THE ASH TREE

By ALEXANDER L. HOWARD

THE ash stands alone among our forest trees in the peculiar shape and manner of its growth. Sculptors and artists have always been inspired by the grace and beauty of trees and all that the tree bears, so that we have exquisite models of the oak leaf, the acorn, the twisted and gnarled bark of many kinds of trees. The habit and growth of the limbs of the ash being distinctive, the artist has taken it as a model for the arms of the standard and other lights in cathedrals and churches, and the architect for the columns and fair tracery which support the vaulted roof similar to that of the forest glade.

Pliny says :

"There be many trees besides that Nature hath brought forth ; for their wood of timber : and among them the Ash, which of all others, groweth most plentifully in every place . . . much ennobled by the praise and commendation that the Poet Homer giveth it, as also for the speare or lance of Achilles, made thereof. . . .

"The Greeks have made 2 kinds of the Ash : the one runneth up tall and even without a knot : the other is lower, more tough and hard, and withall, of a more brown and darkish colour. . . . Others have put a difference between Ashes, according to the places : for that of the plaine and champion country, hath a more curled and fristed graine than the other of the mountaines, but contrariwise, the wood of this is more compact and harder than the other. The leaves of this tree, according to the Greekes, are hurtfull, venomous, and deadly to horses, mules, and such labouring garrons ; but otherwise to beasts that chew cud they be harmlesse. . . . Moreover, they be excellent good, and nothing so soveraigne can be found against the poison of serpents . . . nay, so forcible is their virtue, that a serpent dare not come neare the shadow of that tree. . . .

"A wonderful goodnesse of dame Nature that the Ash doth bloome and flourish alwaies before that serpents come abroad."

Yet it would be difficult to trace the original cause of the belief in the supposed efficacy of the cure by what was called the shrew-ash. Superstition has always held an overpowering influence over the mind of man. The medicinal qualities of trees and shrubs were far more generally known and practised in earlier times, when qualified medical aid was difficult to procure, and the health of husband and children devolved far more on the housewife. It is probable that cures which had been effected by the use of the leaves, fruit or juices of the ash trees had actually been brought about, but certain it is that up to a hundred years ago, and even to-day, a belief still prevails in the curative powers of the shrew-ash.

The Rev. C. A. Johns says :

"They have also a superstitious custom of boring a hole in an Ash, and fastening in a shrew mouse ; a few strokes with a branch of this tree, is then accounted a sovereign remedy against cramp and lameness in cattle, which are ignorantly supposed to proceed from this harmless animal."

Gilbert White (of Selborne) says :

"In a farm-yard, near the middle of this village, stands at this day a row of pollard-ashes, which, by the seams and long cicatrices down their sides, manifestly show that in former times they have been cleft asunder. These trees when young and flexible, were severed and held open by wedges, while diseased children, stripped naked, were pushed through the apertures, under a persuasion, that by such a process the poor babes would be cured of their infirmity. As soon as the operation was over, the tree in the suffering part was plastered with loam, and carefully swathed up. If the parts coalesced and soldered together, as usually fell out, where the feat was performed with

any adroitness at all, the party was cured ; but where the cleft continued to gape, the operation, it was supposed, would prove ineffectual. . . . We have several persons now living in the village, who in their childhood were supposed to be healed by this superstitious ceremony, derived down, perhaps, from our Saxon ancestors, who practised it before their conversion to Christianity."

Johns was of the opinion that John Evelyn half believed in the efficacy of this practice.

Many of our well-known arboriculturists have given us accounts of remarkable trees, among which Elwes mentions the Queen's Ash at Ashridge Park. He says :

"One of the most perfect examples, from a timber point of view, is a tree growing in a wood called Poultridge, just outside Ashridge Park, which is about 125, perhaps 130 feet high. . . . It had, in 1906, an absolutely straight clean stem, about 75 feet in height by 11 feet 10 inches in girth, and looked as if it would square 27 to 28 inches halfway up, in which case it contains about 400 feet of faultless timber in one length."

The year in which the Conservative Party first occupied the house at Ashridge Park (about 1920) I visited the tree, to find that the measure had increased since Elwes's time. I was informed that an immense price had been offered for it and refused. Alas, within three weeks it was struck by lightning, which revealed that it was almost a hollow shell, with scarcely a sound piece of timber throughout the immense size. It was a strange case, as the tree displayed no sign, appearing perfectly healthy, sound, and clothed with a sound bark throughout. I have repeatedly seen oak trees struck by lightning, ash rarely, elm never ; it would be interesting to discover the reason.

No tree repeats itself so vigorously as the ash tree, which through its winged seed spreads far and wide, producing innumerable young seedlings. No tree planted, or transplanted, will grow so sturdily and establish itself so surely. Every gardener finds self-sown ash trees springing up around his beds and paths in such profusion that they become a nuisance, and in those districts where ash plantations abound, every year a wide area of strong naturally regenerated plants will be found. A wiser control in the past would have protected these areas, so that at the least possible cost a wealth of young forest would have been added to our depleted woodlands. This course has never been pursued, and year by year young trees have been trodden down, ploughed up, or destroyed by animals.

While many of the trees grown in Great Britain have been wanted and from time to time have been realizable at varying prices—sometimes actually negligible—the demand for ash has remained constant, and the price regular. Even in Evelyn's time, nearly three hundred years ago, the great value of the ash was recognized. He says :

"In 40 years from the key (seed), an ash hath been sold for £300. sterling, and I have been credibly informed that one person hath planted so much of this one sort of timber in his life-time as hath been valued worth £50,000. to be brought." (£50,000 in his day would be equal to say £100,000 to-day.) "Every prudent Lord of a Manor should employ one acre of ground to Ash with every 20 acres of other land, since in as many years it would be more worth than the land itself."

There can be little doubt that the future will bring the fortunate owner a reward, as it is doing to-day, on a higher scale than any other tree which he could grow.

Of the innumerable species of ash trees which can be found distributed all round the globe, and in pro-

fusion in the United States, Canada, Europe, China and Japan, three kinds only will be referred to in this article—the common ash, the manna ash, and the weeping ash. The common ash (*Fraxinus excelsior*) was abundant in male and female trees before the War of 1914–18, before which time there had been a steady demand year by year; but there was no cause for alarm. With the wholly unexpected and prodigious requirements of the War, and the advent of the aeroplane, whole areas were entirely denuded of the finest trees. A search for straight, well-grown trees, suitable for aeroplane construction, was relentlessly pursued, and ash trees of sufficient length and of clean hard growth brought the owners prices the highest ever known. In the years following the War the demand continued with unabated vigour, and undesirable and unfortunate as it may be deemed, large consignments of trees were sold to Japan.

Through all ages the wood of ash has been used for a great number of purposes, and because of its character it has served a special purpose for which no other wood has been found equal. The early writers or historians continue to record its merits for service both in war and peace.

Johns says :

“As a timber tree the Ash is exceedingly valuable, not only on account of the quickness of its growth, but for the toughness and elasticity of its wood, in which latter quality it surpasses every European tree. In its younger stages (when it is called *ground-ash*), it is much used for walking sticks, hoops, and hop-poles; and it matures its wood at so early an age, that an Ash-pole, three inches in diameter, is as valuable and durable for any purpose to which it can be applied, as the timber of the largest tree. The use of Ash is (next to that of the Oak itself) one of the most universal: it serves the soldier (Spears were anciently made of Myrtle, Cornel and Hazel, but Pliny prefers the Ash for that purpose)—and heretofore the scholar, who made use of the inner bark to write on, before the invention of paper. The carpenter, wheelwright, and cart-wright find it excellent for plows, axle-trees, wheel-rings, and harrows; it makes good oars, blocks for pullies, and sheffs, as seamen name them: for drying herrings no wood is like it, and the bark is good for the tanning of nets; and, like the Elm (for the same property of not being apt to split or scale), is excellent for tenons and mortises; also for the cooper, turner and thatcher; nothing is like it for our garden palisade hedges, hop-yards, poles and spars, handles and stocks for tools, spade-trees, etc. In summer the husbandman cannot be without the Ash for his carts, ladders, and other tackling, from the pike, spear, and bow, to the plow; for of Ash were they formerly made, and therefore reckoned amongst those woods which, after long tension, has a natural spring, and recovers its position, so as in peace and war it is a wood in highest request.”

The quality of the wood grown in Great Britain surpasses in its toughness and flexibility that of any other country, although some grown in Canada and some in the Transylvanian Alps approach it very closely. For the purpose for which it is used it would be difficult or even impossible to find a satisfactory substitute. With the advent of the aeroplane, ash became a far more important medium, one indeed on which the whole course of the War of 1914–18 was peculiarly dependent. Ash was used for the longersons, collapsible wheels, internal packing blocks, and for skids and runners for gliders, where length, straightness of grain, absence of imperfections, strength and toughness preserved the lives of flying men. Such was the demand that the whole available existing supply of seasoned wood was exhausted in a few months. Thousands of trees were cut down in Great Britain, and thousands were brought from the

Continent. No less than twelve thousand trees could have been seen at one depot, in separate piles. The imported ash produced a longer length of clean straight growth than that grown in Great Britain, showing the advantage gained by scientific forestry practised abroad as compared with the absence of these methods in Great Britain. The largest drying kilns available were continually employed with day and night shifts, year in year out, without cessation, and wood from growing trees was actually in aeroplanes flying over the enemy's lines within a few months of the felling of the trees. Ash was also used for the keel pieces of the gondolas or boats of the blimps or airships. The length required for this purpose was exceptional, being about 26 ft. long, with a dimension of 1½ in. by 4 in.—a demand which, although drastic, was fulfilled.

The ash tree is attacked by a fungus, the identification of which does not yet appear to have been determined. Everyone will have noticed spreading from the trunk, perhaps at the base, or at any other point to the crown, a collection of overhanging growths, in mushroom form. This is the outward manifestation of the fungus growth in the tree. Sometimes it forms in a part where vigorous young shoots are pushing out, which form what is known as a burr. With the ash tree, however, the fungus mingles with the wood growth, consolidating into one solid mass of apparently woody growth. Such burrs when cut through display the customary bird's-eye surface, but intermingled will be found thin black streaks circling in and out among the bird's-eye marking. Ash burrs, whether pure and white without fungus, or whether as described above, with fungus, have always been highly valued, and for three hundred years used by cabinet-makers in veneer fashion for the making of art furniture. Examples can be found, particularly in the cases of grandfather clocks, especially those made in the reign of Charles I. The fashion would seem to have insensibly fallen away, but has revived again lately.

We must not overlook the weeping ash (*Fraxinus excelsior* var. *pendula*), one of the most decorative forms that any tree bears. This tree appears to have been discovered about one hundred and fifty years ago, and Elwes says :

“Loudon describes several forms of it, and says that the original tree was discovered near Wimpole in Cambridgeshire 150 years or more ago,”

and he refers to another form, “the Cowpen Ash”, which he says has “assumed a very similar habit”; and still another, the Kincairney Ash, which “was distinguished by its alternately pendulous and upright branches”. He reports a weeping ash, by far the finest known, which was grafted about 1848 at Elvaston Castle, near Derby, and was reported as being 98 ft. high, with long weeping branches, and another with a bole 50 ft. by 12½ ft.

Apparently it is necessary to rear this tree only by means of grafting on to the ordinary common stock, a proceeding which has much been neglected, but which if pursued would give additional interest and much pleasure to those who are concerned with arboriculture. No doubt the enterprising nurseryman will have continued to produce the weeping ash for his customers, but its popularity to-day is insignificant in comparison with about one hundred and forty years ago. The beautiful examples then established can be seen in almost every park and garden, in the gardens of country houses, in the public parks, in cities and the surrounding gardens, and in the botanical gardens,

but the youthful tree which should take its place is conspicuous by its absence to-day.

The manna ash (*Fraxinus ornus*) is another beautiful tree, far too little known or appreciated in Great Britain. It is said to have been introduced by Dr. Uvedale in 1710 from southern Europe. Elwes says the tree was common "in Eastern Spain, Corsica, Sardinia, Italy, Servia, Bosnia, Greece, and Asia Minor".

Later he adds:

"Its chief economic importance is due to its being the source of manna. The manna of commerce, according to Hanbury, is exclusively collected in Sicily . . . incisions are made in the bark . . . and the manna exudes as a clear liquid, which solidifies on the stem of the tree or on pieces of straw or wood that are inserted in the incisions. Manna consists mainly of a peculiar sugar called mannite, which is a mild laxative and is employed as an official drug in many countries."

So far as it is possible to ascertain, no use has been made of the manna ash tree for the production of manna in Great Britain, as has been the case in Sicily and southern Europe.

So little is this tree known that the owner of a house had one of them on her lawn, which she highly prized, and which for years was appreciated by those who visited her, but every inquiry she made failed to reveal its identity.

The tree thrives well, and under good conditions will reach a height of 50-60 ft., with a maximum recorded girth of 8 ft. 8 in. A very fine specimen can be seen at Kew, the measurement of which is given by Elwes as 60 ft. high by 7 ft. 6 in. girth. A very fine grove of these trees can be seen near the Castle at Arundel.

A young tree, but already with a beautiful habit, can be seen near the Epstein statue in Hyde Park. This tree, about seven years ago, was heavily loaded with seed, of which I obtained a quantity, and from which I reared three hundred and fifty trees, some of which are now 8 and 9 ft. high. Whether these trees will revert to the original stock or prove to be true manna ash (*F. ornus*) remains to be seen. Generally, if not always, it has been grafted on to a stock of the common ash (*F. excelsior*).

The trunk, with a smooth grey stem, supports the crown, whence branches somewhat drooping bear a rich foliage, not unlike the common ash, but with a more rounded and delicate leaf. Dr. R. Melville says:

"The Manna Ash, . . . exhibits a fair degree of variation in leaf form. There are at least two varieties described of the Manna Ash based upon leaf shape."

The lovely whitish flowers give off a delightful perfume, which permeates the air around the tree.

The wood is of finer grain, but otherwise similar to that of the common ash, but so rarely provided that it is generally unknown to the craftsman.

CHOLESTEROL METABOLISM IN THE ANIMAL BODY

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THERE has been a considerable amount of recent work on the unsaponifiable fatty material of several types of animal tissue, and one of the results of this kind of experiment has been to throw some light on the changes which probably take place during

life in the substance cholesterol (I), a ubiquitous constituent of animal cells.

By no means the least interesting aspect of this research is the somewhat unexpected discovery that the changes undergone by cholesterol are so easily brought about that it is often impossible to say with certainty that they might not have occurred during the processes leading to the isolation of the resulting products from the tissue extract. Moreover, Bergström and Wintersteiner¹ have shown that purified cholesterol itself can be transformed under conditions of pH, oxygenation and temperature which must occur *in vivo*. The possibility that enzymic systems might alter the course of cholesterol transformation has not yet been adequately explored, but it seems safe to assume a high degree of probability for the occurrence of at least the following substances in the tissues named, if these are supplied with oxygen at a normal mammalian pH and temperature:

Substance	Found in extracts of
α -7-hydroxycholesterol (IIa)	ox liver ² , pigs' liver ³ , mares' serum ⁴ , pigs' spleen ⁵ .
β -7-hydroxycholesterol (IIb)	mares' serum ⁴ , human atheromatous aortas ⁶ .
7-ketocholesterol (III)	bulls' testis ⁷ .
$\Delta^{3,5}$ -7-ketocholestadiene (IV)	pigs' testis ⁷ , pigs' spleen ⁵ , human atheromatous aortas ⁶ .
$\Delta^{4,6}$ -3-ketocholestadiene (V)	pigs' spleen ⁵ , human atheromatous aortas ⁶ .
3(β),5,6(<i>trans</i>),-trihydroxycholestane (VI)	ox liver ² , pigs' testis ⁷ , human atheromatous aortas ⁶ .
Δ^4 -3(β),6,-dihydroxycholestene (VII)	pigs' spleen ⁵ .
3(β)-hydroxy-6-ketocholestane (VIII)	pigs' spleen ⁵ .

Substance (IV) is easily formed in mild conditions by dehydration of (III), and may thus arise during the working-up of extracts. Compounds (IIa), (III), (IV) and a simple transformation-product of (IIb) have also been found after 'autoxidation' of cholesterol *in vitro*¹, while (IIa) and (VII) are obtained when cholesterol is subjected to photo-oxidation⁸. It will be noticed that the transformations indicated by the above substances affect only rings I and II of the sterol nucleus; and in fact no evidence has yet been accumulated which would indicate the course of any more profound breakdown of the molecule. Apart from indirect experiments, such as those of Bloch and Rittenberg with deuterium¹⁰, definite proof of further chemical changes during cholesterol metabolism is still lacking.

It may also be noted that, in spite of the facile *in vitro* production of 7-dehydrocholesterol (IX, provitamin D₃), from α -7-hydroxycholesterol (IIa), the mechanism of the formation of this important substance in the animal body remains entirely obscure.

Prelog, Ruzicka and Stein⁶ point out that tissues which so far they and their colleagues have examined in great detail differ from adrenal tissues, testis and urine in containing no steroids of the C₂₁ (progesterone, corticosterone, etc.) or C₁₉ (androsterone, testosterone, etc.) types, a fact which, if it is generally confirmed for other tissues, may prove highly significant for studies of steroid metabolism.

Cholestenone (X) has been found in dogs' and rats' faeces¹¹ and in pigs' testis⁵. Rosenheim and Webster¹¹ continue to believe that it is a precursor of faecal coprosterol (XI), which they think is unlikely to arise, as was formerly believed, by bacterial action in the intestine¹². The same workers have observed a quite remarkable dietary influence on the production of coprosterol by the intact animal¹³; this discovery may be a valuable lead towards the solution of more than one problem. In this connexion,