

ACCORDING to the report of the principal chemist of the Government Laboratory for the year ending March 31, it appears that during the past twelve months the work of the Customs branch of the Laboratory has more than doubled in magnitude, the increase being due chiefly to the imposition by the Budget of April, 1901, of duties on sugar and cognate substances, and on the numerous articles in the manufacture of which these substances are used. More than 64,000 samples were submitted for test as compared with about 34,000 in the preceding year.

A CAREFUL experimental inquiry regarding the nutritive value of alcohol has recently been carried out in the chemical laboratory of Wesleyan University by Messrs. Atwater and Benedict, a report on which forms the sixth memoir of vol. viii., published by the National Academy of Sciences. The main question studied is the value of alcohol as a fuel in the human body and its comparison in this respect with sugar, starch, fats and other nutrients of ordinary food materials. Collaterally, the question of the effect of alcohol upon the proportions of nutrients digested from the food with which it was taken has also been examined. Metabolic experiments on an elaborate scale have been instituted with the view of investigating the problem, and no expense has been spared to obtain complete and accurate results, a large share of the costs having been borne by the Committee of Fifty for the Investigation of the Drink Problem. The results of the inquiry indicate that more than 98 per cent. of the ingested alcohol was oxidised in the body and that the potential energy of the alcohol was transformed into kinetic energy as completely as that of the ordinary nutrients. Alcohol appears to be very efficient in the protection of body fat from consumption, but not quite so efficient as the isodynamic amounts of the ordinary nutrients in the protection of body protein. The conclusion is drawn that so far as the utilisation of the total energy of the diet is concerned, there is a slight advantage in favour of the non-alcoholic diet, especially when the body is subjected to hard muscular exertion, but the difference is so small as to lie almost within the limits of experimental error.

The additions to the Zoological Society's Gardens during the past week include a Purple-faced Monkey (*Semnopithecus cephalopterus*) from Ceylon, presented by Miss M. Wheatcroft; a Bonnet Monkey (*Macacus sinicus*, ♂) from India, presented by Mr. C. F. Taylor; a Green Monkey (*Cercopithecus callitrichus*) from West Africa; a Bonnet Monkey (*Macacus sinicus*) from India, presented by Mr. R. M. Drury; an Australian Sheldrake (*Tadorna tadornoides*) from Australia, presented by Mr. W. Jamrach; an Egyptian Monitor (*Varanus niloticus*) from West Africa, presented by Mrs. Mary A. S. Deacon; two Cocteau's Skinks (*Macroscincus cocteaui*) from the Cape Verde Islands, presented by Mr. F. Newton; two Axolotls (*Amblystoma tigrinum*) from North America, presented by Mrs. Millicent Summers; a Spotted Salamander (*Salamander maculosa*), European, presented by Mr. R. R. Green; a Common Snake (*Tropidonotus natrix*), British, presented by Mr. E. Crane; a Grand Galago (*Galago crassicaudata*, var.) deposited; a Black-necked Swan (*Cygnus nigricollis*, ♀) from Antarctic America, purchased; a Rufous-necked Wallaby (*Macropus ruficollis*), a Common Wallaroo (*Macropus robustus*), born in the Gardens.

OUR ASTRONOMICAL COLUMN.

CATALOGUE OF NEW DOUBLE STARS.—Mr. W. J. Hussey publishes, in No. 21 of the *Lick Observatory Bulletin*, the fifth catalogue of one hundred new double stars which he has discovered with the 12-inch and 36-inch refractors of the Lick Observatory, all these doubles having distances less than 5".

Twenty-five per cent. of the five hundred pairs announced have distances not exceeding 0".50, 48 per cent. not exceeding 1".00, and 72 per cent. not exceeding 2".00. The average distance for the five hundred pairs is 1".52.

NO. 1714, VOL. 66]

HYPOTHESIS ON THE NATURE OF SOLAR PROMINENCES.—Prof. W. H. Julius has described before the Royal Academy of Sciences (Amsterdam) a theory as to the nature of solar prominences.

It may be remembered that Prof. Julius accounted for the doubling of the arcs in the spectrograms obtained by him during the last total solar eclipse, by saying that it was due to the anomalous dispersion of the chromospheric light, and he now applies this theory of anomalous dispersion to account for solar prominences. He abandons the idea of the existence of various layers of different materials in the solar atmosphere, and suggests that "throughout the gaseous body, as well inside as outside the critical sphere, the various elements are altogether intrinsically mixed (granting that in the mixture the quantity of materials with greater specific gravity must grow with the depth)." It is suggested that, in the whirls formed by the ascent and descent of heated gases combined with the rotational velocity of the solar atmosphere, we get anomalous dispersion at the points where two or more of these whirls intersect and break each other; and the author goes on to propose "that the whole chromosphere with all its prominences is nothing but this system of waves and whirls, made visible within shorter or longer distances from the sun's edge by anomalous dispersion of light, coming from deeper layers."

Prof. Julius also points out that this theory abolishes the necessity for supposing the immense velocities which Fényi and others have observed in connection with solar prominences, because it suggests that there is not a transmission of material, but only successive appearances of the same phenomena at various heights. He likens this to the apparent velocity of the line of foam caused by water waves breaking on a coast which is inclined to their wave-fronts (*Proceedings of the Royal Academy of Sciences, Amsterdam*).

VISIT OF THE ENGLISH ARBORICULTURAL SOCIETY TO COMPIÈGNE.

THE English Arboricultural Society held its annual meeting in London on Monday, August 18, and Mr. George Marshall, of Frimstone, Liphook, one of the members of the Royal Forestry Commission, was elected president for the year, in succession to Dr. Somerville, of the Board of Agriculture. M. Daubrée, Conseiller d'État and Directeur des Eaux et Forêts, was elected honorary vice-president, and four other French officers connected with the forests which were to be visited by the Society were elected honorary members.

On August 19, fifty-three members of the Society proceeded *via* Boulogne to Compiègne. Among these, besides our president, may be noted Mr. H. J. Elwes, F.R.S., of Colesborne, Gloucestershire; Mr. Coroner Graham, of Durham; Mr. F. W. Beadon, of Longley Hall, Huddersfield; Mr. J. Smith Hill, principal of the Agricultural College, Aspatria; Sir Hugh Beevor; Mr. J. Davidson, the secretary, in charge of the forests belonging to Greenwich Hospital; Mr. E. McA. Moir, late of the Indian Forest Department; Mr. Forrest, agent to the Duke of Bedford at Thorney; Mr. W. Forbes, forester to Lord Masham; Mr. Havelock, forester to Lord Yarborough; Mr. Gillanders, forester to the Duke of Northumberland; Mr. A. C. Forbes, forester to Lord Lansdowne, and many other foresters and nurserymen.

On August 20, the party proceeded to Villers Cotterêts (Aisne), the birthplace of Dumas, and spent the morning in inspecting the extensive timber yards of M. Carpentier and of the Chemin de Fer du Nord. The French band saws are the best in existence, and a very large quantity of fine beechwood is now being sawn up. The beech is sawn green during summer and then carefully seasoned, while oakwood is now being collected for autumn and winter sawing, hornbeam wood being sawn up in the spring. M. Carpentier sells much hornbeam wood in England. The system of creosoting by the Chemin de Fer du Nord is new. It is very effective, and was explained in detail and by practical illustration by the director. Large quantities of beech and oak sleepers are thus prepared, the beech absorbing three times as much creosote as the oak, and, as an experiment, a few maritime pine sleepers were being tried, this species not being yet used by this railway.

After breakfast, the party visited the Forêt de Retz (32,550 acres with a net revenue of 23,698*l.*), on undulating land 200 to 800 feet in altitude, the soil being chiefly a deep and fertile

foam above cerithic limestone, sand and quartzite. It is one of the finest forests in France, containing

Beech	...	...	...	40	per cent.
Hornbeam	..	...	...	40	„
Pedunculate oak	...	...	...	15	„
Sallow, poplar, chestnut and elm				3	„
Conifers	...	...	...	2	„

During the last thirty years, oak has been extensively planted in the young woods, so that it is hoped to raise the percentage of this species to 33 per cent. We inspected some of the regeneration areas and thinnings, under the guidance of M. Cottignies, Inspecteur des Eaux et Forêts, and his assistants, and were greatly pleased with the results, not a single blank existing in the forest.

On August 21, the Society visited the Forêt de Compiègne (36,072 acres with a gross revenue of 33,480*l.*). It is situated on a poorer and drier soil than that of the Forêt de Retz, half the area being flat and on Eocene sands and clay, the rest hilly (117 to 495 feet altitude) and above nummulitic sand and lime-



FIG. 1.—Sessile Oak in the Forêt de Bellême. Girth at 4 ft. 6 in. = 9 ft. 9 in. Total height 119 ft. 6 in.

stone. M. Peiffer, Inspecteur des Eaux et Forêts, conducted us through the forest, which, when I saw it in 1871, was overstocked with red deer and rabbits, so that natural regeneration was rendered almost impossible. Although game is still important and produces an annual rental of 3880*l.*, yet it is now kept sufficiently in check, and the regeneration of the forest is proceeding satisfactorily, chiefly by natural seed. A practical illustration was given of setting free oak saplings from invasive growth of inferior species. This is done by the forest guards with a crescent-shaped cutting instrument having a handle about 4 feet long, and attracted much attention and commendation.

The party visited the splendid Château de Pierrefonds, which, under Napoleon III., was restored to its former condition in the middle ages by M. Violet le Duc, and from its watch-tower a most extensive forest panorama of the two forests of Retz and Compiègne was seen. We were then joined by M. Daubrée, the chief of the French Forest Department, and by the Conservateurs of Paris and Amiens, MM. Récopé and Molleveux,

and inspected the sessile oaks of the Beaux Monts. Such a mass of huge 300-year-old oak trees is to be seen only in France. A photograph of a French sessile oak taken by M. Granger, one of the Compiègne forest officers, is here reproduced.

The Mayor of Compiègne and the French officials dined with the Society in the covered courtyard of the hotel, which was ornamented with flags, creepers and evergreen trees. Besides the usual patriotic speeches by the president and the Mayor of Compiègne, Mr. Elwes, F.R.S., proposed the health of the French Forest Department in an excellent French speech, which was responded to most sympathetically by M. Daubrée, who invited the party to visit other French forests on some future occasion, and expressed his thanks for being elected one of our vice-presidents.

On August 22, most of the visitors went to Paris, some of whom visited the Forêt de Fontainebleau, but several proceeded to Valenciennes and spent two days in the splendid coppice-with-standards of the State forests of S. Amand (8290 acres) and the private forest of Raismes (3500 acres) belonging to the Duchesse d'Arenberg. These forests are on Tertiary sandy loam above the Coal-measures, and are noticeable for the equable distribution of standards (chiefly oak and ash) from ten to 120 years old. This is less marked in the State Forest,

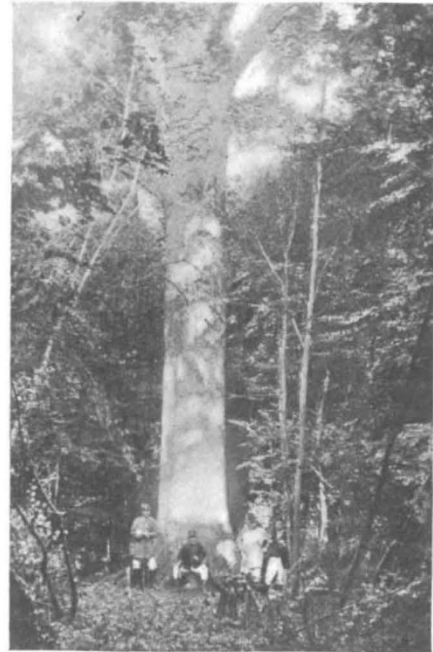


FIG. 2.—Pedunculate Oak in the Forêt de S. Amand.

owing to wholesale felling of old oaks from 1790 to 1815. The ideal to be aimed at is to have 1400 cubic feet of standards per acre when the underwood is twenty-five years old, and to fell half this volume, leaving 700 cubic feet to grow for another twenty-five years, when it should again amount to 1400 cubic feet. A photograph is here given of one of these old standards, the distinctive growth of which, as compared with that of the oak grown in high forest, being noteworthy. During the Napoleonic wars, a large area in the forest of S. Amand had become mere heather and bracken waste; this was sown with Scotch pine about sixty years ago; the oak has sprung up naturally among these pines, which are being gradually removed every six years, and broad-leaved forest, chiefly of birch under oak standards, results. Each of these forests produces a net revenue of about £1 2*s.* 6*d.* per acre.

A full account of the notes taken in this expedition will be published in this year's *Proceedings* of the Society, the chief object gained being the continual discussion in the forest of interesting points of forestry by the members and the French foresters, and the demonstration of the successful following of a continuous plan through many decades for producing fine timber.

W. R. FISHER.