of individual variation. The instrument offers a ready means of detecting paralysis of the soft palate; and it has been suggested that it may be made available for the comparative study of phonetics, for the instruction of the deaf, and for the formation of a system of logography. One curious result we select to mention from the many details of the paper: less motion of the palate occurs in saying 'mamma' than 'papa.' Dr. Allen suggests that the smaller effort required may be one cause of children usually learning the former word first. Like all Dr. Allen's work, this also is excellent.

— In the series of manuals of technology edited by Professor Ayrton and Dr. Wormell, and published by Messrs. Cassell & Co., will soon be published a work on watch and clock making, prepared by Mr. David Glasgow, the vice-president of the British horological institute.

— We understand that *Papilio*, which was removed a year ago from New York to Philadelphia with a change of editor, is now practically to return to New York, as it is to be merged into the Bulletin of the Brooklyn entomological club. Both these names will be dropped at the close of the seventh volume of the Bulletin, in April next, and a new series commenced under the title of 'Entomologica *sic* Americana,' a monthly journal of twenty pages.

— The Journal of the Iron and steel institute sums up the known distribution of iron ore in north-west Africa as follows: "In Morocco there are beds of hematite of considerable size, and their continuity and re-appearance westwards is now an ascertained fact. Commencing from the Tunisian frontier, the Mediterranean seaboard offers an abundance of payable ore at various points, and these deposits were very extensively worked by the Romans, forming indeed their main supply. The most productive Algerian mines furnish a spathic carbonate containing sixty per cent of ferrous oxide, and a hematite containing ninety-two per cent of ferric oxide. The composition of the Algerian ore is exceedingly uniform, and it is almost entirely free from sulphur and phosphorus. These beds re-appear as far west as the confines of the provinces of Rihamina and Dukkala in South Morocco. The deposits consist of red hematite, and show an outcrop of very extensive area. Specimens brought from the Sahara caravan route either to Tafilelt or Timbuctoo prove the re-appearance of these iron-ore beds south of the Atlas ranges."

— The Brookville (Ind.) society of natural history proposes soon to issue a bulletin containing articles, by members of the society, on the natural history of south-eastern Indiana. Mr. W. H. Fogel of West Columbia, W. Va., has presented the society a large collection of archeological specimens, including one of the finest series of hematite implements in the United States. The society is continuing this winter the courses of free lectures, devoted to scientific subjects of popular interest, which it has formerly supported. The second of these lectures, on the ancient vegetation of the globe, was given by Joseph F. James of Cincinnati, on Jan. 13; and the third, on poisons, by Mr. J. U. Lloyd of Cincinnati, on Feb. 3.

— Mr. J. J. Thomson is to succeed Lord Rayleigh as professor of physics at the university of Cambridge.

— Mr. D'Arcy W. Thompson, formerly of Trinity college, Cambridge, has been elected professor of biology in University college of Dundee.

— With the number for 1885, the management of the *Neues jahrbuch für mineralogie, geologie, und palaeontologie* passes into the hands of M. Bauer of Marburg, W. Dames of Berlin, and Th. Liebisch of Königsberg.

— The modern mathematician finds the space of three dimensions, in which our visible universe is contained, entirely too contracted for his conceptions, and is obliged to imagine a space of n dimensions in order that his fancy may find room to disport itself. But it is a new idea, on the part of the novelist, to make the conceptions of transcendental geometry the basis for an amusing story. 'Flatland, a romance of many dimensions, by A. Square' (Boston, *Roberts brothers*, 1885), is in substance a description of life as a geometer might imagine it to be in space of one, two, or n dimensions. Readers of 'Alice behind the looking-glass' will not fail to notice the resemblance of the present work to that singular play of fancy. Curiously enough, a 'scientific romance' on the fourth dimension is just now announced in England by C. H. Hinton.

— A new application of the electric light, devised and used by W. E. Waters of Orange, N.J., is an improvement on the old style of illumination in the astronomical observatory. It consists of a small incandescent lamp-bulb, about three-quarters of an inch in diameter, placed in the end of a cylindrical hard-rubber handle, four inches long, with a push-button on the side. A flexible wire cord connects the apparatus with the battery-wires, and enables the operator to carry this 'electric lantern' about in the hand, ready for use at any moment. This lamp has been used by Mr. Waters about two years, and has proved entirely satisfactory.

— It is announced that Mr. William Cameron, who has given much time to the exploration of Malayan countries, has just prepared at Singapore, on a scale of half an inch to the mile, a large and elaborate map of districts recently explored by him in Selangor, Ulu Selangor, Sungei Ujong, and other parts of the Malay peninsula.

— Dr. R. Neuhauss, a young German physician, has returned to Berlin after extensive explorations among the South-Sea Islands, and has read a report of his researches before the Berlin anthropological society. Part of his ethnological collection he has presented to the Berlin museum.