Ephemeris for Berlin Midnight.

1894.		R.A. (app.) h. m. s.		Decl. (app.) ° ′		Brightness.
Dec. 13	...	23 21 36	...	−5 33·9		
,, 15	...	26 46	...	4 55·7	...	0·53
,, 17	...	31 52	...	4 17·9		
,, 19	...	36 54	...	3 40·5	...	0·48
,, 21	...	41 53	...	3 3·5		
,, 23	...	23 46 48	...	−2 26·9	...	0·43

The brightness of the comet on November 21 has been taken as unity.

A NEW STAR?—The Rev. T. E. Espin has announced that a very red star of the eighth magnitude, not in the Bonn Durchmusterung, was found by him on November 29, in R.A. 17h. 54·3m. Decl. + 58° 14′. The spectrum belongs to Secchi's Type IV.

PROF. VICTOR MEYER'S NEW METHOD OF DETERMINING HIGH MELTING POINTS.

A DESCRIPTION of improved apparatus for the determination of high melting points, by his admirable new method, is contributed to the current *Berichte* by Prof. Victor Meyer, in conjunction with his students Messrs. Riddle and Lamb. The simplicity of the method will doubtless cause it to take rank immediately among the standard processes for the determination of physical constants, and alongside the universally popular method of determining vapour densities, which we likewise owe to the distinguished Heidelberg professor. Naturally, however, operations at temperatures higher than those at which the hardest varieties of glass soften, must perforce be conducted in apparatus constructed of platinum, just as in the cases of the determinations of vapour density at the same high temperatures. One of the main advantages of the method is that it only necessitates the use of a very small quantity of the substance whose melting point is to be determined, thus enabling it to be extended to compounds of the most extreme rarity.

The method is based upon the principle of measuring the temperature by means of a miniature air thermometer constructed of platinum, the air contained in which is expelled, at the moment when the fusion of the substance under investigation occurs, by means of a soluble gas into a gas-measuring vessel filled with a liquid capable of dissolving the expelling gas. The substance whose melting point is to be determined is placed in a small and very narrow platinum tube, which is fixed to the bulb of the air thermometer during the operation, and both are immersed in a bath of a fused salt whose melting point is considerably below that of the substance under investigation. Hence the operation of determining a high melting point by this method is perfectly analogous to that usually adopted in determining ordinary melting points lower than the temperature of boiling mercury.

The air thermometer is simplicity itself. It consists of a spherical platinum bulb of about 25 c.c. capacity, from which rise parallel to each other two relatively long capillary tubes, also of platinum. One of the tubes passes down into the interior of the sphere, almost touching the opposite inner surface, while the other only just pierces the envelope. Both are bent at right angles at their upper extremities, in opposite directions. In order to eliminate all errors due to the capillary tubes a compensator is also employed, consisting of a long capillary U-tube of the same bore and bent at right angles at the extremities, so as to form an exact counterpart of the capillary portion of the air thermometer. The small tube containing the substance is firmly fixed by means of stout platinum wire so that its lower portion is in close contact with the sphere; the walls of the tube are of the same thickness as those of the sphere. The salt employed for the purposes of a bath is contained in a capacious platinum crucible, supported over a table furnace in a miniature basket of platinum gauze. One of the capillary tubes of the air thermometer is ready to be connected with an apparatus for generating pure carbon dioxide, and the other is attached to a gas-measuring burette similar to the well-known Schiff nitrogen apparatus, but somewhat narrower, and surrounded by the outer tube of a Liebig's condenser, through which a stream of cold water is continually passed. This arrangement enables the air to be collected and measured in the proximity of the furnace. The measuring burette is filled with a concentrated solution of caustic potash. The temperature of the water-jacket is measured by a thermometer immersed in a small accessory reservoir, through which the water passes immediately after leaving the jacket. A very simple device has been adopted for determining the exact moment when fusion occurs. Before the experiment the little test-tube is heated until the substance melts; a fine platinum wire, furnished with a thickened end, is then inserted in it, and allowed to become fixed by the solidification of the substance. The fine wire is then passed over a pulley some distance overhead, and the free depending end is attached to a weight; just below the weight a bell is hung.

When everything is ready for the actual operation of determining a melting point, the salt in the crucible is fused, the lower part of the air thermometer and its attached substance-tube are inserted in the bath of liquid, as is likewise the compensator, connection with the measuring burette is made, and the carbon dioxide apparatus is arranged to be delivering the pure gas. When the temperature of the bath at length attains that of the melting point of the substance, the portion of the latter in immediate contact with the walls of the platinum tube fuses, and instantly the wire is released, and the weight falls and strikes the bell. The moment the sound is heard, connection with the carbon dioxide apparatus is established, and the air contained in the thermometer is displaced and driven into the measuring burette. The compensator is similarly treated, and the quantity of air which it contained deducted from that contained in the thermometer. From the resulting volume, together with the knowledge previously obtained concerning the capacity of the thermometer and compensator and the known expansion of air, the melting point is obtained by a very simple calculation.

Four groups of interesting results have already been obtained by use of the new method, indicating the dependence of the melting point upon atomic weight. They are as follows:

Salt.	Melting point. °	Salt.	Melting point. °
Potassium chloride	800·0	Potassium iodide	684·7
Potassium bromide	722·0	Rubidium iodide	641·5
Potassium iodide	684·7	Cæsium iodide	621·0
Sodium chloride	815·4	Calcium chloride	806·4
Sodium bromide	757·7	Strontium chloride	832·0
Sodium iodide	661·4	Barium chloride	921·8

It will be observed that in the halogen salts of both sodium and potassium a diminution of melting point accompanies a rise in the atomic weight of the halogen; also that a lowering of the melting point accompanies a rise in the weight of the metallic atom in the case of the iodides of the alkali metals potassium, rubidium, and cæsium, while the reverse occurs with respect to the chlorides of the alkaline earthy metals calcium, strontium, and barium. Whether there is rise or fall of the melting point with ascending atomic weight, however, the salt of intermediate molecular weight invariably exhibits an intermediate melting point.

A. E. TUTTON.

SCIENCE IN THE MAGAZINES.

THERE are very few articles on purely scientific subjects in the magazines received by us this month. Apparently the magazine-reading public thinks a scientific pabulum unsuitable for Christmas reading; or is it that men of science are too deeply engrossed in their researches to cultivate the art of writing interestingly upon the wonders of nature? Literary men frequently play fast and loose with natural phenomena and laws, and are often pilloried for doing so; but, on the other hand, many men of science do not pay due regard to the literary polish which is essential to an attractive style.

The first number of the *Fortnightly* under the new editor, Mr. W. L. Courtenay, contains two articles of interest to our readers, one on "A True University of London," by Mr. Montague Crackenthorpe, and the other on "The Spread of Diphtheria," by Dr. Robson Roose. Mr. Crackenthorpe deals broadly with the whole question of the expediency of establishing in London a University which shall teach as well as examine. He defines the work of a true metropolitan University as follows: (1) To do the work of the higher teaching by its own professorial staff, and to superintend and aid its being done by other educational agencies in the metropolis. (2) To examine and to grant degrees, but to grant them as a mark of success in regular and systematic courses of study, rather than in the display of hastily acquired, and, therefore, ill-digested knowledge. (3) To stimulate scholarly and scientific research by means of well-equipped libraries, laboratories, and other like apparatus, and by the institution of public lectures of an advanced character, like those of the Sorbonne and the College de France. The scheme drawn up by the Gresham Commissioners satisfies most of these requirements, and a *deus ex machina* in the shape of a Statutory Commission is all that is wanted to establish it.

So much attention has recently been given to the new treatment of diphtheria, that Dr. Roose's sketch of the history of the complaint, and the circumstances which tend to promote its spread, comes very opportunely. His description of the measures calculated to check the prevalence of the disease, and of the remedy lately introduced, is clear and concise, whilst the following statement, though commonly known in the scientific world, will remove the misapprehension that exists in the minds of a large section of the general public :—"Löffler and Klebs discovered the microbe of diphtheria, and studied its life-history ; Roux and Yersin demonstrated that the bacillus was capable of evolving toxic material, and Behring crowned the edifice by discovering the antidote."

An address by Prof. G. W. Prothero, on "Why should we learn History ?" contained in the *National*, would at first hardly seem to be a subject for comment in these columns. There is, however, much in the address worth noticing here, for Prof. Prothero shows that history, if not strictly speaking a science, may be taught in a scientific way. Let us briefly state his argument. There are many gaps in history, but in every science there is a lack of information on certain points. Even astronomy, the most exact of the sciences, has its dark spots, and there are shady places in evolutionary biology. Thus, so far as imperfection of knowledge goes, history and science only differ in degree. A greater difficulty, perhaps, is that the historian cannot employ experiments either to discover facts or to test observations ; but here again it suffers in company with geology and other branches of natural knowledge concerned with the past. History is therefore not disqualified from being a science because it is not experimental. The infinite variety and extent of historical phenomena, and the presence of the human element are, however, "obstacles which, it must be allowed, check history on the threshold of science. If indeed the term science is to be restricted to the knowledge and application of general laws—if that alone is science which can foretell with certainty the occurrence of certain results—if science deals with no phenomena but such as can be exactly weighed and measured—then history is not a science at all. But this is surely to restrict science within too narrow limits. All sciences are not equally exact or equally capable of generalisation. . . . There is, in fact, a regular gradation from the sciences of abstract reason and mathematical formulæ, through the phenomena of the inanimate and the animate world to the world of man." But, *pace* Prof. Prothero, if history be granted a place among the sciences, it must be scientific in the ascertainment of its facts. Take the Black Death as an illustration. The vague and exaggerated statements of certain chroniclers of its ravages may be taken as evidence, or the more laborious process of searching the registers of the time may be explored. The difference is that one of the ways is scientific, while the other is unscientific. In the drawing of conclusions, also, "there is the same distinction between scientific and unscientific work as there is in the ascertainment of historic facts. For instance, Buckle, in illustrating his theory that national character depends largely upon food, attributes the weakness of the Hindoos to an almost exclusive diet of rice. A striking but misleading generalisation, for, as Sir H. Maine has pointed out, the great majority of the Hindoos never eat rice at all. . . . There is, then, a scientific way as there is an unscientific way of studying history. If treated one way, its results are guess-work and delusion ; if treated another way, if industry, reason, and sober judgment are brought to bear, its results are in many cases matter of certainty, in many others matter of at least high probability. And, if we except the science of mathematics, what more can be said of any science ?" The main object of Prof. Prothero's address was to show that historical study exerts considerable influence upon the mind and character. This is certainly the case, and if the student is trained on the lines indicated in the foregoing, intellectual results of the highest order must follow.

The great landslip which caused the formation of the Gohna Lake, Gurhwal, in the central Himalayas, has led Mr. W. M. Conway to write on "Mountain Falls" in the *Contemporary*. This catastrophe, however, is only used as a peg upon which to hang an account of the great Alpine landslip which buried part of the village of Elm, in Canton Clarus, thirteen years ago. The *Contemporary* also contains a metaphysical article by Emma Marie Caillard, in which cosmic and ethical processes are discussed, and Prof. Huxley's opinions on evolution and ethics are criticised. Prof. Huxley is also involved in a paper on religion and science, contributed by A. J. Du Bois to the *Century*. Another article for abstract philosophers is Prof. Seth's second paper on "A New Theory of the Absolute."

Sir Robert Ball contributes to *Good Words* another of his interesting—albeit superficial—papers on great astronomers, the subject being Sir John Herschel. *Chambers's Journal* contains the usual complement of chatty articles, among which we notice one on smoke absorption, descriptive of Colonel Dulier's patent system of removing the soot and sulphurous acid from the products of combustion, by treatment, before passage into the chimney, by both steam and water ; and another on remarkable hailstorms.

A passing reference will suffice for the remaining papers on scientific topics. The result of prematurely releasing a chrysalis from its cocoon, a subject on which we published a letter by Dr. L. C. Jones in our issue of November 22 (p. 79), serves Mr. W. C. Wilkinson as the theme of a poem in the *Century*. St. George Mivart writes popularly on "Heredity" in the *Humanitarian*, his paper dealing chiefly with Prof. Weismann's speculations. A posthumous paper of Richard Jefferies' appears in *Longman's Magazine*, and Mr. Phil Robinson contributes a facetious paper on rattlesnakes to the *English Illustrated*. In addition to the magazines and reviews named in the foregoing, we have received *Scribner*, *Cassell's*, and the *Sunday Magazine* ; but these do not contain any articles that can be commented upon here.

OYSTER CULTURE ON THE WEST COAST OF FRANCE.

AT the request of the Lancashire Sea-Fisheries Committee, I spent some time, last June and July, in investigating the various methods of shell-fish culture in use along the western coast of France from Arcachon in the south to Brittany in the north. There can be no doubt that there are extensive and flourishing shell-fish industries along the French coast, and one is struck very forcibly with the admirable manner in which the people seem to make the best of unfavourable conditions, and to take full advantage of any opportunity given to them by nature. Few places on any coast could look more desolate and forbidding than the vast mud swamps of the Bay of Aiguillon, and yet by means of the "bouchot" system many square miles of this useless ground have been brought under cultivation, and an industry established which supports several villages. Then again, the neat little enclosures along the beach at many places, carefully tended by the owners at low tide, remind one constantly of market gardening, and enforce the truth of the idea, long familiar to the biologist, and now beginning to be more generally recognised, that the fisherman should be the farmer, not the mere hunter of his fish, and that aqui-culture must be carried on as industriously and scientifically as agriculture.

In addition to industry and care on the part of the fisher-folk, women as well as men, the success of the shell-fish industries in France is largely due to the encouragement and wise assistance of the Government, especially in the regulation of general oyster-dredging and the reservation of certain grounds for supplying seed. The practical question—and one of enormous importance—is : Is there anything special in the conditions in France, either of the land or of the water, which would render their methods inapplicable to our more northern shores ? I do not believe that the question can be satisfactorily and finally answered until some experimental cultures on a fairly large scale have been tried ; but a consideration of the details and results of the French methods will at least give us some idea of which experiments are worth trying, and of the localities which might be cultivated with most prospect of success.

1 Abstract of a report, by Prof. W. A. Herdman, F.R.S., to the Lancashire Sea-Fisheries Committee.