

because side by side with the teaching of science there is the teaching of the "humanities." The remarks conclude with a statement of the amount allotted from the public funds to university colleges. Out of the sum available under the Local Taxation Act about £600,000 a year is devoted to technical education, but only £23,854 was given to fourteen university colleges in England and Wales in 1892-3 by twenty local authorities, in addition to a sum of £29,550 provided by the Treasury, of which nearly half (£13,306) went to the three Welsh colleges alone. The support certainly seems insufficient for the great services rendered by the colleges to the nation.

THE third Report of Mr. J. A. Bennon, the Director of Technical Instruction in the County Palatine of Lancaster, was presented to the County Council a few days ago. It is clear from the report that every effort is being made by the Committee to expend judiciously the funds at their disposal. A sum of £28,500 was distributed among the urban and rural districts of the county last year. The following amounts were voted for work in special subjects:—Navigation, £250; Sea Fisheries, £300; University Extension Lectures, £500; Horology, £250; Mining, £500; Silk Industry, £500; Plumbing and Sanitary Science, £750; Horticulture and Bee-keeping, £500; Practical Agriculture (including Veterinary Science, Poultry-keeping, and allied subjects), £1000. In addition to the ordinary sums allotted to each district, special grants, amounting to nearly £1000, were made for the purpose of purchasing apparatus and appliances. University College, Liverpool, and the Owens College, Manchester, each received a grant of £400 for the same purpose. Classes in horology are held at Prescott, but they are quite inadequate for the whole county; and do not impart the thorough teaching, either theoretical or practical, that is given on the continent. A deputation from the Committee visited some of the Continental Schools of Horology, and as a result of their inspection they strongly recommended the establishment of a County School of Horology, similar to the school at Geneva. It was afterwards resolved at a large and representative conference that "it is desirable to establish a Technical School of Horology and Scientific Instrument-making, including electrical, optical, and mechanical instruments, both practical and theoretical, for the County of Lancaster." Efforts are now being made to put this resolution into effect. The establishment of a school to afford effective teaching in subjects relating to the silk industry is also under consideration. It is proposed to found the school upon the model of the Seidenweb Schule of Wipkingen, in Zürich. For the purpose of providing instruction in practical agriculture, a farm and farm buildings, covering nearly 150 acres, has been acquired at Hulton, near Preston. A vote of £650 was made to the Harris Institute for special courses to agricultural students; and a number of lectures on subjects relating to agriculture were delivered in various parts of the county, while agricultural experiments were carried on in several districts.

SCIENTIFIC SERIALS.

Wiedemann's Annalen der Physik und Chemie, No. 7.—Absorption spectrum of pure water for red and infra-red rays, by E. Aschkinass. The "extinction coefficients" of water for the various wave-lengths at the red end of the spectrum were determined by the bolometer, and calculated by the formula

$$J' = J e^{-\epsilon d},$$

where J is the intensity of the incident, and J' that of the transmitted light, d the thickness of the layer in cm , e the basis of the Napierian logarithms, and ϵ the "extinction coefficient," which therefore means the reciprocal of the thickness which a ray must traverse in order to be reduced to $1/e$ of its original intensity. Of these extinction coefficients 200 are given, for wave-lengths extending from 0.4500μ to 8.49μ . The minimum is at $\lambda = 0.5375$, being 0.00005 , and the maximum of 2733 is attained at $\lambda = 3.02 \mu$. A second maximum occurs at 6.09μ , but between 6.7 and 8.5 the values of the extinction coefficients vary only between 700 and 900 .—Absorption of radiant heat by liquids, by Charles Friedel. The liquids investigated were carbon compounds contained in cells between an iron block and a thermopile. Among the results obtained are the following:—Whenever, in a chemical compound, H, O, HO, or N are replaced by S or halogens, the transmittance of the solution is considerably increased. In homologous series the transmittance

is regularly changed by every addition of CH_2 , but the direction of this change depends upon the nature of the other atoms contained in the molecule. The absorptive power of a compound does not essentially depend upon the size of the molecule, but seems to be a property of the constituent atoms. The greatest influence is always due to H, N, and also O. In isomeric compounds the diathermancy is different, and the difference is not only connected with the difference of atomic volume of the elementary atoms, but also with the difference of linkage of the atoms amongst each other; in saturated compounds the diathermancy (transmittance) always increases with the atomic volume. The determination of the diathermancy is the most delicate test available for the purity of organic liquids or salts which are soluble in highly diathermanous liquids.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Horticultural Society, June 25.—Mr. McLachlan in the chair.—Mr. Wilson exhibited a pot containing some seedling plants, in blossom, of the North British species *Primula scotica*, which is found in pastures of Orkney, Caithness, and Sutherland. The flowers are homomorphic, not having the stamens and pistils of different lengths as in most other *Primulas*.—Mr. Jackman exhibited small trees of *Fagus sylvatica*, with the leaves small, entire, and round. As the trees exhibited an erect form, with short branches, it would seem to be the result of some check to growth, the form of the leaf representing a less developed state than that of the ordinary type of tree.—Mr. Colinet, of Guernsey, forwarded some hazel wood found in peat near the coast of Guernsey, containing flint implements, stone rings, and pottery, presumably neolithic. No hazel is now known to be indigenous to Guernsey.—Mr. McLachlan exhibited specimens of *Melanostoma scalare* attached to flowering stems of a grass, *Glyceria fluitans*.

July 23.—Dr. M. T. Masters described a curious case of *Cypridium* malformed, received from Messrs. Sander and Co., in which the sepals were normal, but the two petals and lip were absent.—Dr. Masters also drew attention to a peculiarity in the venation of the lobed leaves of *Lavandula dentata*.—Dr. Ch. B. Plowright forwarded specimens of the parasitical fungus *Æcidium nymphaeoidis*, with the following observations:—"This *Æcidium* has been stated by Chodat to be connected with the Puccinia on *Scirpus lacustris*. In November 1877, *Puccinia scirpi* was found floating in the river Ouse at King's Lynn. During the past winter I found it on the bulrushes (*S. lacustris*) in the 'Old Bedford' at Earith, Huntingdonshire. On revisiting the spot this July the *Æcidium* on Villarsia was met with in great abundance." Dr. Plowright also sent specimens of the fungus *Æcidium chenopodii*, with some remarks upon them.—With reference to the specimens of flies attacked by a fungus, brought before the last meeting by Mr. McLachlan, it was reported from an examination made at Kew that "the fungus is *Empusa conglomerata*, Thaxter (a somewhat rare species), parasitic on Diptera, especially the larvæ and imagines of Tipulæ. Distrib.—Europe and United States. This is the first record for Britain."—MM. Letellier et Fils forwarded from Caen some growing plants of thornless gooseberry, from which they have issued four kinds, raised by M. Ed. Lefort, of Meaux, France. The usual triple spines were either quite absent, or represented by mere rudiments only.—Mr. Cannell sent some trusses, with small jagged-edged petals of a crimson colour, approximating the original wild form. They appeared among his long-selected beds of sweet williams, the margins of the petals being rounded and smooth.

PARIS.

Academy of Sciences, August 5.—M. Marey in the chair.—Experimental study of the transverse vibrations of cords, by M. A. Cornu. The complex vibrations of strings produced as in actual musical instruments have been studied. The transverse vibrations of a string, excited in any way whatever, are always accompanied by torsional vibrations, the torsional elasticity of the cord taking effect in the same way as the transverse component of the tension. Not only is the actual vibration complicated by these torsional vibrations, but, in many cases, the transverse vibrations are themselves rendered more complex by the fact that strings are seldom or never symmetrical about their axes. The vibrations have been studied by means of very