

Miss Boring report the results of their study of the corpus luteum in the hen. Its origin is from the theca interna of the ovary, and it is clearly homologous with the corpus luteum of the cow. The course of its development is an abbreviation or fore-shortening of that in the cow, corresponding, indeed, with the late involution stages. Its resemblance to the corpus luteum of the oviparous duckmole is striking. The corpora lutea in hen and cow contain a similar yellow fatty substance. In both there is a yellow amorphous pigment in the cells containing the fatty substance. In the hen a mass forms in an atretic or undischarged follicle, which is practically identical with the corpus luteum that forms in a discharged follicle.

The same investigators have made a study of eight cases of hermaphroditism in poultry (*Journ. Exper. Zool.*, vol. xxv., 1918, pp. 1-30, 9 plates, 9 figures). The birds in question were females with embryonic or degenerating ovaries. Three were changing to a male condition in respect to reproductive organs, external characters, and even sex behaviour. But no structural counterpart was found for the abnormal behaviour of one hen treading another hen. Development of comb, spur, and wattles does not stand in any direct quantitative relation to the sex-condition of the gonad, but the shape and carriage of the body have a general relation thereto. The amount of luteal cells or pigment is in precise correlation with the degree of external somatic femaleness exhibited by the individual, but it does not appear that the interstitial cells of the gonads have any causal relation to the secondary sex-characters in the abnormal birds here dealt with.

We have not come to an end of the interesting budget of papers from Maine. Thus there is an investigation by Prof. Pearl (*Amer. Naturalist*, vol. li., 1917, pp. 545-99 and pp. 636-39) redefining the concept of inbreeding, and showing how the degree of kinship between any two individuals may be most precisely expressed. There is another by Prof. Pearl and Mr. S. W. Patterson showing that milk production changes with age in a definite manner (following a logarithmic curve), and in Jersey cows reaches its maximum at approximately the age of eight years and seven months.

J. A. T.

SCIENCE AND INDUSTRIAL DEVELOPMENT.

THE British Scientific Products Exhibition, which has been organised by the British Science Guild, and will be opened by the Marquess of Crewe at the Central Hall, Westminster, on Thursday, July 3, will afford an opportunity for vindicating the supremacy of Great Britain in the field of discovery and invention. It will show the strength and variety of home manufactures and indicate the indispensability of science in industry, in peace as in war.

One of the practical results of the exhibition should be to create new markets for new products and establish new industries for dealing with raw materials. The extent to which Germany had derived benefit from the exploitation of these resources and insidiously used her control to our disadvantage was not realised until after the outbreak of war. With this knowledge before us, and the conviction that most strenuous efforts will be made by Germany to appropriate trade and commerce which in Imperial interests we should secure for ourselves, it is of the utmost importance to accentuate the lesson which events have taught us. The exhibition will provide this means of enlightenment and its influence at the present epoch cannot be over-estimated.

We must leave for a later occasion the account of

the main features of the exhibition, and direct attention here to the one aspect which deserves special emphasis. Modern industry requires the use of a greater number of skilled research workers and of men with technical knowledge for responsible positions. The census of production (1907) showed that the net annual output per head is generally greatest in those industries which employ the highest proportion of persons receiving salaries as distinct from wages, and it diminishes as one passes to industries where the percentage of wage-earning employees increases. Thus, taking the nine leading industries, but not including coal-mining, the highest annual output per head is 185*l.* in the chemical industries, where 12 per cent. of the persons employed receive salaries and 88 per cent. wages; next in order of annual output per head and proportion of salaried employees come iron and steel factories (118*l.*) and engineering factories, including electrical engineering (108*l.*); and at the bottom of the list are the jute, linen, and hemp factories with a net output of 61*l.* only, the percentage of wage-earners being 98, of salaried persons 2. These figures indicate that the employment of skilled technologists means increased productivity, and they point to the importance of improved training of artisans in technical schools. If research methods are to be more generally applied to industries greater skill and accuracy will be required from the general body of workers, so that it is not merely the duty of the universities and colleges to supply highly trained research workers, but the technical schools have also the important duty of educating the artisan for the new type of work required under the new conditions.

The way to increase the number of highly skilled technologists is to make their position and prospects better than they have been. Many employers still express their preference for the so-called practically trained man over the man with scientific training, whereas in other countries the college-trained technologist finds ready acceptance in all branches of industry. Whether it is accepted or not, the fact remains that much of the commerce and manufacture of the modern world demands the leadership of highly trained, widely informed men, and that these men must be forthcoming if we are to be able to take a leading place among the nations of the world. It should be the purpose of an efficient educational system to provide adequate opportunities for the training of men of this type from whatever station of life they may be selected. Of all methods of reconstruction none is more likely to add to national wealth and strength than the application of science to industry; and the more men there are capable of being entrusted with it, the greater will be the progress.

THE HISTORY OF THE LONDON PLANE.

IN an article on "The Artificial Production of Vigorous Trees," an abstract of which was published in *NATURE*, January 7, 1915, p. 521, Prof. Augustine Henry directed attention to certain well-known trees, like the Lucombe oak, Huntingdon elm, cricket-bat willow, and black Italian poplar, which owe their vigour and botanical characters to the fact that they are of hybrid origin. Such hybrids arose as chance seedlings due to cross-pollination of two trees of different species growing together. The introduction into Europe during the seventeenth century of North American trees which grew alongside similar, but distinct, European species in parks and gardens was the occasion of considerable hybridisation. Trees like the black Italian poplar and the London plane, which have never been seen anywhere in the wild

state, are intermediate in botanical characters between an American and a European species in each case, and are undoubtedly first-crosses.

The origin and history of the London plane, *Platanus acerifolia*, form the subject of a paper by Prof. Henry which appeared in the Proceedings of the Royal Irish Academy for April last. This tree has all the peculiarities which are met with in a first cross. It is intermediate in fruit and in leaves between the supposed parents, the Oriental plane, which is indigenous in Greece and Asia Minor, and the Occidental plane, which grows in a wild state in the forests of the eastern half of the United States. Its vigour is exceptionally great, as is usual in hybrids of the first generation; and its seeds when sown produce a mixed and varied crop of seedlings, in which are variously combined the characters of the two parents. Several supposed forms of the London plane, which are not uncommonly cultivated, appear

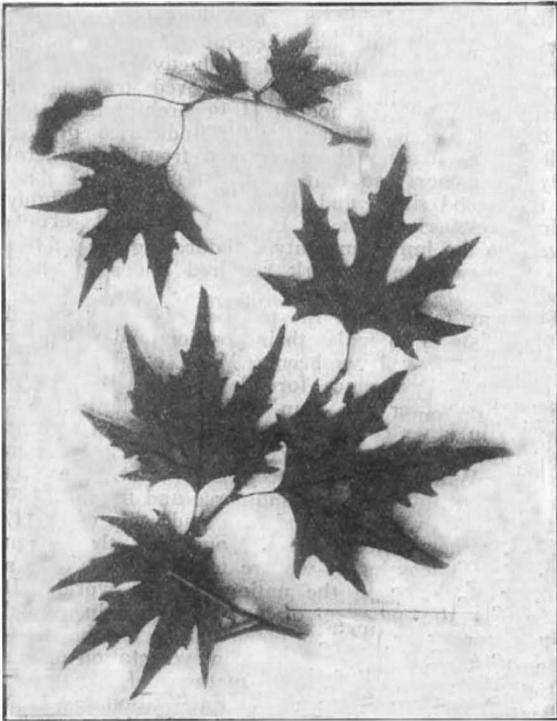


FIG. 1.—*Platanus orientalis*. From Thermopylæ seed.

to be chance seedlings of this tree, being hybrids of the second generation.

The London plane is extensively used for planting in the streets of towns of Europe and North America, as it has been found to surpass all other trees in its powers of resistance to drought, smoke, and other unfavourable conditions of soil and atmosphere. In the cities of New England, Ohio, Pennsylvania, etc., the London plane is much more successful as a street tree than the Western plane, notwithstanding the fact that the latter is the finest and largest native broad-leaved tree in the forests of these States. The selection as a street tree of the London plane in preference to the native species in the regions where the latter flourishes depends on the vigour inherent in the former tree on account of its hybrid origin.

The London plane, being undoubtedly a hybrid, must have originated as a chance seedling in some botanic garden where an Occidental plane and an

Oriental plane happened to be growing close together. Such a seedling, by the vigour of its growth and the novelty of its foliage, would attract attention and be propagated by an observant gardener. The ease with which the London plane can be raised from cuttings would much facilitate its propagation. Prof. Henry shows that it possibly originated in the Oxford Botanic Garden about 1670, though this surmise cannot be definitely proved.

The Occidental plane was introduced from America into England by Tradescant in 1636, about a century later than the earliest record of the Oriental plane in this country. By 1670 there would have been trees of the American species old enough to bear pollen. The connection with Oxford is as follows:—Jacob Bobart, jun., who succeeded his father as curator of the botanic garden at Oxford in 1680, left in MS. "An Enumeration of Trees and Shrubs," in which

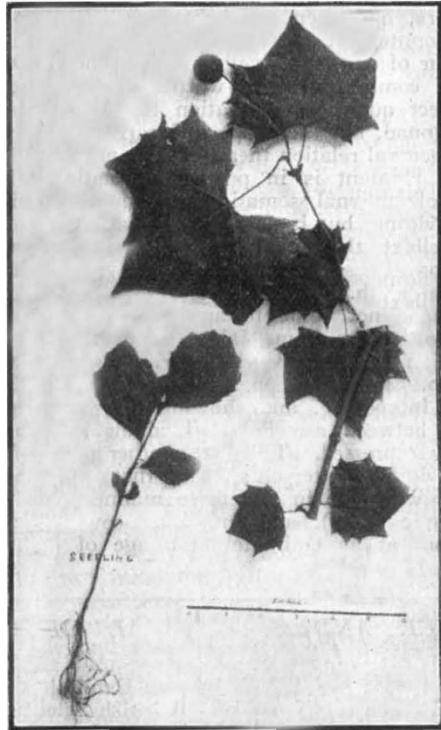


FIG. 2.—*Platanus occidentalis*.

for the first time there is mention in any record of the London plane. This MS. is, unfortunately, without date, but a similar MS. has 1666 on the fly-leaf. In the "Enumeration" the planes in cultivation are distinguished as follows:—

No. 475. *Platanus orientalis, pilulis amplioribus.*

No. 476. *P. inter orientalem et occidentalem media.*

No. 477. *P. occidentalis aut virginiensis.*

Corresponding with the diagnosis, No. 476, of the London plane, as intermediate between the Oriental and the Occidental species, there is a dried specimen, undoubtedly *P. acerifolia*, in the Sherard Herbarium at Oxford labelled "*Platanus media*."

The first published description of the London plane was by Plukenet in 1700 in his "Mantissa" (p. 153), which reads as follows:—"Platanus orientalis et occidentalis mediam faciem obtinens, Americanus, globulis grandioribus, foliis splendidibus atris." The type-specimen of this description is in the British Museum, Herb. Sloane, No. 101, folio 112. In addi-

tion, there are two sheets of specimens, collected by Petiver about the same period, one of which, Herb. Sloane, No. 149, folio 237—two fine leaves of *P. acerifolia*—is labelled "*Platanus media*, n.d., Bobart, Ox." It is possible that the original tree from which this specimen was taken by Bobart was then living in the Oxford Botanic Garden. As Plukenet describes this plane as bearing large fruit-balls in 1700, it may have been then thirty years old, which would give the date of origin of *P. acerifolia* as 1670.

This history synchronises well with the date of the magnificent London plane, probably the oldest in Europe, which is living in the Palace Garden at Ely, and now measures 110 ft. high, the trunk being 23 ft. in girth at 5 ft. above the ground. It was planted by Gunning when he was bishop there between 1674 and 1684. Bishop Gunning spent some time at Oxford before his appointment to the Ely diocese.

The splendid London plane at the Ranelagh Club, Barnes, is precisely of the same size as the Ely tree, and is probably of the same age, both these trees

Various seedlings of the London plane have been selected from time to time, and one of them, *P. pyramidalis*, which originated on the Continent about 1850, is now as commonly planted in the streets of our towns as the true London plane. Another seedling, *P. hispanica*, a beautiful tree resembling the Occidental plane in foliage, was known in England before 1731, and must have come from seed of one of the earliest London planes. The history of *P. hispanica* is as follows:—Miller, in his "Dictionary" (seventh edition published in 1759), mentions in all four planes. The Occidental and Oriental planes, he says, "are undoubtedly distinct species, but there are two others in English gardens, which I suppose to be varieties that have accidentally risen from seed; one is titled the maple-leaved plane (*P. acerifolia*), and the other is called the Spanish plane-tree." He considered *P. acerifolia* to be a seminal variety of *P. orientalis*, as seeds of a large Oriental

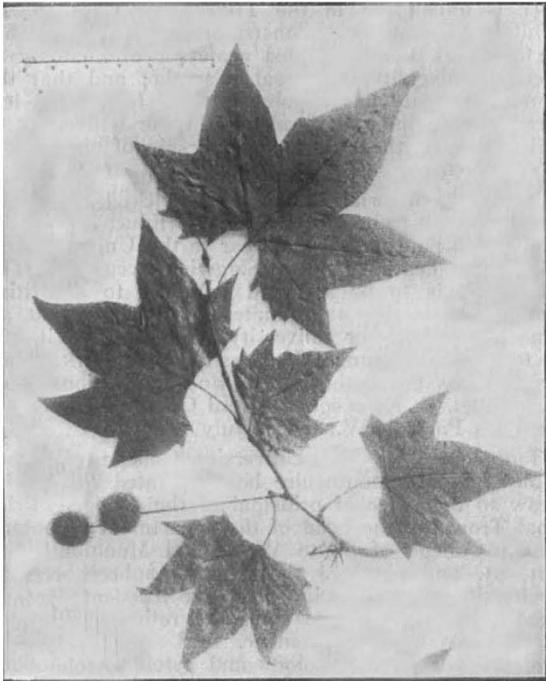


FIG. 3.—*Platanus acerifolia*. Kew.

being apparently cuttings of the original tree, which is postulated in this account to have been in the Oxford Botanic Garden. There is no record of the age of the Ranelagh Club tree. There are two other immense London planes, probably coeval with the Ely tree, namely, one at Peamore, near Exeter, and the other at Woolbeding, Sussex; but no particulars of their history can be obtained.

On the Continent there are no examples of the London plane approaching in size or age the fine trees at Ely and Barnes; and no mention is made of it by any Continental writer before 1703, when it was briefly described by Tournefort. Since the latter date the cultivation of the London plane has spread over the Continent, and it is now common in towns in France and Germany. In the United States, as stated above, it is widely cultivated as a street tree, but almost invariably under the erroneous name of *P. orientalis*. The true *P. orientalis* is very rare in America, and is never used for planting in streets.

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FIG. 4.—London plane at Ely.

plane in Chelsea Garden produced plants of this sort several times. His description of the Spanish plane is unmistakable: "It has larger leaves than the other sorts, more divided than those of the Occidental plane, sharply indented in the edges, light green, foot-stalks short and covered with a light down. It grows faster than the other sorts, but I have not seen any very large tree of this kind." He further states that he planted four planes, one of each sort, in 1731.

It would appear from this evidence that *P. hispanica* originated some time before 1731, and was probably a seedling of one of the early London planes, which by this time had been bearing seed for many years. This beautiful tree has always been rare in cultivation. There are, however, two fine trees at Kew, which have tall, straight stems, with ascending branches above and pendulous branches below, bearing magni-

ficient foliage. *P. hispanica* has been considered by many authors to be a variety of *P. occidentalis*, but the achenes clearly show it to be of hybrid origin.

The history of the other peculiar planes, here regarded as hybrid seedlings of the second generation on account of their botanical characters, is obscure. They may ultimately prove to be identical with young seedlings of *P. acerifolia* which are now growing at Kew and Glasnevin, when these in after years acquire adult foliage and bear fruit. This would be a positive proof of their hybrid origin.

The botanical characters of the two parent species, of the London plane, and of the supposed descendants of the latter, six of which are in cultivation, have been carefully investigated by Prof. Henry, assisted by Miss M. G. Flood. The numerous differences observable in the achenes, fruit-balls, and leaves of these trees prove to be exactly of the same kind and range as occur in hybrids artificially produced, and afford presumptive evidence that from *P. acerifolia*, an accidental cross between two wild species, the other planes, such as *P. pyramidalis*, *P. hispanica*, etc., only known in the cultivated state, are descended.

When the seed of a first-cross is sown the seedlings produced constitute a mixed and varied crop, in which are variously combined the characters of the two parents. The best proof, then, of the hybrid nature of *P. acerifolia* is the fact that it does not come true from seed, which appears to have been known to Lorberg in 1875 and to Gadeceau in 1894. Two sowings made in recent years establish this very clearly. There are now eight seedlings planted in the Queen's Cottage grounds at Kew which were raised from seed of *P. acerifolia* that was sown in April, 1911. These range in height from 4 ft. to 10 ft., and are very diverse in foliage, some closely resembling *P. orientalis*, and others resembling *P. occidentalis*, a few being intermediate. One of them appears to be identical with *P. hispanica*. There are also two seedlings at Glasnevin, which are the only survivors of a set raised at Cambridge in 1910 from seed of a large London plane growing near the main gate at Kew. The rest of the set died from drought, having been transplanted into a field in that dry year. These two seedlings are extremely unlike in foliage; one has leaves indistinctly lobed, resembling those of *P. occidentalis*; the other has deeply lobed leaves, and differs little from *P. orientalis*.

The artificial production of a cross between *P. orientalis* and *P. occidentalis* has not been possible in this country, where there exists no adult living tree of the latter species from which pollen could be obtained. An attempt to reproduce *P. acerifolia* by cross-pollination of the Occidental and Oriental planes might be made in the United States, using the native tree as the female parent.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Mr. R. H. Rastall, of Christ's College, has been appointed University lecturer in economic geology, Mr. Herbert Stone University lecturer in forestry, and Mr. F. Debenham, of Gonville and Caius College, University lecturer in surveying and cartography.

Mr. T. C. Nicholas, of Trinity College, has been appointed assistant to the Woodwardian professor of geology, and Mr. J. M. Wordie, of St. John's College, demonstrator of petrology.

Mr. A. W. Hill, of King's College, and Mr. E. H. Rayner, of Trinity College, have been approved for the degree of Sc.D.

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EDINBURGH.—The University Court, on the recommendation of the Senatus, has resolved to re-establish the lectureship in military history and strategy. It has also been resolved to institute a diploma in public health.

Dr. H. S. Allen, reader in physics, King's College, London, and secretary of the Physical Society of London, has been appointed lecturer in natural philosophy.

MR. S. C. MONK has been appointed lecturer in electrical engineering at the Devonport Technical School.

THE resignation of Dr. R. L. Weighton of the chair of engineering at Armstrong College, Newcastle-upon-Tyne, is announced.

THE first award of the William Gibson research scholarship for medical women (minimum 250l. per annum) has been made to Miss M. Esther Harding. The scholarship is held for two years.

IT is announced in the *Times* that Capt. S. E. Whitnall, University demonstrator of human anatomy, Oxford, has been appointed professor of anatomy at McGill University, Montreal, Canada; and that the same University has appointed Capt. John Tait, lecturer in experimental physiology in the University of Edinburgh, to the Drake professorship of physiology.

AMERICAN university women have founded a fellowship as a memorial to Miss Sidgwick, one of the two women members of the British Educational Mission which paid a visit last year to the United States, where the death of Miss Sidgwick occurred. The fellowship is to be awarded annually to a British woman for a year's graduate research work at an American college or university. For 1919-20 it will be tenable at Columbia University, New York. Particulars may be obtained from, and applications made to, Miss L. C. Kempson, Bedford College for Women, Regent's Park, N.W., before July 1.

THE council of the University College of South Wales and Monmouthshire has appointed Dr. A. H. Trow to the office of principal of the college. Principal Trow became head of the department of botany at the College of South Wales and Monmouthshire in 1893, and obtained the degree of D.Sc. of the University of London in 1899. He has been Acting-Principal of the college since the retirement of Dr. E. H. Griffiths in September, 1918. His chief publications are on the biology and cytology of aquatic fungi and on genetics. His studies of the common groundsel constitute a valuable addition to our knowledge of the inheritance of quantitatively variable characters. The work that will devolve upon Principal Trow for the next few years under the scheme of reconstruction to be effected as the result of the Report of the Royal Commission on University Education in Wales will be of a critical character, and of vital importance for the growth and evolution of the institution.

School Science Review, the new publication promoted by the Association of Science Masters (formerly the Association of Public School Science Masters), will be greatly appreciated by all interested in the progress of science. To teachers themselves it will supply that long-felt want: a medium for the regular interchange of opinions from the schools point of view, and for the record of new ideas in courses and experimental work; to wider educational circles it will show clearly what is being done in the leading schools for the advancement of science. The first number runs to thirty-two pages of most readable material. Mr. C. L. Bryant, of Harrow, writes a valuable account of the