AMBER

G.P.

ALL ABOUT IT

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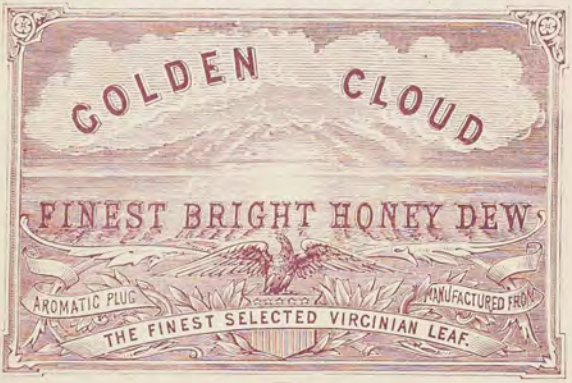

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Number Seven.

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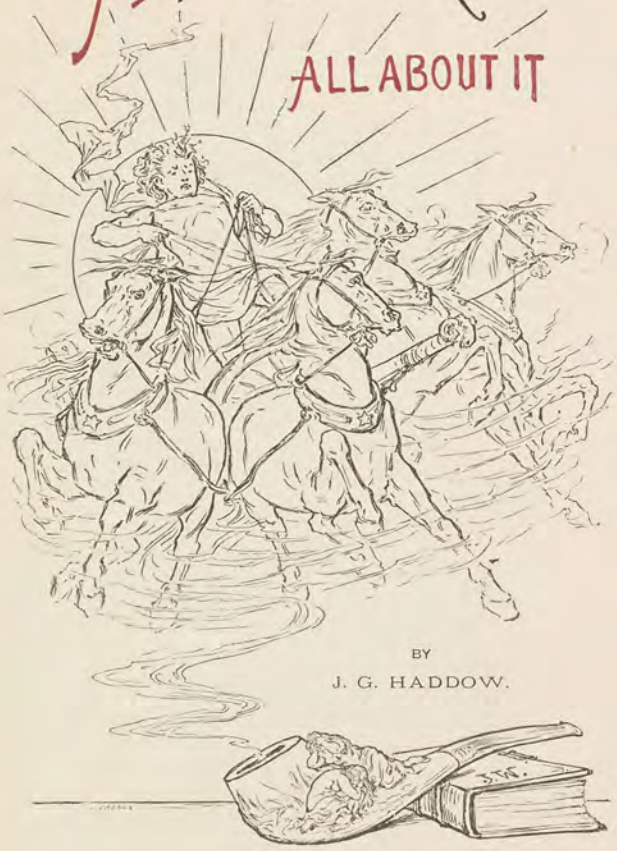
AMBER

ALL ABOUT IT



BY

J. G. HADDOW.

LIVERPOOL:

AT THE OFFICE OF "COPE'S TOBACCO PLANT."

1892.

DER KAUFMANN.

Wohin segelt das Schiff? Es trägt sidonische Männer,
Die von dem frierenden Nord bringen den Bernstein, das Zinn.
Trag' es gnädig, Neptun, und wiegt es schonend, ihr Winde,
In bewirthender Bucht rausch' ihm ein trinkbarer Quell.
Euch, ihr Götter, gehört der Kaufmann. Güter zu suchen,
Geht er, doch an sein Schiff knüpfet das Gute sich an.

F. von Schiller.

THE MERCHANT.

Where sails the ship?—It leads the Tyrian forth
For the rich amber of the liberal North.
Be kind, ye seas—winds, lend your gentlest wing,
May in each creek, sweet wells restoring spring!—
To you, ye gods, belong the Merchant!—o'er
The waves, his sails the wide world's goods explore;
And, all the while, wherever waft the gales,
The wide world's good sails with him as he sails!

(Lord Lytton's *Translation*).

PREFACE.

SOME years ago that profound scholar and philosopher, the late Mr. WILLIAM MACCALL, contributed to the pages of *Cope's Tobacco Plant* a mass of material for a short History of Amber, mainly translated from German sources. This material, collated and printed originally without any pretence at continuity or arrangement, it was intended at the time should be cast into more organic form, and the present booklet is the outcome of that intention. Much new information, however, has been added and many fresh sources consulted in its compilation.

AMBER: ALL ABOUT IT.

BY

J. G. HADDOW.

I.

AMBER is a substance of great antiquity. Hundreds of years before the Christian era it was eagerly sought for by the Phœnicians, and to-day it is still one of the favourite materials for the manufacture of articles of luxury. What we know of its long history is greatly due to the researches of German antiquarians, and although many of the details of these researches are of interest to the student alone, much remains that cannot fail to engage the sympathies of general readers, and must be especially interesting to smokers who are brought into daily contact with amber articles.

Amber is analogous to the vegetable resins, and is the product of various extinct coniferous trees, though it now appears as a mineral. As an article of ornament it was highly prized by the ancients, and much controversy still arises as to which special region they depended upon for their supply of it. Prussia is the chief producer, and in all probability always has been. There in stormy weather amber is thrown in large quantities on the coast. It is also found near the seaboard in veins and deposits in the "blue earth" and other strata.

The word amber is most generally believed to have been derived through the Spanish from the Arabic *anbar*.

Our historical knowledge of Prussia, the land of amber, reaches no further than the last six centuries. The formation and depositing of amber belong to a much earlier period, and in dealing with the subject the antiquarian finds it necessary to go much beyond the age of which we have positive knowledge, and draw his conclusions from probabilities alone. To the *Amber Land* of Dr. G. C. Berendt we are greatly indebted for information on the geology of amber.

Andrew Celsius, who lived in the first half of the last century, showed that the surface of the water on the coast of Sweden sank as much as half an inch yearly. Leopold von Buch, Lyell, Keilhau, and Nilsson confirmed the fact, but pointed out that the effect was produced not by the depression of the water, but by the elevation of the land, which takes place in various regions in different degrees.

Toward the end of the twelfth century, according to Waissel and Henneberger, the Frische Nehrung,* at the mouth of the Vistula, rose into existence, after a continuance of northern storms for twelve years; and it is noticeable that on Henneberger's map we see three islands in place of the long sword-like form presented by the Frische Nehrung at present. It is recorded that the sea burst through the Nehrung in 1455, 1497 and 1520, forming in succession the Balga Water, the Königsberg Water (both since choked up), and the Pillau Water. But Hagen, forming his judgment from a record in Old Pillau church, maintains that in 1311 the breach then existing in the Nehrung, below Lochstädt, was filled up by a violent storm, and that a new breach was made and continued open until 1479. On the day of the Three Holy Kings in this year, a northern storm, lasting four days, broke through the Nehrung and created the Pillau Water, which, however, did not acquire its present depth until about 1510. The exact year is not quite certain; several have been mentioned. In February, 1840, a breach 1800 feet wide was made by the drifting ice of the Vistula, by which the fortification of Weichselmünde was severed from the Nehrung.

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* Fresh Sandbelt.

Similar changes have been wrought in Samland, the great amber region, which now is only a fragment of its former self. In the thirteenth century the province of Witland sank, and the Frische Haff rolled above it. The mouth of the Pregel once was farther west and formed a basin called Lippe. Land that was covered with forests of pines and firs, is now at the bottom of the sea, and sandhills stand out where large ships once might ride at anchor. The first Christian church of Prussia, at Saint Adalbert in Samland, is said to have been five miles from the shore in the immediate proximity of which it now stands. Many changes have also occurred in the interior within the historical period. Two thousand and thirty-seven lakes of different sizes are said to have existed in Prussia five hundred years ago. The Spirding Lake, in East Prussia, is now merely a remnant of its former proportions. And there is no doubt that at the building of Elbing, in 1237, Lake Drausen reached its very walls, from which it is now five miles distant.

The preceding details show that the slow geological evolutions of recent centuries have sufficed to effect considerable change in the profile of the Prussian coastline. It was not until after the amber formation that the vast commotions and transformations of North and Central Europe ceased and the more peaceful order of things commenced.

Three periods of ordinary or stone-coal, of brown coal, and of submarine forests are distinguished in the world of fossil plants. The first of these, it is universally admitted, sprung from an excessively luxuriant vegetation flourishing originally on islands, which often emerged from and sank again into the ocean, covering themselves during each existence with an abundant vegetation. At that time, reckoned by Bischoff at a million years since, an equable and higher temperature prevailed over the whole earth, and hence the same plants of that period are found in the stone-coal seams of North America and Silesia, of Melville Island and England. During the long continuance of this epoch the general temperature of the earth's surface had decreased, and from the sea, which covered what is now the great plain extending westward from the Ural Mountains, there rose islands. These islands, like the earlier ones, also covered

themselves with a flora, which, in accordance with the changed conditions, was very different from that of the stone-coal period. The North European Lowland, when rising from the waves, became the domain of the brown coal formation, preserved in which rests an organic creation much more nearly related to the present creation than to that of the stone-coal period; nevertheless, it is an extinct creation, and belongs to the primeval world. This period, like others, is also of immeasurable length, consisting of many acts or ages separated from each other in time and space by the frequent recurrence of northern diluvial floods. The formation of amber belongs to one of the intermediate ages of the brown coal formation. The investigation and exposition of amber's organic remains are, therefore, of essential importance in the study of this particular period of the world's history. Finally, the sunken submarine forests, several of which have been noticed in Northern Europe—for instance, on the coasts of Lincolnshire and Brittany, near the Isle of Man, and near Schleswig—are of later date than the brown coal, and form the transition to the existing flora, from which they show but few deviations, while in places their trees completely agree with those still growing on the neighbouring coasts.

Out of the ocean just mentioned, and in the region of the present Samland, land emerged in insular form, or as a mass of continent. It grew in extent, and, favoured by the mild sea climate, covered itself with vegetation and the forests which were the birthplace of amber. In these forests certain trees poured forth their amber resin in such vast quantities that the soil on which they grew seems still to be filled with it. The north-western limit of the former islands or continent producing the amber-tree stretched beyond the present north-west point of Samland. The centre of these primeval forests Berendt is inclined to place near and above the extreme north-west point of Samland, about latitude 55 deg. and longitude 19 to 20 deg. east of Greenwich. Amongst other reasons for coming to such a conclusion he cites the well-known fact that, of all the Baltic shores, the west of Samland and the north coast of the Frische Nehrung, the parts lying nearest the point he fixes upon, supply amber in the greatest abundance and have always

done so. He points out also that in this region storms from the north-west for Samland and from the north-east for the Frische Nehrung, bring in the amber from the sea in the largest quantities.

It is natural that amber as a marine upcast should decrease in proportion as the coast recedes from the richest point. The coast of Sweden possesses but little, which is found chiefly near the towns of Skanör and Falsterbo.*

Beyond Brüsterort we see that the northern strand of Samland receives very little, whilst the Kurische Nehrung receives still less. The quantities in Kurland are so small that although amber is the property of the Crown it may be gathered there by anyone who chooses. The farther north we advance along the shores the less we meet. Turning in the opposite direction, south-west, from the rich point near Brüsterort, we find amber in abundance on the coast of the Frische Nehrung, though it visibly decreases beyond Danzig, and is still scarcer in Pomerania. The trace gradually grows indistinct beyond Rügen on the north coast of Denmark, but it reappears on the west. The best amber region of Denmark is on the west coast, extending from the Gulf of Nissum to the southern point of the Island of Fanö. This district yields a moderate amount, and in some years amber of the value of about £40 has been got on a stretch of two Danish miles. Further south the Hitzbank is the richest locality. Beyond Hitzbank the signs of amber slowly disappear until they are entirely lost on the Belgian shores, only to appear again on the west of France. The east coast of England, mainly that of Suffolk, also yields amber; the quantity is, of course, too small for exportation, but it was probably known and employed in England in the most ancient times. In the Thames, pieces as big as the fist have been discovered, bearing visible signs of friction against sand during their transport by the sea.

Inland also the quantity declines with the increase of the distance from the starting point. But neither Prussia's southern provinces nor contiguous countries are absolutely wanting in amber, and even in remoter regions

* Hjalmar Stolpe, in the Report of the International Congress on Prehistoric Archæology, Stockholm, 1874.

rich discoveries have been made on rare occasions. Bock (1767) records that in his time there was scarcely a village in the fields of which amber was not found; whilst Aycke (1835) informs us that there are even near the coast considerable tracts in which we see no trace of amber. In Samland amber in huge quantities is found on the sea level, 30 feet above it and from 70 to 140 feet below it. In the Pomeranian plateau it occurs 2 feet above the sea level, from 200 to 300 feet above it, or even higher, and also 50 feet below it. In the forest soil at Weichselmünde amber is either on a level with the surface of the sea, or from 5 to 10 feet lower. When some years ago the sides of the high road at Kowal, five English miles from Danzig, were planted with trees, a deposit of amber was revealed two feet under the surface. Explorations were made, and the owner of an adjacent field a hundred paces from the spot found at a depth of 30 feet sufficient amber "to pay off the debt on his property"—whatever that may mean. Similar good fortune is not rare in the neighbourhood, on which account diggings, more or less successful, are undertaken every year in the fields of many villages near. Hartmann, writing in 1677, tells us that occasionally pieces of amber were drawn up in fishing nets, not only from the sea but from inland rivers, ponds and lakes, sometimes from a depth of 80 feet. It happened at times that the amber pieces were more numerous than the fishes caught. Amber has also been noticed in wells; and there was once a famous amber-yielding spring at Bartenstein. The River Radaune, flowing over a plateau rich in amber, loosens and carries down lumps of that substance. Most of the Radaune water passes through the canal from Praust to Danzig, and this canal once a year is cleared of the sand which accumulates in it. To facilitate the work the stream of the river is diverted into its old bed, which, when the stream again leaves it, is eagerly examined by children in search of amber. Along with the sand many pieces of amber are shovelled out in cleaning the canal, but they are seldom of large size.

The amber tract, in the Pomeranian plateau, is from 30 to 40 miles long, and in many places more than five miles broad. For over a hundred years it has yielded rich treasures of amber. It runs from the Stargard and

Dirschau district into the Danzig district, and passing from here through the fields and meadows of the villages Gischkau, Belkau, Löblau, Bankau, Kowal, Wonneberg, Nenkau, Schüddelhau, Karczemhen, Kokosen, Leesen, Czappeln, Mattern, Bissau, Pempau, it gradually vanishes beyond Bernadowo. Berendt regards this circle as the richest in amber to be found inland. In the immense strata of fine white or yellow sand, found to the east of the Oder, in Pomerania, amber lies in large quantities. Nine thousand thalers' worth was extracted at Rohr in one winter, while Treten produced twelve thousand thalers' worth. The shaft was sunk to a depth of 90 feet in one very rich deposit. Widening the range we find it, much more thinly distributed, in Lithuania, Poland, Silesia, Lusatia, and Saxony, The Mark, Mecklenburg, and Holstein. But in all these places valuable discoveries have in recent times been made. In South Germany, France, Spain, and Upper Italy amber is not absolutely lacking. Pieces have been found near Bologna; and in 1874, a piece of exceptional beauty turned up at Campaolo, near Mercato Saraceno in the province of Forli, and not far from Cesena. Such a discovery was very noticeable in a locality where the presence of amber had never been suspected. Some years ago amber was found in a coal mine at Ischl, in Upper Austria. According to Runge, the oldest stratum in which amber is encountered is the Segeberg gypsum. "It occurs," he says, "in small quantities, yellowish-white or yellow in colour, and mixed with boracites; the gypsum itself belonging to the trias formation. Of more recent origin is the amber appearing in Westphalia, in the lower oolithical formation. Mention is made from time to time of amber in the chalk formation. In pitch-coal, not far from Richenburg, Germany, it has also been seen; and at various places in the same country, in the greensand formation, lying under the coal strata." Sicilian amber has been met with at Asaro, Centorbi, Leonforte, S. Filippo, Girgenti, Terranova, Spaccaforno, Scicli, Ragusa, Castrogiovanni, and Caltascibetta; in the last mentioned place it rests in a brownish-grey, loose sandstone, in contact with small pieces of quartz, similar to peas in size, along with clay, and wood resembling lignite. From these strata, that rightly or wrongly have been supposed to belong to the chalk formation, the

Giarretta or St. Paul's River carries off the amber into the sea, by which it is thrown back upon the coast of Catania, near the river's mouth. Ferrara (1805) mentions 82 varieties of Sicilian amber, but he distinguishes not only shades of colours but also pieces containing insects, flowers and other things. All the different hues of amber, from black to white, are met with in Sicily. "Amber is encountered in France," continues Runge, "in grey schistose-clay in some spots; at others it is in coal, while at Saissons and at Homblières, near Saint-Quentin, it is found in a pyritiferous layer, a yard and a-half thick. For the last hundred years it has been obtained at Trabenières, in Hainault, where it lies in a fine, grey, firm clay, containing fossil coniferous wood and gypsum crystals. This amber, which is reddish orange in colour, possesses the characteristic odour and is chiefly used as fumigating or incense powder. In the Magothy river, near Cape Sable, in North America, and in the Anne Arundel district of the Maryland State, amber is met with in pieces, yellow, grey, or brown in colour, with beautiful agate-like or jasper-like aspects and concentric lines; or in friable porous fragments. When it is burned it emits the true scent of the Prussian amber. It lies in or above lignite strata, and in contact with fossil wood, which itself contains amber. At Mizun, in the direction of the Lutta, amber of a yellow or green colour frequently presents itself in marly sandstone strata. Galicia, in the Austrian Empire, contains amber, intermingled with sea-shells. In Bukowina, south-east of Galicia, detached masses of amber having the imprint of reeds upon them figure by the side of fragments of bituminous wood. In other parts of Galicia amber has been dug from what is called Carpathian sandstone. In the forest of Klobouk, in Moravia, amber appears in the ferruginous Carpathian sandstone, belonging to the chalk formation, according to some geologists. At Santiago, in San Domingo, in the valley of the brook Acagua amber pieces, some as large as the egg of a goose, reward the explorer. The Acagua brook carries away the amber from hills of marl, which is rich in petrifactions, and bears a near resemblance to the miocene clay of the Vienna basin. In the neighbourhood of the village Kaltschedanskoi, in Siberia, a stratum of alum earth covered by sandstone contains a mass of

lignite, of ferruginous flints and of amber. Amber has also a resting place, which few are bold or diligent enough to disturb, in the black tertiary coal strata, near the River Tizil, in Kamtschatka."

The Academy of Sciences, St. Petersburg, possesses pieces of amber said to have come from beyond Turukhansk; and Ruprecht and Sawelief found bituminous wood and yellow amber on the northern coast of the Kanin Island, as well as on the shores of the Polar Sea generally. Howorth mentions* that amber is largely used among the wandering tribes of Mongolia; it is procured from Borneo through the Chinese, who from very ancient times have traded with that island. Amber is likewise reported to have been met with in China and in other parts of the globe, but speaking generally substances having the appearance of amber, found in warm countries, the East Indies, Brazil, Africa and Madagascar, have turned out to be copal, or a resin resembling amber, and which frequently can only be distinguished from the true article by burning. Captain Hannay records, in the Journal of the Asiatic Society of Bengal, in 1837, that he saw amber diggings in the Húkong valley, Burmah. "The whole country," he says, "presents a succession of small hills, the soil whereof consists of reddish or yellowish clay. The freshly dug earth has a very agreeable scent. The diggings are from 6 to 15 feet deep. Amber is found in large quantities. The deeper the digging the better the amber. The variety most esteemed, which is of a brilliant pale yellow, can only be found, it is stated, at a depth of 40 feet. As in Prussian diggings, the amber is only found in small veins, which do not extend far, or in irregular, scattered clumps." One is inclined to suspect from these closing words that Captain Hannay's ideas of Prussian amber diggings were not formed from personal inspection.

After leaving behind such opulent traces of former existence the amber forests have vanished; not one remains on the face of the globe. The trees have not only disappeared, but beyond the amber itself they have left no substantial indications of their former presence on the earth. It is true that in the blue earth

* Report of Prehistoric Archæology Congress, Stockholm, 1874.

of Samland we find with the amber ligneous remains, but they are merely chips and small boughs; no trunk of any size has yet been discovered. These fragments, which bear visible signs of having been borne along by the water, are such as lie about in every forest; that they belong to the amber forests is indubitable, for among them may be seen small boughs of the amber tree, entirely filled with the resin. In connection with all geological strata, we find accumulated the remains of the corresponding vegetation, and why should we not find the remains of the amber forests? The few particles that are found do not in the remotest degree represent the mass of wood they must have possessed in order to produce the quantities of resin we know to exist in the form of amber. Runge has estimated that the forests yielded 100 million hundredweights of resin; a mass that would make a cube of which each side would measure about 531 feet. At present no satisfactory reason is forthcoming to explain the entire absence of substantial remains of these immense forests. A possible theory is that of Agassiz, who suggests that the sudden advent of an ice period annihilated all organisms with a single stroke.

The origin of amber veins has been the object of much interesting investigation. A general opinion is that the veins and masses of amber are a coast formation and not primitive deposits in the soil in which the amber trees grew. Of this view, which there can be no doubt is correct, a very interesting explanation is given by Berendt. After a northern storm, he says, we may see on the South Baltic shores a dark brown marine deposit, stretching in a long line as far as the eye can reach. This mass is left at the furthest point reached by the waves, and distributed in unequal bulk, sometimes as much as two feet thick, according to the wind prevailing and the form of the strand. It consists of many sea growths, some of them extinct, all chaotically mixed together. Intermingled with the heap are amber pieces, and sometimes other resinous lumps and sea-shells. Winds from another direction either cover the long line with sand or scatter it, so that within a short time the whole accumulation disappears. In the days when the amber was deposited, the sea-streams from the north dislodged remains from the amber islands

they had inundated, and, sweeping it southward upon the emerging mainland, built up stratum after stratum of vegetable matter mixed with amber, exactly in the same fashion as is revealed to us in a much smaller degree at the present day. The girdle would stay in the same position until the waves from another direction tore it in many places, dislodging and sweeping on the upcast material from one region to another, leaving sometimes two or more parallel lines, or piling them one above another with layers of sand between; fashioning, in short, the very formations which in our own days the amber veins and nests present. The veins are no more than the former border lines of land and sea, and the nests, or detached masses of amber, are but cavities and sheltered spots in the ancient shores, into which accident gathered the marine refuse. If human hands were no longer to gather the amber of the Baltic, the layers would go on forming exactly as they did ages ago.

In the course of many thousands of years the retreating sea built up the amber. The shattered trunks and the larger amber clumps lying near them in the soil of the inundated forest would be the first to be torn away, which explains the finding of the most valuable pieces chiefly in the deepest strata. On the gradual rising of the continent, the sand and clay, heaped up irregularly, grew higher and higher, and ultimately became covered with vegetation and forests. The accumulations being cut off from the air, and perhaps brought into contact with water by further inundations—for repeated sinkings and upheavals of the soil are not improbable during so long a period—there necessarily followed the transformation of all woody fragments and of all vegetable matter, except the immutable resin, into brown coal, and through gradual decay into bituminous earth. Both substances are joyful signs to the amber seeker, and often lead the way to rich veins.

It will be noticed that the formation of amber and its distribution are events of two very different periods. The formation begins with the appearance from the sea of the island group, assuming the land to have been in the shape of islands, embracing the whole time of duration of the amber forests; whilst the distribution does not start until the final destruction of the amber trees, and lasts in a

diminished degree to the present day. We must bear in mind, therefore, that the strata containing amber belong to the time of amber's submergence, and consequently are of later date than its formation.

Johann Christian Aycke, whose investigations were published in 1835, made a minute examination into the origin of amber. He was of opinion that the amber trees, subsequently named by Göppert the *Pinus Succinifera* or *Pinites Succinifer*, must have been in a diseased condition to exude the resin in such excessive quantities. From observations he made, it would appear that sometimes portions of the solid wood became entirely transformed and issued forth as amber fluid. The white, opaque amber and the transparent amber appear often in one piece, either in layers with definite limits, or each passing into each after the manner of an incomplete mixture of clear and muddy water. Aycke pointed out that both kinds must have been poured forth by the tree at the same time and from the same aperture. The resin issued in varying conditions of consistency, as is shown by the different shapes. The so-called "petrified pins" are especially interesting, so far as their shape is concerned. They were formed from long tough threads of the resin, and were retained in their original shape by a subsequent flow pouring over and enclosing them. These pins must have been produced by a viscous fluid thicker than that, for instance, into the centre of which small insects such as midges, water moths, ants, termites and spiders were able to work their way after being entrapped. The liquid resin would no doubt often come into contact with leaves lying upon the ground, though specimens bearing the impression of leaves are comparatively rare. It is obvious that delicate external impressions would soon be obliterated by friction against the sand of the sea during the immersion of amber, and innumerable specimens must have been destroyed in this way.

The scientific study of the zoology and botany of amber has only been commenced within the last fifty or sixty years, but already the history of the substance has been much enriched thereby. Berendt, Menge, Germar, Loew, Hagen and Zaddach have distinguished themselves by their studies of the amber fauna. Zaddach has told us that the amber forest was inhabited by

creatures possessing the forms of the existing animal world. Sometimes, however, the remains found in amber point to animals different in species and often in genus from those now living. Occasionally in one individual are combined the characteristics of various families and orders of animals at present existing; and such individuals, therefore, exhibit a form from which two different orders have been developed in the later evolution of the animal world—a circumstance often noticed in dealing with the living forms of an earlier period. This is the case with a small insect which, by the structure of its feelers, feet and mouth, belongs to the neuroptera, whilst the scaly covering of the fore-wings reveals affinity with butterflies. In the amber fauna we meet larvae, caterpillars, bees, ants, flies, chafers, earwigs, galley-worms, spiders, myriapods, small crustaceans, small butterflies, land snails and others. Altogether over a thousand species, and some hundreds of genera have already been described or mentioned.

As early as 1830, Berendt had recognised many plants from particles preserved in amber, of which he had collected, polished and examined over two thousand pieces containing animal and vegetable remains. In 1845, Göppert became associated with Berendt in his investigations. Menge had made a rich collection of vegetable remains in amber, and defined 163 species, which Göppert, in his celebrated notice in the Monthly Reports of the Berlin Academy, 1853, distributed into 24 families and 64 genera. The portions of plants most generally preserved are those which fell off at regular periods of the year, or which were easily torn off by the wind and scattered about the forest. Such were the acicular leaves of the conifers, blossom catkins with their stalks, small remnants of boughs, leaves, flowers, filaments, anthers, ramenta, and similar particles, from which all deductions in regard to the flora of the amber forest have to be drawn. Amongst other trees and plants included in this flora have been recognised the beech, the birch, the alder, the hornbeam, the poplar, the oak, the willow, the fir, the pine, the cypress, the thuja *(Thuja Occidentalis)*, a chestnut, the acacia, the camphor tree, lichens, water-liverworts *(Jungermanniæ)*, many kinds of fungus, foliaceous mosses, both such as are found on trees and such as grow on the

ground in shady places; the fern, the common bilberry, many heaths, some pyrolæ, the great mullein *(Verbascum Thapsus)*, honeysuckles and plants akin to *Caprifoliacæ*. The most common tree of the amber forest, however, appears to have been a thuja, corresponding to our *Thuja Occidentalis*.

II.

IN the English Bible the allusions to amber occur in the Book of the Prophet Ezekiel. It is generally believed by Biblical critics and commentators that the Hebrew word *chashmal* in the original relates not to amber but to a metal. In the thirtieth chapter of Exodus there is the record of a command given to Moses for the making of a perfume, "a confection after the art of the apothecary, tempered together, pure and holy." The ingredients are given in detail in the thirty-fourth verse, and it has been questioned whether or not amber was intended by the "pure frankincense" that was to be mixed with the "sweet spice." There are several other suggestions of a similar nature. An attempt, worth recording for its singularity, has been made to bring the amber land into connection with the Bible. Proof, so called, has been brought forth intended to show that the Land of Havilah was no other than Samland, and that the river Pison was the Baltic; that Paradise was in Samland, and above all that the Tree of Life was the amber-yielding tree. Those who care for curiosities of literature will find ample material for the gratification of their taste in Johann Gottfried Hasse's book, entitled *Prussia's Claims, as the Amber Land, to be the Paradise of the Ancients, and the Earliest Home of the Human Race.*

Amber not infrequently figures in the works of ancient classical writers. The oldest allusions occur in the *Odyssey*, in which *Electron*, the Greek name of amber, is found three times. The word *Electron* was also used for a mixture of gold and a small portion of silver, but the evidence is in favour of the belief that it is employed in the *Odyssey* for amber. The first passage (Book iv. 73), is in the description of

the palace of Menelaus, which is said to be ornamented with the brilliancy of copper, of gold and *electron*, and silver and ivory. Considering that the metallic *electron* was a compound of gold and silver, the enumeration of it as distinct from gold and silver would seem superfluous. The supposition that amber is intended is maintained too by the very natural contrast of gold and amber, and silver and ivory. In each of the two other places where it appears (Book xv. 460 and Book xviii. 295) mention is made of a gold necklace bound, or held together with *ambers*, the plural, which alone is almost sufficient to prove that amber *beads* are meant.* The Greek *electron* was also used for gold, and with this signification it appears in Sophocles' tragedy *Antigone*, in which the tyrant Creon declares that all the Sardinian *electron* would not tempt him to give up the body of Polynices for burial. The *electron* here mentioned was the gold that according to the testimony of the ancients was found in the river Pactolus, and which was the chief source of the wealth of Crœsus, whose name has passed into a proverb. In Hesiod's description of the shield of Hercules (v. 141), *electron* is mentioned as a component. Amber would, of course, be useless for defensive purposes, and we might be tempted to give the preference to the metal in this case, if other things were not described, as forming portion of the shield, that are neither harder nor stronger than amber. Consequently, amber is here also the most natural interpretation. Herodotus† has a casual reference to amber. He says: "Of the extreme tracts of Europe, towards the west, I cannot speak with any certainty; for I do not allow that there is any river, to which the barbarians give the name of Eridanus, emptying itself into the Northern Sea, whence (as the tale goes) amber is procured; nor do I know of any islands called the Cassiterides (Tin Islands), whence the tin comes which we use. For, in the first place, the name Eridanus is manifestly not a barbarian word at all, but a Greek name, invented by some poet or other; and, secondly, though I have taken vast pains, I have never been able to get the assurance from an eye-witness that there is any

* Smith's Dictionary of Greek and Roman Antiquities, art. *Electrum*.
† iii., 115.

sea on the further side of Europe. Nevertheless, tin and amber do certainly come to us from the ends of the earth." Even from this short passage we can see that "the father of history" was not given to putting implicit faith in every tale he heard, though his reputation would probably have lost little by his admitting the existence of the Scilly Isles (Cassiterides). With regard to the Eridanus, the existence of which Herodotus also questioned, Dr. George Rawlinson points out that the name still lingers in the Radaune, the small stream which washes the west side of the town of Danzig. Much doubt exists as to what river the name Eridanus was originally applied to by the Greeks. The most probable theory is that the name was given to a great river somewhere in the north of Europe, on the shores of which amber was produced, and of which some vague report had reached the Greeks through the traders who brought the amber to the shores of the Adriatic. In later times the name Eridanus was also given to the Po, in the north of Italy, probably from the idea that as the amber was shipped from Adria, at the mouth of the Po, that must also have been the spot where it was found. It is stated by Aristotle and Hippias that the force of attraction and even a soul were attributed to the magnet and to amber by Thales, who was apparently acquainted with the electrical qualities of amber in the sixth century before Christ. Aristotle himself, drawing his conclusion from the insects found in it, recognised that it must originally have been in a fluid state.

There are also allusions to amber in the fourth book of the *Meteorologica* of Aristotle, in the *Timæus* of Plato, in the fifth book of Diodorus Siculus (who relates the fable of Phaëthon's Sisters), in the treatise of Theophrastus on *Stones*, in the first book of the *Materia Medica* of Dioscorides, and in a host of other Greek writings, most of which are cited by Pliny. The remarkable fable of the Sisters of Phaëthon, invented by the Greeks, we find at some length in the second book of the *Metamorphoses* of Ovid. Phaëthon, the son of Phœbus (the sun-god) and the beautiful Clymene of Libya, entreated his father to be entrusted for a day with the guidance of the sun-chariot. He started on his course, but he could not restrain the wild sun-horses; soon he utterly lost control of them, and

coming too near Tellus, the earth, set her on fire. The Earth passionately implored Jupiter not to let her be burned; Jupiter killed Phaëthon with a thunderbolt, and his body fell into the Padus (Po). The naïades of the river buried the corpse on the bank upon which it had been thrown by the stream. Clymene and the Heliads (the three sisters of Phaëthon) found the grave, over which they ceaselessly wept, unable to tear themselves away. At last the sisters took root in the ground, bark rapidly covered their bodies, their arms became boughs, and their hair leaves, and they were entirely changed into trees. Still the tears continued to flow, and these, hardened by the sun, became amber, with which women love to adorn themselves.* A somewhat similar legend is told by Sophocles, but instead of Phaëthon's sisters we have the mythical hero Meleager. This story is referred to by Moore, in *Lalla Rookh*, and Pliny in his *Natural History* alludes to it, and indulges in a little criticism on its merits. Pliny† discusses amber more fully than any other ancient writer, and freely cites the theories and speculations of many who went before him.

Virgil has a passing reference to amber in the *Bucolics* (viii.) Much more interesting, however, are the allusions in the following epigrams of Martial, all of which deal with enclosures in amber:

(Book vi. xv.)

"An ant beneath a poplar found,
An amber tear has covered round;
So she that was in life despised,
In death preserved, is highly prized."

(Book iv. xxxii.)

"In the bright tear Phaethon's sisters shed
A bee is seen, as in its nectar, dead.
Its many toils have earned a guerdon high,
For such a tomb a bee might wish to die."

(Book iv. lix.)

"On weeping poplar boughs a viper crawls,
An amber drop upon the reptile falls,
Amazed she feels the gummy chains around,
But in their hardening mass she's safely bound.
Her royal tomb Cleopatra need not prize,
For in a nobler one a viper lies."

* This is the ancient story the artist has represented in the frontispiece.

† Natural History, Book xxxvii., Chapters 11, 12 and 13.

Some doubts have arisen as to whether Martial in the last instance has not mistaken a lump of copal for amber; and the same doubt has been expressed with regard to the amber containing lizards, mentioned by Pliny. However, it is possible that the substance really was amber, for numerous pieces have been found quite large enough to hold these creatures. Nowadays the special value possessed by pieces containing fragments of plants, insects, and other relics of past ages, has suggested to fraudulent individuals the manufacture of imitations. Sometimes the imitation has been carried too far, and fishes which could not possibly find their way into amber in a natural manner have been enclosed. In making these spurious specimens the fish, or whatever else is chosen, is placed into a piece of amber hollowed out for the purpose, and the crevices are filled up with mastic, a species of gum resin yielded by the Mastic or Lentisk tree of Morocco. A second and exactly similar piece of amber is procured and shaped to fit on the aperture of the first piece; the two are then moistened with caustic, and when warm they are pressed closely together. The whole is often marked with furrows and lacings to hide its real character, but the deception is readily exposed by an immersion in boiling water or in spirits of wine, either of which causes the two pieces to fall asunder.

Many different opinions are held as to which was the country to yield the amber used by the ancients. Some refuse to believe that Prussia was the land, and maintain that the Greeks and Romans were acquainted with Sicilian amber. In Tacitus there is a paragraph which clearly shows that in the time of the writer the amber employed by the Romans came from Prussia (*Germania*, chap 45).

III.

WITH the exception of metals and ivory, there is no article of commerce of which the history can be traced so far back as that of amber. It was the search for tin and amber that, at a very remote period, first brought the ancients into the wilder regions of the west and north of Europe. A thousand years before Christ the Phœnicians

were not only acquainted with amber, but they were already trading in it. To the Greeks it was known many centuries before the Christian era, as is manifest from the allusions in their earliest writers.

It is possible that amber was known to the Romans in the time of the kings. Early in the present century, on Monte Crescentio, near Marino, and under a volcanic rock, varying from 40 to 60 inches in thickness, were found a number of terra cotta urns of inferior quality, surrounded by yellow volcanic ashes. In each urn was the model of a peculiarly formed dwelling-hut, also of rough terra cotta, and in each model were the remains of charred human bones. Amber and bronze articles, as well as various vessels, lay about the huts within the urns.

It is still a matter of controversy whether the ancients obtained their amber from the shores of the Baltic, the shores of the North Sea, or from Sicily. Of all these we may say at once that Sicily is the most improbable. In the whole of the literature of antiquity there is not a single passage which suggests that the ancients were acquainted with Sicilian amber. We find it mentioned for the first time by Carrera in 1639, and he was followed by Gassendo, Campanella and Mongitore. Boccone in 1684, and Sendelius in 1762, speak of Sicilian amber, and the latter cites Sicily as the only region of Italy producing it. From that time we find no further mention of Sicilian amber, until 1805, when Ferrara's very complete work was published. Although there is such a great lack of evidence that the amber of Sicily was known to the ancients, it certainly seems strange that it should have escaped their notice, since it is produced in large quantities, especially in the neighbourhood of Catania. It has been held that the North Sea was the only source known to the ancients, but this theory is sufficiently refuted by the discoveries of Greek and Roman coins in Samland. Pliny in his *Natural History* tells us that the Greek traveller Pytheas (fourth century B.C.) said the Goths, who inhabited the coasts and islands of the Southern Baltic, traded in amber, which was gathered on an island distant from them a day's sail. From the proofs collected by Nilsson, many are of opinion that the presence of the Phœnicians in Scandinavia and the Baltic, and, consequently, their sea traffic in amber is fully

demonstrated. Other authorities, however, explain the presence in Scandinavia of objects of Asiatic art in another fashion. Lenormant,* for instance, says that amber was carried by caravans across Germany, and in return objects of Asiatic—in later times of Etruscan—art, were dispersed throughout Germany and Scandinavia by the same means, where they exercised a great influence on the infant art of the natives.

There is little doubt that the great bulk of the amber used by the ancients was carried overland to the south by the traders of Etruria. The Etruscans were most probably acquainted with amber (perhaps through the Phœnicians) before we have any knowledge of their obtaining it directly from the north. It is found wrought even in the oldest tombs of the ancient Etruscan city, Caere, now known as Cerveteri. As far back as the seventh century B.C., it was perhaps chiefly through Etruscan channels that the Greeks obtained it.

The latest investigations of the early trade between the north and south of Europe are contained in Genthe's work, *The Etruscan Barter Trade*, and Sadowski's Polish book, *Commercial Routes of the Greeks and Romans.* These two books were published about the same time, and it is a singular fact that both authors, writing simultaneously and unknown to each other, have arrived at practically the same conclusions from different methods of working. Genthe, who chiefly relies upon antiquities which have been recovered from graves, traces three important routes by which the productions of Italian industry were carried to the north to be exchanged for the precious amber. Commencing at Hatria, (Adria) on the Adriatic coast, the first route led over the Alps into Switzerland; another route, starting at the same point, passed up the Adige Valley by Verona, Trient, Botzen to Hallstadt; and the third ran from Hatria by Cilli, Marburg and Grätz to Carnuntum,† all in the Austrian Empire. Beyond the Danube, Genthe does not venture, but here in the remoter east, between the Oder and the Niemen and Dnieper, Sadowski is at home. He traces

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* Ancient History of the East.

† Carnuntum is usually identified with the modern Haimburg, a town on the Danube, about 27 miles E.S.E. of Vienna.

routes, from Hallstadt to Königsberg, from Hallstadt to Danzig, and from Carnuntum to Königsberg. The Danzig route runs over the ford* of the Sazawa river by Glatz,† Schweidnitz, Glogau on the Oder, Priment, across the Obra to Gostyn, over the Warthe at Schrimm, and over the Netze at Czarnikau ‡ to Danzig. A branch road leads from this route at Glatz, passing over the Oder at Dyhernfurt, and by Herrnstadt to meet the main road again at Gostyn. The Königsberg route takes the same line as the last as far as Glatz; from here it runs by Dyhernfurt, Massel, Kalisz, over the Warthe at Kolo, across the Vistula, by Konojady, over the little river Ossa, a tributary of the Vistula, and by Elbing, Braunsberg and Königsberg to the amber coast. From the Danzig road, just above Schrimm, a branch runs to the Königsberg road; it passes between two small lakes at Znin, crosses the Netze at Tur, and the Brahe near its embouchure into the Vistula, and finally over the last-mentioned river to meet the Königsberg route at the Ossa ford. The road from Carnuntum runs by Römerstadt § over the Vistula at Cracow and again at Warsaw, across the Bug, and the Narew, turning abruptly north-west at Lyck to Königsberg. In support of the theory that these routes once formed the great commercial highways between north and south, may be cited the numerous discoveries of articles of ancient art made upon them. Such discoveries have been made, for instance, in Bohemia, at Schweidnitz, Hirschberg and Priment, near Nimptsch, and at Massel, Braunsberg, Konojady, and many other places. The articles brought to light were certainly not made in the countries in which they were found, but must have journeyed thither at some period from the civilised south.

Genthe is inclined to regard it as demonstrated, that the Germans first entered into relations with the Italians by the ancient Rhine route, from which amber travelled through Switzerland and over the Alps to the Etruscans and to the Massiliots, the Phœnician inhabitants of Massilia, the present Marseilles. By following the valley of the Rhine, the Germans reached the frontiers of the

* At the Budorgis of Ptolemy. † The ancient Stragona.

‡ The ancient Limiosaleum.

§ The Carrhodunum of Old Germany.

Helvetians; but that the amber trade followed that valley only as far as the mouth of the Aar, is shown by the rare occurrence of amber ornaments in the graves along Lake Constance, as well as by the frequent discovery of Etruscan bronzes in the Aar valley. The route ran along the valley of the Aar, by the channels of international communication, from Lake Bienne and Lake Neufchatel, to the Geneva Lake and the valley of the Rhône, and from here over the Alps into Italy. The importance of this route is eclipsed by the others which have been named. Genthe himself surmises that it was only the amber of the North Sea coasts that first went southwards by the Rhine and Aar route, though considering it probable the Baltic amber was borne along the same paths at a very early time.

We have seen that the great commercial roads all led to Hatria, whence the much prized amber took its departure with other Etruscan wares for Athens. In the earliest days amber was not carried direct by Etruscan mariners to Athens, nor was it fetched by the Athenians themselves from Hatria. Genthe suggests that probably in this case, as in other instances of the interchange of northern products, Tarentum was the entrepôt. At a somewhat later date direct voyages were made from Athens to the Adriatic Sea.

The substance *lyncurium* (also called *lugcourion*, *ligcourion* and *liggourion*), the existence of which Pliny refused to admit, was, without doubt, amber itself. From the statements of Theophrastus and others, however wide of the truth they may be as to particulars, it is evident that the Greeks obtained amber from Liguria. on the north-west coast of Italy, at a very early period. The trade most likely became depressed, and finally died out by reason of the more lucrative traffic carried on at Hatria.

There was still another trade route from the amber coast, running in a totally different direction from those which had their outlet at Hatria. At one time the Greeks and their colonies maintained a well-developed amber traffic on the Pontus Euxinus, or Black Sea. The direction taken by this commerce, which is marked by Greek and Roman discoveries, has been traced by Wiberg. Starting at the mouth of the Bug on the Black Sea, the

route followed the River Ingul, and afterwards the Dnieper, to the neighbourhood of Kiev. So far the chain of Greek discoveries is continuous. Higher up they are lacking, but we find Roman coins on the banks of the Pripet, which the traders were forced to navigate, in order to pass the morass of Pinsk-Rokitno. Thence the route led to the Upper Narew, and along the Angerapp and the Pregel valleys to Königsberg. The traffic along this route died out when the Greeks fell under the dominion of Rome, and when, after the formation of the Byzantine Empire, a new commerce sprung up on the north shores of the Black Sea, amber was deserted by fashion, and its place was occupied by furs and other products of northern regions.

In consequence of the great influx of amber into the valley of the Po, amber ornaments existed there in much greater numbers than in any other country of the old civilised world. The substance, which elsewhere held rank with gold, in this region sank to a very low level. In Pliny's time the women, north of the Po, wore, instead of collars of brass, necklaces of amber beads. Articles found in Etruscan and Celto-Etruscan tombs, belonging to the first and second centuries after Christ, give confirmation of the fact; and proofs of the abundance of amber extend as far as Ancona. Paul Boccone, the Italian botanist, in 1667, described some ancient sepulchres, near Ancona. The coffins were of stone, and in one were found strings of amber beads, some as large as hens' eggs, and in such numbers that "a bushel measure could have been filled with them." On this side of the Alps it is only Hallstadt, in Austria, which contains any very abundant traces of amber. There, however, it was manifestly so common as to be extensively used as an ornament by the peasantry. One string of beads was found nine feet in length, and containing four hundred pieces of amber of all forms and sizes, along with sixty blue and green glass pearls. The bronze articles found in the Hallstadt cemetery present the entire development of Etruscan art, from the Assyrian-Phœnician style to the Celto-Etruscan mixed forms, and show the whole duration of the commercial movement. In the Hallstadt tombs elaborately made Etruscan ornaments are numerous, and offer a complete contrast to those manufactured by

the barbarians themselves. In the numerous beads, discs, necklaces and other amber articles which have been found in the graves of the Stone and Bronze periods, a certain degree of skill in perforating, cutting and polishing is unmistakable; but nowhere do native artistic productions, whether found in the North Sea or Baltic coast districts, or in the middle of Europe, show the incomparable accuracy and fineness in perforating and turning, and especially the precision in cutting, which are seen at Hallstadt in certain necklaces, and in the zigzag inlaying of hilts of ivory.

Amber ornaments found in graves in Great Britain are very similar to those found elsewhere in Europe. The beads of necklaces found in British graves are of exactly the same form as those found at Hallstadt. Jet necklaces of the same form have been met with in Britain, and as jet is a special product of the country, some have thought that the jet ornaments, and therefore also amber ornaments of a similar form, have been made at home. But it seems more likely that the inhabitants of our own country exchanged the rough jet for the same material wrought into ornamental shapes, in a manner similar to that of the natives of the amber coast with regard to amber.

Single beads were found in several of the Anglo-Saxon graves opened in Kent by the Rev. Bryan Faussett* towards the end of the last century. The supposed power of amber against witchcraft and evil spirits offers the most likely explanation of the use of these beads. Most of the tombs in which Faussett found amber, however, contained more than one bead, but in none of them were they found in large quantities—six and seven are the highest numbers he mentions. Many of these were apparently of home manufacture, being cut irregularly as if with a knife. The whole were in graves of women and children. In a tomb opened by Faussett at Sibertswold Down, near Sandwich, Kent, was found a silver ring, set with a piece of amber.

About thirty years ago, a Saxon cemetery was discovered at Sarr, in Kent, and in the tomb of a woman were found, along with other valuable relics, 140 beads,

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* *Inventorium Sepulchrale.*

of which 133 were of red amber. The number was unusually high. Further researches in the same cemetery revealed beads in great variety, but those made of amber were comparatively rare.

Towards the end of 1890, "an interesting discovery was made at Rome, in the course of excavating the foundations for the Palace of Justice in the ancient gardens of Domitian. Two sarcophagi were discovered, one of them being the tomb of a young bride, Crepereia Tryphaena by name, who is represented as asleep upon her funeral couch, at the foot of which stand a man and woman with faces expressive of their grief. In the coffin were the remains of the corpse, the head still covered with long and beautiful hair. Near the head of the dead girl was a finely carved oaken doll, with jointed limbs. Tryphaena had worn several rings, and on one of these is the word 'Filetus,' perhaps the name of her husband. Another of red jasper has engraved on it two clasped hands holding the stalk of some ears of wheat—an allusion, it is supposed, to the ceremony of marriage by *confarreatio*. Amongst other objects was an amber hairpin. A crown of myrtle leaves—still in good preservation—is supposed to have been the nuptial wreath of the young Roman damsel whose pathetic story is thus made public after so many centuries of oblivion. The tomb of Crepereia Tryphaena has been placed in the Museo Capitolino. English antiquaries will be reminded of the young Romano-British girl whose bright tresses are still to be seen in the York Museum. The Roman 'find' is, however, much more important archæologically. The tomb is believed to belong to the age of the Antonines."

IV.

AFTER an existence of over a thousand years the amber trade between Italy and the Baltic began to droop, and finally died out entirely. Different reasons have been assigned for the fall of the traffic, but the migration of European nations, after the formation of the East Roman Empire, is generally regarded as the true cause.

Kohn, the German translator of Sadowski, suggests with some show of reason that it was fashion that inflicted on the trade the most serious injury, if not the actual death-blow. In the classical territory, at the time of Pliny, amber must have been exceedingly plentiful, or the country women, north of the Po, could not have replaced their bronze necklaces with strings of amber beads. The Celto-Etruscan graves of peasants, of the first and second centuries after Christ, offer some testimony in favour of this view, in the profuseness of amber ornaments they reveal. "What would become of the diamond trade," asks Kohn, "if the diamond fields were to pour forth their riches in such abundance that our village maidens could afford to deck their comely little persons with quantities of the brilliant stones?" The diamond trade would, undoubtedly, be destroyed in such a case. One fact must be borne in mind, in connection with such a theory of Kohn's, which may have some effect upon its worth. In a half-civilised country, the jewellery of the women often represents the savings of the household, and, consequently, the presence of large quantities of amber articles among the peasantry would not alone be sufficient to show that amber had lost its value. Further damage to the amber trade Kohn attributes to its transformation into direct traffic after it had existed as barter for centuries.

On their first appearance, the bright Roman coins may have been gladly accepted by the northern barbarians, but at a later period when the coins multiplied, and dishonest traders ascribed to them higher values than they possessed at home, they were less readily accepted by the amber finders.

After the decline of the northern traffic, the first we hear of amber is in connection with the Ostrogothic King, Theodoric the Great. On one occasion the Æstii, the inhabitants of what we now call Samland, sent a quantity of amber as a present to Theodoric, and the gift was acknowledged, as we learn from Cassiodorus. This incident would seem to have given Theodoric a special interest in amber, for we learn from Procopius that he sent a mission to the distant Baltic shores in quest of amber, and was fortunate enough to secure a piece weighing from seven to eight pounds.

From the time of Cassiodorus and Procopius amber disappears from view for centuries, and little is known either of the amber land or its inhabitants until the tenth century, when the latter make their appearance in history under the name of Borussians or Porussians. After Bishop Adalbert, of Prague, had been martyred in 997, by the Prussians, Boleslav, Duke of Poland, succeeded in making Christians of them at the point of the sword. Strenuous efforts were made by the Prussians to throw off Christianity and the Polish yoke, which, after many disappointments, they succeeded in doing in 1161. The fear of losing their freedom by the adoption of Christianity, caused the Prussians to resist every effort for their conversion. The inroads made by the pagan Prussians upon the lands of the neighbouring Christians, and their advance into Pomerania, induced Conrad, Duke of Masovia, to appeal to the Knights of the Teutonic Order, who willingly offered their services on condition of being allowed to keep possession of the territories they subdued. The Knights entered Prussia in 1230, and, after half a century of warfare, found themselves, in 1283, absolute masters of the country, which they had succeeded in converting by an almost complete extermination of the pagan inhabitants. During the struggle, the Knights founded the cities of Thorn, Kulm, and Marienwerder; and later, Memel and Königsberg. Ceaseless and unfortunate wars with Poland and internal decay of the Order, greatly accelerated its decline, and, in the days of their misfortune, the Knights began to oppress the subjects whom they had previously governed well. In 1454, the plundered cities, allying themselves with Poland, rose against their persecutors, and the Knights, reduced to their lowest state, were finally compelled to accept peace almost at any price. To aid them against their enemy, Poland, the Teutonic Order, in 1511, elected as their Grand-master the Markgraf Albert of Anspach and Baireuth, a kinsman of the King of Poland, and a scion of the Frankish line of the Hohenzollern family. His election had not the immediate beneficial results the Knights had desired, but, ultimately, it was fraught with undoubted advantages to the whole country. In 1525, the Grand-master became Duke of Prussia, and the constitution was changed from an ecclesiastical to a temporal

duchy. Albert proved a judicious ruler, and the people prospered in many ways under his direction. He died in 1568, at the age of 78, and was succeeded by his son-in-law, Johann Sigismund, Elector of Brandenburg; and since that time the Prussian throne has been occupied by the Hohenzollern-Brandenburg House.

During these stormy times in the amber region, amber itself gives but little evidence of its existence. In 1394, it figures in a Königsberg charter, in which the unlawful acquisition or possession of the precious substance is strictly prohibited. Kulm received more attention and formed the subject of certain charters over 600 years ago. It gave its name to the *Jus Culmense*, a code of laws in which there is reference to many kinds of mines and their products, though, what is somewhat surprising, amber is passed over unmentioned.

From the beginning of the fifteenth century, amber beads make a frequent appearance in wills. They were evidently held in high esteem, for a couple of them sometimes represent a legatee's sole benefit under a will. In fact, will-makers would appear to have had a weakness for dividing their amber beads into pairs before making them the subject of bequests. A certain John Baret, for instance, of Bury St. Edmunds, left by his will, made in 1463, a pair of amber beads to each of seven legatees, as well as to "eche yoman of household." The same testator bequeathed to the Abbot of Bury St. Edmunds, "for a tokne of remembraunce," his "bedys of white ambyr with the ring of silvir and ovir gilt longyng therto." "My lord Abbott of Bury St. Edmunds," figured again in 1504, in the will of Anne Barett, who gave him her "grete bedys of whyght ambyr." In earlier centuries amber was sometimes written "lambre," and in old wills we often find the word in that form. The will of Wm. Askme, made at York in 1389, contains a bequest of a "payr bedys of lawmbyr;" and Sir Brian Stapleton, whose will was proved in the same city in 1394, gives his "grandes paters nosters de l'awmbre" to his nephew.

The origin of amber has in all ages presented a problem exciting the deepest interest. In the remotest times, in the narratives of the Phœnicians, and in the myths with which the ancient poets so freely dealt, we see the resinous nature of amber recognised. The error

made by the ancients at first was in the selection of the black poplar as the amber tree; but Pliny got very near the truth when he represented the resin as flowing from a tree belonging to the pine family. Pliny cites many ancient writers who held to the resinous nature of amber. Aristotle ventured even to speak of petrified poplar gums. Naturally, among a poetic race, fanciful notions arose, and fiction dreamed of amber as the petrified semen of elephants, fishes, whales, dolphins, seals, and other animals. Pliny was inclined to poke fun at Sophocles for the fable he gives of the origin of amber, and wondered "how he could hope any one would credit such a story." But it is not probable that Sophocles either believed in it himself or expected his readers to do so. In any case, it is clear that the ancients were fully aware of amber's true origin, notwithstanding the fantastic stories met with in their literature. In the middle ages, however, the matter was different. Most writers rejected the old theory, and some even ventured to scoff at the imagined blindness of their predecessors. Some confusion seems to have existed in those days between amber and spermaceti, a waxy matter obtained from a cavity in the head of the whale, which was sometimes called white amber. The confusion may probably have arisen in the minds of those who believed that amber was a product of the same animal.

In the sixteenth century amber treatises began to issue from the press pretty rapidly. One of the earliest was from the pen of Simon Grunovius, a Dominican monk, though it was not published until 1677, when Philip Jacob Hartmann printed it in the form of an appendix to his own work on amber. Grunovius indulges in some rather fabulous speculations, but he also gives us a few details of dealings with amber in his own time, which are much more reliable. He tells us that the inhabitants of the amber coasts were obliged to fish for amber by task-masters appointed by the Government, and that one bushel of coarse salt for every bushel of amber collected was the gatherer's only remuneration, although the occupation was so hazardous, that it was no uncommon thing for the searchers to lose their lives by drowning. Amber poachers were remorselessly hanged, without delay, on the tree nearest the place of capture. Grunovius teaches

us something, too, of the commercial value of amber in his day. "Very pretty images," he remarks, "are carved from this stone,* which are held in high estimation. In the year 1520, I had to bring an affair at Rome before Pope Leo X. I could not obtain a signature to a petition which I had to present. I thereupon went to Cardinal John N., and made a present to him of a heart of gold-gleaming amber, a half-finger in length. In the bright sparkling amber was carved the image of John the Baptist as a child. The whole was valued by the Pope at 2000 florins, though it had cost in Prussia only ten vierdings." George Agricola, the learned mineralogist of the sixteenth century, was one of the scoffers at the ancients' theory of the origin of amber. "How can amber," he demands, "be derived from the trees, seeing that it is thrown forth from the sea? No trees grow in the sea." He took no trouble to prove the views of the ancients to be wrong, but boldly stated that no other refutation was needed than the simple statement that they were false. Summing up the variety of stories prevailing among the ancients, he remarks: "All these opinions contradict each other. Fortunately, they are all wrong!" His own theory is as follows: "Amber is fat and burns. It consists, therefore, either of sulphur or of bitumen. The latter supposition we are driven to accept by the following facts. The springs throw forth bitumen of various colours, white, yellow, reddish, black, dark purple-red, dark azure. By heating, amber is soon changed, partly into an oil of a peculiar colour, partly into a black bitumen, which, through rubbing, becomes purple-red, and is similar to the bitumen of Judea, so that it is not easy to distinguish it therefrom; partly into black ashes, and partly into a fine white matter, which has some likeness to salt."

With few exceptions, those who came after Agricola, shared his erroneous views. Among these were Andreas Aurifaber,† a professor of medicine at Königsberg, 1551; Sebastian Munster,‡ 1554; Johann Wigand,§ 1584; Sir

* The German name of amber is *Bernstein*, i.e., *ignitible stone*.

† *Kurzer gründlicher Bericht woher der Agtstein oder Börnstein komme, dass er kein Baumharz sey sondern ein Geschlecht des Bergwachs, und wie man jenen in Arzeneyen möge gebrauchen.*

‡ *Kosmographia Universalis.*

§ *Vera Historia de Succino Borussico*, written in 1584, though not published until 1690.

Thomas Browne,* 1646; and Philip Jacob Hartmann, in his *Succini Prussici Physica et Civilis Historia*, published in 1677, with the treatise of Grunovius as an appendix. Hartmann refuted many fables about amber, but he himself committed the blunder of adopting a ridiculous myth to explain its origin.

Amber was treated by many writers in the seventeenth and eighteenth centuries, but the question of its origin was still unsettled in the time of Linnæus, who endeavoured to prove its vegetable nature. Linnæus mentions that the substance is found on the English coast, chiefly in Suffolk. It was not until the last century that all doubt on the formation of amber was dispelled. Bock, in 1767, and Biörn, in 1808, classed amber as a pine or fir resin. The latter conjectured that at some time when the Baltic extended further south than at present, amber was carried to it by streams from the south. He imagined that there had been a conflagration of forests, and supposed that the home of the amber trees had been in the Carpathians or in the region of Poland and Posen. Schweigger's celebrated treatise on amber made its appearance in 1819. From the anatomy of the wood, between the layers of which amber is found, from the bough nodes and the visible year rings, Schweigger showed that the amber tree could not have belonged to the family of palms, as had often been supposed, but that it ought to be classed with the dicotyledons. He thought it probable that amber was the product of various trees, but was unable to determine their species, as the different kinds of wood had not been sufficiently examined. Forming his judgment on the animals and plants preserved in amber (though he mistook some pieces of copal for it), he believed that the climate of the amber period was warmer than the present climate of the same region, yet still not a tropical one. With the publication of the researches of Schweigger was finally solved the problem of the nature and origin of amber, the discussion of which, having been commenced by Aristotle and continued by Pliny, had existed over two thousand years.

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* *Pseudodoxia Epidemica, or Enquiries into Vulgar and Common Errors.*

V.

AMBER is encountered in very many parts of Europe, as we have already seen. Occasionally, in places of little repute as amber-yielding districts, the quantity obtained is large; but by far the greater portion of amber found in commerce is the product of the North Sea and the Baltic. The places of honour must be assigned to the west coasts of Denmark and Schleswig-Holstein, and the north coast of Prussia, from Stralsund to Memel. The former region, Runge tells us, yields three thousand pounds of splendid amber yearly. The amount has been variously stated, and by one authority it was placed as low as two thousand pounds. The latter region, however, is the great amber land of the world. Its most important portions are the Frische Nehrung, and the coast of Samland, from Pillau to Brüsterort, which from time immemorial have formed the amber domain. The supply of amber in these places is at times so abundant that, during one night in the autumn of 1862, 4000 pounds, worth 12,000 thalers, were obtained near Palmnicken and Nodems. Samland, which unfortunately is not marked in the majority of English atlases, forms the peninsula between the small inland seas, the Frische Haff and the Kurische Haff.

The Grand-masters of the Teutonic Order took possession of the amber fishery during their rule, and derived a large revenue from it. Subsequently, it became the monopoly of the Crown, and the amber was gathered under the superintendence of a permanent officer, who disposed of the proceeds by public auction; it was also his duty to keep a watch upon the coast, and any one caught gathering fragments on his own account was liable to capital punishment. Since the beginning of this century, the right of collecting amber has been let to contractors, who have the monopoly of the shore upon payment of an annual rent.

In the most important amber district (the Frische Haff and the coast to Brüsterort), the violent north-west winds are mainly instrumental in loosening the amber from the bottom of the sea, and sweeping it to the shore. The specific gravity of amber (1·07) is little greater than that of sea water (1·026), which makes it easily carried by

the waves, especially as it is mixed with a tangle of sea weeds. Experience shows that, in driving the amber upon particular points of the coast, less is due to the direction of the gale than to the direction of the wind that succeeds it. Accordingly, we find that special winds favour special parts of the coast, and the dwellers at one point of the shore sometimes, during an unfavourable breeze, have the dissatisfaction of seeing the amber at a short distance from them borne along to their neighbours.

The amber gatherers, however, by no means content themselves with that only which the waves throw upon the beach. One favourite mode of obtaining it is by fishing or scooping up the tangle as it floats along on the surface of the water. To this process the name of *Schöpfen* is given. The net is called *Käscher;* it is shaped like a butterfly net, and fastened at the end of a strong stick, or light pole about 20 feet long. Men, women and children are employed in the work. The men wade out as far as they can go, and with the aid of their nets gather the amber tangle as it is borne along by the surge; it is then thrown upon the beach where the women and children pick out the amber and arrange the pieces according to their size and value. This process goes on day and night throughout the year, for the amber fishers have to watch continually for a propitious moment. The most violent and most productive storms occur in November and December; and the occupation calls for hardy and vigorous men. Often the cold is severe, and at such times the men engaged in the work protect themselves with leathern cuirasses, which frequently before being put on and after being taken off have to be thawed by the fires kept up on the beach by the women. Sometimes in rough weather it is impossible to stand against the waves which break over the men's heads and carry them off their feet. On such occasions it is customary to form a line connected by a strong rope, after the manner of travellers on the Alps. It is also said by Runge that, at times when a billow is threatening, a man will firmly fix his fishing pole in the sand and nimbly climb it until the fury of the wave is spent.

The product of this special mode of amber gathering is subject to fluctuation. Two hundred years ago, Hartmann stated that when the fishing was favourable, from

twenty to thirty bushels could be got in three or four hours. A bushel of amber weighs about seventy pounds, and this special kind is worth in the average two and a half thalers a pound; so that on the lower calculation the yield would be fourteen hundred pounds of amber, worth three thousand five hundred thalers. Nowadays, such rich hauls are exceedingly rare, if they ever occur at all. Some shores remain unproductive for years, until suddenly a favourable wind blows supplies to them. This form of amber-gathering is the most ancient. It is mentioned by Tacitus, and from the earliest times it appears to have been practised without any change in this very simple *modus operandi*.

In places where large stones lie close to the beach, a different system has to be adopted, as the force of the waves is broken by the stones and the amber falls among them. The manner of getting in such places is named the *Bernsteinstecken*, and it is mentioned by Aurifaber (1551) and by Wigand (1584). The men engaged in this way put out in boats, each of which has four or five occupants. The work can only be carried on in a clear, calm sea, as the amber has to be fished up from the bottom, and a sharp and practised eye is needed to distinguish it even in the smoothest sea. One boatman loosens the amber with a particular sort of spear, while another holds his *Käscher*, or net, in readiness to catch it. The length of the *Käscher* poles and spear poles varies from ten to thirty feet. The iron spear head is a plate of iron, the shape of a half-moon, or triangle, three or four inches in length and the same in width. The net is six or eight inches in diameter. When large blocks of stone have to be moved to set the amber free, crooked forks with prongs, sometimes eighteen inches long and twelve inches apart, are employed. During operations the boat leans over, and the gunwale is brought nearly to the surface of the water.

In the vicinity of Brüsterort, a way differing somewhat from the last, is in vogue. It is known as *Steckerei*. A rich deposit of amber lies, at a depth varying from fifteen to thirty feet, on a tract three or four hundred paces wide and six hundred paces long, extending east and west along the shore at Brüsterort. In this case it is not absolutely necessary that the water should be tranquil before the work can proceed. The large stones, which

are present here in great numbers, are first brought to the surface and carried away on rafts, and then the bottom is swept with nets provided with sharp rims, to dislodge the small stones and pieces of amber. Hooks similar to those already referred to, are used for loosening the large stones, which are afterwards raised to the surface between the strong prongs of other instruments. The sea, near Brüsterort, bears a most striking aspect, dotted with hundreds of boats, all bending to the gunwale, and filled with eager men devoting the whole of their attention to the gathering of amber.

The latest method employed for raising amber is that of dredging, which has been introduced in the Kurische Haff on an extensive scale. It was noticed that the dredging machines employed to keep open one of the most important channels, brought up pieces of amber from the bottom of the Haff. The firm of Becker and Stantien, of Memel, undertook to keep open the channel and pay a considerable rent for the privileges, on obtaining the right to get amber in the Kurische Haff. Forthwith, three hand and nine steam dredgers were set to work, and kept going for six months in the year. The annual yield in the earliest years of the enterprise was 73,000 lbs. of amber, worth about 180,000 thalers. The cost of working was, of course, high, and as many as six hundred men were employed. This amber stratum in the Kurische Haff, apparently is of recent formation. The amber rests in a green sand, along with many ligneous remains and old sea tangle. In companionship with it are sometimes articles of art, similar to those found in old Prussian graves. The presence of this amber in the Kurische Haff is accounted for by the assumption which is supported by old maps, that the Haff was formerly open to the Baltic. The presence of the artistic ornaments, which now and then are also found in the Baltic, is probably to be explained by repeated inundations of the coast districts, by which the articles would be washed from graves.

The gathering of amber from the sea and beach is the most ancient way of getting it, but for a little over two hundred years amber has also been obtained on the Peninsular of Samland by mining.* From Hartmann's

* Wilhelm Runge's *Der Bernstein in Ostpreussen* and *Die Bernsteingräbereien im Samlande.*

work, published in 1677, we learn that fifteen years before that time amber diggings were first investigated and worked. The Samland Peninsula exhibits three distinct systems of strata. Lowest of all rests a layer of sand with a greenish-grey tint; next comes a brown-coal formation with the lighter sands and grey clays appertaining to such strata; and on the top lies a deposit of marl and sand with northern erratic blocks. All these systems contain amber, though in the two upper ones it occurs only at long intervals. Throughout the lowest green sand, on the contrary, it is distributed evenly and in abundance. It is in this stratum that is found the famous dark clayish-sandy vein, known as the *blaue Erde* or *blue earth*, which is the great treasure-chamber of amber. It varies from four to twenty feet in thickness, and in it are found in company with amber, remains of wood, sea crabs, mussels, sea urchins, sharks' teeth, saurians' teeth, and so on. In earlier centuries, the systematic mining for amber in Samland, was limited to the brown-coal sands, which here and there are fairly rich in amber. They are easily reached in all places, and, consequently, were readily worked. The first disturbance of the blue earth was in the middle of the seventeenth century, when a digging was made at Warnicken, but it was not until the beginning of this century that the stratum as a whole attracted special attention, and became an important source of the amber supply. The blue earth stretches along the Peninsula from Kraxtepellen to Rantau, for the most part below the sea level, and prior to the present century Warnicken was the sole spot at which it had been opened. Capital for working mines was soon forthcoming, when the value of the deposits was recognised. Large pits were excavated in the sides of the cliffs, and as the earth was dug out it was conveyed by means of tramways to the beach. The workman's spade, well sharpened with a file, is forced slowly into the earth, until its passage is obstructed by a piece of amber, which is then carefully dug out. The operations are frequently rendered very difficult by the inrush of water, especially where the mines descend as far as forty feet below the level of the sea, as at Warnicken, Hubnicken and Kraxtepellen. Chain pumps are used to overcome the water, but such attempts are often in vain,

and many mines have been abandoned long before they were worked out. Overseers stand near the miners, to see that the precious substance is not purloined. About eight hundred men find employment all the year round in the Samland mines.

Felix Dahn gives an interesting description of the amber mines:

"At Palmnicken," he says, "we visited the diggings in which, about thirty paces from the domain of the waves, the sea-gold is sought. It is an amazing sight! In the downs, shafts and galleries are made. The fresh water is pumped out. Forty feet under the sea level the pits are dug, and the perpendicular boring reaches a depth of fifty feet. The workmen stand in three parallel rows, knocking to pieces every clod of the blue earth, the stratum in which amber is oftenest found. A group of six or eight men is placed under each overseer. While he stands watching, that which is found is thrown into a vessel of water. The men grouped nearest the sea when they have examined the blue earth, throw it with large shovels from the lowest floor of the pit to the higher platform, which is reached by long, narrow ladders. Here the refuse material is taken in charge by a group of men and women, and flung from shovels to the third or uppermost platform, whence it is carted away. All the operations accord with the rhythm of a slow and monotonous melody which the overseers sing. This regularity of movements is intended partly to prevent pilfering, which, however, cannot be altogether prevented, although the miners are carefully searched before leaving the pit after the day's work. It is not astonishing that in the whole range of diggings not less than twenty hundredweights are raised on many a day. Men, women and children, in all imaginable costumes, in the oddest of attires, shielding themselves against the sharp, whistling winds, digging vigorously or swinging their shovels to the languid strain of the sombre melody;—what a singular spectacle is this!"

The yield of the blue earth varies from a twentieth to a third of a pound per cubic foot; the average is estimated by Runge at about a twelfth of a pound. A pound of well-sorted pit amber is worth from four to five thalers.

We have already seen that the layer of blue earth often reaches considerably below the level of the sea. Naturally, it is also continued under the sea itself, and hence, as Runge points out, we have an explanation of the presence of amber in the Baltic. It is estimated that there is under the Baltic a line of blue earth about fifty miles long, portions of which the sea is constantly dislodging. Statistics show that the annual product of amber fishing has not greatly varied, and it is supposed that quite a third more than that which comes under

review in the statistics is purloined by the amber fishers. From the quantity of amber obtained from the sea in the course of a year, it is conjectured that something like 600,000 cubic feet of the blue earth are annually destroyed by the motion of the water. It is of course possible that only a small proportion of the amber dislodged is thrown upon the coast, and, if such is the case, the destruction of the blue earth is naturally more extensive than is estimated. In all such calculations there is a strong element of the hypothetical, but it is looked upon as certain that, in whatever light the point is viewed, only a small portion of the submarine layer needs annually to be torn away to yield the amber which the fishers obtain.

Prussia yields about 220,000 pounds of amber, worth over a million thalers, out of a total of something like 250,000 pounds yearly for the whole world. Samland alone produces 200,000 pounds, of which the mines give 35,000 pounds, the fishing from 80,000 to 100,000 pounds, and about 73,000 pounds are obtained by dredging. The quantity found in Sicily is comparatively small, but it is beautiful in colour and is sold at a high price. Amber occurs in very irregular shapes, generally in roundish lumps, grains or drops. The pieces are small, and rarely exceed one pound in weight, although one was once obtained in Jutland weighing 27 pounds. There is a beautiful piece of amber in the Royal Mineral Cabinet at Berlin, which is 13½ pounds in weight, and worth £1500. This rich specimen was found in 1803, at Schlappachen, between Insterburg and Gumbinnen; it is 13¾ inches long, 8½ inches broad, 5⅝ inches high at one side, and 3½ inches at the other. Fabulous accounts have been given of the size of lumps of amber. Regnard, in 1681, recorded that the Margrave of Brandenburg presented the Emperor of Russia with a chair of amber, that was supposed to be the greatest curiosity in the world; and that he also gave the dauphin—by whom he probably meant the hereditary grand duke—a mirror of the same substance, which was considered a masterpiece. Santos speaks of a lump found on the coast of Melinda, in 1596, so large that a man could easily hide behind it. He adds, that the piece had to be broken into fragments, as no one was rich enough to purchase it whole.

The uses to which amber has been put are numerous. Although it is not now so much prized for jewellery as it formerly was, we cannot judge in what favour it is still held from its employment in England alone. In Holland, brooches, earrings, necklaces and similar articles, are extensively manufactured from it, and it is highly valued by smokers in all countries for the mouthpieces of pipes.

Amber is found in almost innumerable degrees of cloudiness, some qualities being as clear and colourless as water. The more opaque varieties, especially those of a light greenish-yellow tint, are in the greatest demand in Europe. They are also the dearest. The colour ranges from a bright white, to yellow, green, blue, red and brown. Of red there are several shades, some bright and fiery; the green and blue sorts are rare. Unusually beautiful emerald-green, as well as violet and purple-red varieties are found in Sicily.

The amber pieces are valued according to their form, colour, purity and size; and before the sale of the raw amber it is necessary to remove the outer coating and smoothen the surface, so that the interior may be seen.

Over a hundred separate classes are distinguished by traders, each class containing only pieces of similar colour, size and form, so as to make all in one class suitable for a certain purpose. An amber-worker, for instance, who only made mouthpieces of pipes and cigar holders would have no use for small round pieces.

The principal class, known as *Sortiment*, is formed of pieces over 10 decagrammes (about 3⅓ ounces) in weight; the next class, *Tonnenstein*, is subdivided; it contains pieces of which from five to eight make a pound, and others of which to make up the pound, 10, 20 and 30 pieces are needed—known as tens, twenties, thirties, and so on. The name of *Korallen* is given to another class, consisting of round pieces, suitable for making beads of different sizes. Lastly, the fragments which are too small for working, or are defective, are converted into incense powder, succinic acid, amber oil and varnish. Probably, about 1½ per cent. of all the pieces found are fit to be placed in the *Sortiment* class, of which the mines yield somewhat more than the sea. The *Tonnenstein* class claims 10 per cent.; and the *Korallen* from 40 to 45 per cent., whilst the remainder is made up of fragments.

The amber obtained by dredging from the Kurische Haff alone, is divided into fifty-eight classes. One pound of this amber, of a certain purity of colour, and containing only nine pieces, is worth sixty-six shillings; a similar weight made up of eighteen or forty pieces, is worth forty-five shillings for the lower number, or thirty for the higher. The price decreases with the size of the amber, and a pound weight, consisting of 100 or 200 pieces, is only valued at twelve or nine shillings, as the case may be. Transparent pieces of the same size fetch forty per cent. less. All these classes consist of amber in shapes suitable for mouthpieces. The round, or *Korallen* class, is somewhat cheaper. A pound of this sort, containing thirty pieces, is sold for thirty shillings, and the same weight made up of sixty or a hundred pieces, is worth eighteen or twelve shillings. The sea amber has less defects than that dug from the mines, but the latter is preferred, as it is mostly of a better colour. The cheapest fragments of amber are sold for as little as fivepence a pound, whilst the value of rare and large "cabinet pieces" of fine colour is very high.

In the working of amber, the pieces are first cut into the required shape with a fine saw, and then reduced to their permanent form by rasping, filing and scraping, or by turning on a lathe. After being rubbed smooth with fine pumice-stone and water, they are finally polished with a little spirit of wine and Vienna-chalk, on the rough side of a strip of cotton fustian. Sometimes amber has to be bent to make mouthpieces of a certain form. In this case, the substance is laid in oil for a time, before receiving its final polishing. Such a precaution prevents the surface of the amber and the opening of the bore from drying up when the heat is applied. It is then gradually warmed over a gentle flame of a spirit lamp, and bent with the greatest care. The process demands of the worker considerable knowledge of the substance, as only the most practised eye can distinguish with any certainty the quality of amber which readily lends itself to the treatment from that which cannot be dealt with in such a manner with safety. The slightest speck or defect, almost invisible to the unaccustomed eye, may be sufficient to cause the amber to break at the first attempt to bend it, spoiling the piece and rendering futile all the

labour spent in shaping it. Some kinds of amber may be bent repeatedly, but the operation is seldom repeated with success on the ordinary quality.

Clouded amber is made clear by being soaked from twelve to twenty-four hours in warm oil, the temperature of which is gradually increased without being allowed to reach boiling point. The colour of the material is slightly darkened by the process. For the manufacture of brooches, earrings, etc., amber is often coloured artificially.

Among the many imitations of amber, perhaps the best is the production of a mixture of copal, camphor and turpentine. The composition bears a very near resemblance to the real substance, but its true character is exposed by its softening in cold ether, which leaves amber untouched. Amber melts at 536° Fahrenheit, whilst the imitation is reduced to a liquid at a lower heat—a fact that suggests another test by which the two may be distinguished.

VI.

IN English literature the allusions to amber are numerous, both in prose and poetry. It is generally employed as a colour word, to give the idea of a clear liquid gold colour. Its use in this manner is daily becoming commoner, and a certain class of novelists even indulge their characters in "amber drawing-rooms." One of the earliest references to the fossil resin amber, if not actually the earliest in English literature, occurs in the Early English version of Colonna's *Destruction of Troy*, (line 1666) written about the year 1400. Since that time, we meet with numerous passing allusions in the works of Skelton, Shakespeare, Crashaw, Gray, Burns, C. Brontë, and others too many to mention.

In Milton's *Comus** we find the attendant spirit beginning his song to the beautiful water-nymph thus:

> "Sabrina fair,
> Listen where thou art sitting
> Under the glassy, cool, translucent wave,
> In twisted braids of lilies knitting
> The loose train of thy amber-dropping hair."

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* Line 863.

Carlyle, in the *Sartor Resartus*,* speaks of an amber-locked maiden, and further instances are met with in the comedy of *George a Greene*, ascribed to Robert Greene, in George Wither's *Epithalamia*, in Sylvester's translation of Du Bartas, and in Robert Greene's *Orlando Furioso*. The resemblance in colour between amber and the sun was not first pointed out by modern poets, as comparison between the two is as old as Homer.†

The amber light of the rising and setting sun is often alluded to by English writers. The expression occurs in some passionate lines in Tennyson's *Lover's Tale:*

> "O Love, O Hope!
> They come, they crowd upon me all at once—
> Moved from the cloud of unforgotten things,
> That sometimes on the horizon of the mind
> Lies folded, often sweeps athwart in storm—
> Flash upon flash they lighten through me—days
> Of dewy dawning and the amber eves
> When thou and I, Camilla, thou and I
> Were borne about the bay, or safely moored
> Beneath a low-brow'd cavern . . . . "

Later on in the same poem we read, in a scene at sunset:

> "The loud stream,
> Forth issuing from his portals in the crag,
> Ran amber toward the west . . "

Here the colour of the stream was the reflection of the hues of the western sky.

The following lines are from Milton's *L'Allegro:*

> "Some time walking, not unseen,
> By hedge-row elms, on hillocks green,
> Right against the eastern gate,
> Where the great sun begins his state,
> Robed in flames, and amber light,
> The clouds in thousand liveries dight."

Bryant has a similar use of the word in *Sella:*

> "As the sun
> Stooped towards the amber west to bring the close
> Of that sad second day, and, with red eyes,
> The mother sat within her home alone,
> Sella, was at her side."

Professor Tyndall refers, in the *Hours of Exercise* (xiii.), to the crown of the Jungfrau being "embedded in amber light" after the sun had set; and elsewhere he speaks of "the amber of the western sky."

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* Book i., chap. v. † Odyssey xviii., 295.

Similar allusions are common enough. It is seldom that we find the epithet amber applied to the light of the moon, and yet in Tennyson * it is used in reference to both luminaries.

In the Laureate's picture of "sweet pale Margaret," written so far back as 1830, we read:

> "The very smile before you speak,
> That dimples your transparent cheek,
> Encircles all the heart, and feedeth
> The senses with a still delight
> Of dainty sorrow without sound,
> Like the tender amber round,
> Which the moon about her spreadeth,
> Moving thro' a fleecy night."

The same use of the word occurs in *Comus*, in the line addressed to the moon:

> "Stoop thy pale visage through an amber cloud."

A frequent application of the word amber is to clear water. In the *Wanderer*, Savage refers to "yon amber-hued cascade;" and in the narrative of the temptation of Christ in *Paradise Regained*,† Satan pointing to the great cities of the earth, names

> "Susa by Choaspes' amber stream,
> The drink of none but kings."

The second portion of this quotation relates to a curious custom, though the poet exaggerates the fact by making none but the kings drink the water, instead of making the kings drink no other. Herodotus tell us that when Cyrus marched against Babylon, he took with him a supply of water from the Choaspes. James Silk Buckingham, the founder of the *Athenæum*, says in his *Travels in Assyria, Media, and Persia:*

> "The Kara Soo is unquestionably the Choaspes of Antiquity, celebrated as furnishing always the drink of the Persian kings. And it is a fact worthy of remark that at this moment (1830), while all the inhabitants of Kermanshah drink of the stream Aub Dedoong, and of the spring called Aub-i-Hassan-Khan, the *king's son alone* has the water for himself and his harem from the stream of the Kara Soo."

Buckingham had the curiosity to taste the water himself as he passed by, and he testifies to its superiority.

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* Further allusions to amber in Tennyson appear in the *Palace of Art* (169), and in the Prologue to *The Princess* (19).

† *Paradise Lost* (iii., 359) contains a similar passage.

Amber is fortunate in receiving most tender treatment at the hands of our poets. Rarely, if ever, do we meet any but the most flattering allusions to it. The poet who perhaps has done it the greatest honour of all is Milton, for he has not hesitated to adorn with it the chariot of the Messiah (*Paradise Lost*, book vi., 759).

Some very interesting allusions to amber occur in the poems of Pope. The most notable of them is in the *Epistle to Dr. Arbuthnot*, where the amber inclusa are used, as Pope alone could use such apparently harmless weapons, to add venom to an already scathing satire. To show the neatness of the application the whole passage must be quoted:

"Did some more sober critic come abroad,
If wrong I smiled; if right I kissed the rod.
Pains, reading, study, are their just pretence,
And all they want is spirit, taste, and sense.
Each wight, who reads not, and but scans and spells,
Each word-catcher, that lives on syllables,
Even such small critic some regard may claim,
Preserved in Milton's or in Shakespeare's name.
Pretty! in amber to observe the forms
Of hairs, or straws, or dirt, or grubs, or worms!
The things, we know, are neither rich nor rare,
But wonder how the devil they got there."

In the *Hesperides* we find:

THE AMBER BEAD.

I saw a fly within a bead
Of amber clearly buried;
The urn was little, but the room
More rich than Cleopatra's tomb.

We find amber beads included among the many attractions offered, in Marlowe's *Passionate Shepherd*, to the unwilling maiden. The shepherd pleads to his lady love thus:

"Come live with me, and be my love,
And we will all the pleasures prove
That hills and valleys, dale and field,
And all the craggy mountains yield.

There will I make thee beds of roses
With a thousand fragrant posies,
A cap of flowers, and a kirtle
Embroidered all with leaves of myrtle.

A belt of straw, and ivy-buds,
With coral clasps and amber studs:
And if these pleasures may thee move,
Then live with me, and be my love."

But, alas! if Sir Walter Raleigh has recorded the truth in his *Nymph's Reply*, all pleading was in vain. The answer was decisive:

"If that the World and Love were young,
And truth in every shepherd's tongue,
These pretty pleasures might me move
To live with thee, and be thy love.

Thy gowns, thy shoes, thy beds of roses,
Thy cap, thy kirtle, and thy posies,
Soon break, soon wither, soon forgotten,
In folly ripe, in season rotten.

Thy belt of straw, and ivy-buds,
Thy coral clasps and amber studs;
All these in me no means can move
To come to thee, and be thy love."

The fable making amber the product of tears of birds, recorded by Sophocles, is referred to by Moore in some melodious lines in *Lalla Rookh* (The Fire-Worshippers):

"Farewell—farewell! to thee, Araby's daughter!—
(Thus warbled a Peri beneath the dark sea)—
No pearl ever lay, under Oman's green water,
More pure in its shell than thy Spirit in thee.

Oh! fair as the sea-flower close to thee growing,
How light was thy heart till Love's witchery came,
Like the wind of the south o'er a summer lute blowing,
And hushed all its music, and withered its frame!

But long, upon Araby's green sunny highlands,
Shall maids and their lovers remember the doom
Of her who lies sleeping among the Pearl Islands,
With nought but the sea star to light up her tomb.

. . . . . .

Farewell!—be it ours to embellish thy pillow
With everything beauteous that grows in the deep;
Each flower of the rock, and each gem of the billow
Shall sweeten thy bed and illumine thy sleep.

Around thee shall glisten the loveliest amber
That ever the sorrowing sea-bird has wept;
With many a shell, in whose hollow-wreathed chamber
We, Peris of Ocean, by moonlight have slept.

Farewell—farewell!—until Pity's sweet fountain
Is lost in the hearts of the fair and the brave,
They'll weep for the Chieftain who died on the mountain,
They'll weep for the Maiden who sleeps in the wave."

One of the most beautiful poems to which amber can claim relationship is Mrs. Browning's sonnet, *Comfort.* We copy the whole of it, to avoid the sin of desecrating so rare a gem:

COMFORT.

"Speak low to me, my Saviour, low and sweet
From out the hallelujahs, sweet and low,
Lest I should fear and fall, and miss Thee so,
Who art not missed by any that entreat.
Speak to me as to Mary at Thy feet!
And, if no precious gums my hands bestow,
Let my tears drop like amber while I go
In reach of Thy divinest voice, complete
In humanest affection—thus, in sooth,
To lose the sense of losing. As a child,
Whose song-bird seeks the woods for evermore,
Is sung to in its stead by mother's mouth,
Till, sinking on her breast, love-reconciled,
He sleeps the faster that he wept before."

Carlyle alludes to amber in an incisive paragraph in the *History of Frederick the Great* (chap. ii., 2). After mentioning the origin of the substance and the manner of getting it, he concludes as follows:

"No doubt, Pytheas had his eye upon this valuable product, when he ventured into survey of those regions,—which are still the great mother of amber in our world. By their amber-fishery, with the aid of dairy-produce and plenty of beef and leather, these Heathen Preussen, of uncertain miscellaneous breed, contrived to support existence in a substantial manner; they figure to us as an inarticulate, heavy-footed, rather iracund people. Their knowledge of Christianity was trifling, their aversion to knowing anything of it was great."

Of course, in this passage, Carlyle is dealing with the Prussians, to whom he gives their own German name of the tenth century. Much has been written on the travels of Pytheas, to which Carlyle here alludes. Pytheas was an inhabitant of Massilia, in the fourth century before Christ, and his voyages are mentioned by Polybius, Strabo, Pliny the Elder, and many other writers of antiquity. In our own day, the aim of his journeys has been widely discussed, with the object of bringing them into connection with amber. The latest writer is Karl Blind, whose essay in the *Fortnightly Review* for September, 1891, is well worth careful attention.

In the thirty-fourth chapter of Smollett's *Roderick Random*, we find an amber-headed cane forming part of the "get up" of the foppish Captain Whiffle.

No literary work relates so nearly to our subject as the *Amber Witch*, a cleverly-written story by Wilhelm Meinhold, which was translated into English about fifty years since, by Lady Duff Gordon. It is a painful record of the trial of a young girl for witchcraft, and is written in a quaint, antiquated style. The scene is laid at Coserow, in the Island of Usedom, at the mouth of the Oder, in the time of the Thirty Years' War, two hundred and fifty years ago. We are introduced to the chief characters just after the imperialist troops had departed from the district with all the food and valuables upon which they could lay their hands, leaving the country destitute for miles around. Parson Schweidler, a rigorous old Protestant, tells of the great need and hunger of the whole parish, including his own household, which consisted of himself, a daughter in her 'teens and an old maid-servant. Mary, the pastor's daughter, is a lovable young creature, who endears herself to the reader by many generous acts. When she is weakened by hunger and sorely in need herself, she gives her food to the children of the parish, leaving the larder of the manse absolutely bare. In the midst of the trouble Mary, while seeking blackberries in a dell near the shore, found a rich vein of amber. She hastened home to acquaint her father of her fortunate discovery, taking her apron full of the precious substance. The pieces were large, two of them being nearly the size of a man's head, and the whole were sold to a Dutch merchant for 500 florins. The parson was careful to hide the source of his sudden wealth from his neighbours, lest the amber should be seized by Baron Wittich, the sheriff, who was a notorious villain. This discovery virtually ended the starvation in the village, for Pastor Schweidler and his daughter kept every house well supplied with food until the famine was passed. In the winter, a "goodly quantity of amber" was washed upon the shore during a storm, and the villagers again began to fill their fields with cows and sheep. But the pastor's worst time was still to come. Just as the village was recovering from the destruction the soldiers had done, some of the cattle suddenly became sick, and, according to the custom of

the time, their illness was attributed to witchcraft. Mary was now in great request. A belief existed that if a maiden were to pluck three hairs from the tail of a bewitched animal and bury them "under the threshold of the stall," the animal would recover; and as Mary was the only grown-up girl in the village, she had the office to perform pretty frequently. To her surprise the "cure" succeeded in some cases, though it very naturally failed in others, of which circumstance her enemies took care to avail themselves. The pastor, good Christian, had as much faith in the truth of witchcraft as in that of the Gospel. The state of his mind is admirably shown in the remarks he makes concerning Rüdiger von Nieukerken, who was in love with Mary. "Meanwhile," he relates, "it befell that Rüdiger came riding one day to gather news of the terrible witchcraft that went on in the village. When I told him all about it, he shook his head doubtingly, and said he believed that all witchcraft was nothing but lies and deceit; whereat I was struck with great horror, inasmuch as I had hitherto held the young lord to be a wiser man, and now could not but see that he was an Atheist."

Finally, at the instigation of the villainous sheriff, Mary was arrested on a charge of witchcraft. After repeatedly denying her guilt and undergoing many painful examinations, she was put to the torture. The sole object of this proceeding was to extort a confession of guilt from the person accused. As may be imagined the method was a sure one. The supposed witch was brought into the torture chamber with nothing on but a black "torture shift," and after having once more denied the accusations, she was bound upon the torture-bench and the thumb-screw applied. At this point she very wisely decided to yield, knowing that the torture would be persistently increased until a "confession" had been forced from her. She was now questioned again and answered "Yes" to all the interrogatories, until one of a most horrible nature was asked, which caused her to weep and sob, and to which after hesitating, she replied "No." The "court," however, in such cases was pledged not to listen to the truth, and it was accordingly commanded she should once more be tortured, whereupon she answered in the affirmative. Having now admitted every thing, she was taken back to the cell to await sentence of death.

At this juncture, old Lizzie Kolken, who, with Baron Wittich, the sheriff, had done all the mischief, confessed to the pastor her own guilt and also accused Baron Wittich of being a warlock. But, unfortunately, no witnesses were present, and the court would put no faith in the poor father's somewhat incoherent accusations. The maid was finally condemned to be burned, and the whole court set out to witness the execution, along with Baron Wittich, the sheriff. When some distance had been traversed, the party came to a bridge over a stream. Much difficulty was experienced in crossing this bridge. Men and horses fell to the ground almost as soon as they set foot upon it. Everyone believed the bridge was bewitched, and, of course, the blame was laid on the head of Mary. It afterwards turned out that the only bewitching the bridge had undergone, had been effected with a coat of tallow, well pasted on by the miller's assistant; why the grease was not noticed by those who slipped and fell whilst crossing, is unexplained. After many had attempted to cross, but had withdrawn from fear of the witchcraft, the sheriff, impatient of the delay, spurred his charger forward. Before he had reached the other side, however, a sudden clap of thunder caused the horse to rear, and, falling over the parapet, it shot headlong with its rider upon the great mill-wheel below. The sheriff was killed upon the spot.

So slight an accident, of course, was not allowed to delay matters when there was a witch to be burned, and the march to the stake, which was already in sight, was continued. But before they had proceeded much further, a horseman was seen rapidly following, who was shortly recognised as Rüdiger von Nieukerken. As soon as the constable, who had charge of Mary, identified the new comer, he perceived his object was to rescue the prisoner. He, therefore, made a vile attempt to stab her, but the Lord of Nieukerken was too sharp for him, and before he could effect his purpose he fell pierced through the chest. While the fellow lay on the ground in a dying state, he admitted to have listened at the door when the old witch, Lizzie Kolken, confessed to the pastor that she and the sheriff had done all the witchcraft in the village.

Mary was now immediately released, and, after a little more delay and another touch of sorrow, she was happily married to Rüdiger von Nieukerken.

Now we have concluded our glance at the History of Amber. We have followed it through the successive ages of its existence, down to our own times. We have seen how the trees that bore it sprang into being and flourished in the mild and genial climate of their period, pouring forth in rich abundance their beautiful resin, which, rolling over the soil, caught up and preserved for our gaze small and delicate relics of a bygone age. We have traced the gigantic forests through the varying stages of their life; we have seen their partial destruction, their temporary renovation, and the final annihilation of the whole of their enormous mass. We have seen the fate of the hardened resin after the disappearance of the trees; traced it into the deep, to be cast up again upon a new shore, and stored in the soil by Nature's hand, with her many other priceless gifts. We have followed with increasing wonder in the footsteps of the ancient trader, picturing to ourselves the great fatigues of his labour as he travelled through hundreds of miles of hostile country, often to meet his death in the far-off wilderness from sickness or violence. We have looked, subdued, into tombs of wives and daughters and tiny children—tombs opened after many centuries of absolute repose—revealing the love and sorrow of those that mourned in the simple jewels and amber beads they contained. We have listened to the dreamy songs of poets on the origin of amber. We have also seen the manner of its formation recognised by the ancients, and smiled at the emphatic denial of the truth of their theories by those who succeeded them. We have likewise seen the many ways adopted to procure it in our own day; how it is snatched from the sea and dug from the earth, and wrought into many shapes for our pleasure and delight. And here we will leave it.

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APPENDIX.

FROM PLINY'S NATURAL HISTORY.

No ancient writer has treated of amber so copiously, or, on the whole, so intelligently, as Pliny the Elder, though the credulous and uncritical spirit which he blames in others, he, in this, as in other instances, to some extent himself displays. We shall quote freely from his work on natural history, because he does not merely give his own opinions and theories but those of many others among the ancients. Having spoken of *Murra* (a substance from which drinking cups were made) and of crystal, he continues:—"Amber holds the next place among the objects that delight as luxuries, though it is only among women that it has so far found favour. All these three substances are held in as much regard as precious stones. There are not wanting reasons for liking the two first: crystal cups are useful for cold drinks; murrine cups are useful both for cold drinks and for hot; but even a luxurious taste has not yet been able to assign any cause for the liking which amber inspires. Here I am offered a fitting occasion of exposing the falsehoods of the Greeks. My readers must pardon me if, in recording the marvels which the writers of that nation have uttered about the origin of amber, I am somewhat lengthy; for, in truth, it is useful to know what they have thought on the subject. In the first place,* they have declared that the sisters of Phaëthon, mourning for the sad death of their brother, who was struck by lightning, were changed to poplars, and that every year their tears produce electrum on the banks of the Eridanus, which we call the Padus (Po)—the substance bearing the name of *Electrum*, from *Elector*, one of the names of the sun. Such is the statement made by many poets; and the first who so spoke were, as I believe, Æschylus, Philoxenus, Nicander, Euripides, Satyrus; but it is a fable, merely invented, as all Italy can testify. The more cautious and exact Greek writers have said that in the Adriatic Sea are the *Electrides*†—islands to which amber is carried by the Padus. It is certain, however, that no islands with that appellation were ever known in those regions, and that no islands exist in this quarter to which anything by the current of the Padus can be borne. That Æschylus should place the Eridanus in Iberia—that is to say, Spain—and give it the name of Rhodanus (Rhone); that Euripides and Apollonius should make the Rhodanus and the Padus flow by a common channel into the Adriatic Sea;‡ these two errors, I say,

* Euripides, HIPPOLYTUS l. 737; Apollonius, ARGONAUTICA iv. 596—626.
† Apollonius, ARGON. iv. 580; Strabo p. 215.
‡ Apollonius, ARGON. iv. 627, 628.

PLINY ON AMBER—*Continued.*

urge us more readily to pardon men for being ignorant of the origin of amber, who are so ignorant of geography. Others, who were more moderate, have stated, what nevertheless was equally false, that in the extreme recesses of the Adriatic Gulf, on inaccessible rocks, are trees, which pour forth this gum at the beginning of the Dog Days. Theophrastus says that in Liguria amber is dug from the ground. Chares asserts that Phaëthon perished in Ethiopia, on the territory of Ammon, by reason whereof a temple and an oracle are found there, and electrum is produced there. Philemon thinks that the substance is fossil, and that in Scythia it is extracted in two places, these furnishing an amber which is white, and an amber which is the colour of wax, both called *Electrum;* but that in a third region red amber is found, which is named *Sualiternicum.* Demostratus calls amber *Lyncurion*, and says that it is produced by the urine of the lynx; the distinction being that the urine of the male forms red and fire-like amber, while that resulting from the urine of the female, being more imperfect, is much paler in colour. Others have called amber *Langurium*, and have said that there are in Italy animals called *Languriæ* (creating amber in the same manner as the lynxes). Zenothemis names the animals *Langæ*, and says that they live in the lands through which the Padus flows. Sudines thinks amber the product of a certain tree which grows in Liguria, and Metrodorus agrees with him in opinion. Sotacus opines that in the Britannic Islands the amber drops from certain rocks which, on that account, are called *Electrides.* The notion of Pytheas is that the *Guttones*, a Germanic people, inhabit, in a space extending to six thousand stadia, the shores of the *Mentonomon*—for such is the name they give to an estuary of the ocean; that a day's journey therefrom is the island of Abalus, on whose coasts the amber is thrown by the waves in the spring, being a sort of excrement of the congealed sea; that the inhabitants use it as fuel, instead of wood, and sell it to the Teutons in their neighbourhood. Timæus likewise believes this, but he calls the island Basilia. Philemon has denied that electrum gives a flame. Nicias protests that amber is a sap created by the sun's rays. He maintains that these, when the great luminary is setting, are hurled with such force toward the earth as to leave behind a fat sweat, which, taken up by the tides of the ocean, is thrown on the shores of Germany; that in similar fashion amber is produced in Egypt, where it is called *Sacal;* likewise in India, where it is more highly valued than incense. Finally, he informs us that the whirls of spindles are made of amber by the women of Syria, where amber is called *Harpax*, because it attracts leaves, straws, and the fringes of garments. According to Theochrestus, the floods of the ocean scatter amber on the promontories of the Pyrenees; and this is likewise the opinion of Xenocrates, who has recently written on the subject, and who lives still. Asarubas declares that near to the Atlantic Sea is the lake Cephisis, which the Moors call Electrum; that when this lake is dried up by the sun the mud throws forth electrum, which floats on the surface. Mnaseas gives the name of Sicyon to a certain place in Africa, and the name of Crathis to a river flowing from a lake frequented by birds which he

calls Meleagrides and Penelopes, and propounds that there electrum is produced in the mode indicated above. Theomenes avers that near the Great Syrtis are the gardens of the Hesperides and the pool called Electrum; that on the banks of the pool are poplars, from whose tops the amber falls into the water, and that the daughters of the Hesperides go thither to gather it. If we accept the authority of Ctesias,* we must believe that in the Indies there is a river called *Hypobarus*, a word which signifies *bringing all blessings;* that this river flows from the north toward the Oriental Ocean, into which it throws itself, near a mountain covered with trees which produce electrum; that these trees are called *Siptachoræ*, a word which means *very luscious sweetness.* The statement of Mithridates is, that on the coast of Germany is an island named Osericta, covered with a species of cedar trees, from whose branches the amber flows down upon the stones. Xenocrates assures us that in Italy this substance is not only called Succinum but also Thyon; that in Scythia, where it is also found, it is called Sacrium; and others declare that it is produced in Numidia. But he who surpasses them all is Sophocles, the tragic poet, whereat I am the more astonished when I consider the imposing gravity of his dramas, the glory of his life, his birth among the higher classes of Athens, his exploits and his military commands. He makes amber the product of a region beyond India, and says that it comes from the tears of the birds Meleagrides, weeping for Meleager. How can we help being surprised that he could believe such a fable, or that he could hope to persuade others to believe it? Is there a child ignorant or silly enough to imagine that birds weep annually, that tears are so abundant, and that birds can go from Greece, where Meleager was born, to mourn for him in lands inhabited by the Indians? But it may be asked whether poets do not narrate, or picture, many things equally fabulous. In regard, however, to a thing so abundant as amber, and which is incessantly brought to us as an article of trade, to advance gravely an absurdity so monstrous, when the proof of lying is so easy, is to treat everybody as a fool, and to tell, without shame, preposterous fables. It is certain that amber is produced in the islands of the Northern Ocean, that it is called Glessum by the Germans, and that, for this reason, when Germanicus Cæsar was commanding a fleet in those regions, the Romans gave the name of Glessaria to one of these islands, which, in the language of the barbarians, bears the name of Austeravia. Amber is formed by the pith *(medulla*, or *marrow)* which flows from trees of the pine species, as gum flows from cherry-trees and resin from pines. It is, first of all, a liquid which bursts forth in abundance; then it is congealed by the cold, or by the heat, or by the sea, when the great tides rise and sweep it from the islands. At all events, it is thrown on the coasts, in so light a form, that it seems to be suspended in the water, and does not sink to the bottom. Our ancestors, thinking that it was the sap *(succus)* of a tree, called it, on that account, *succinum.* What proves that amber is the product of a species of pine, is that

* Ctesias INDICA, c.xix.

PLINY ON AMBER—*Continued.*

when rubbed it exhales an odour like that of the pine, and that when set on fire it burns after the fashion, and with the scent, of a resinous torch. It is conveyed by the Germans into Pannonia (Hungary) chiefly; thence the Veneti (Venetians), whom the Greeks call *Heneti*, who are in immediate proximity to Pannonia, and who live round the Adriatic Sea, have brought it into vogue. The fable which has connected the Padus with amber has an evident cause. In our own day, the Transpadanian peasant women wear an amber necklace, for the sake of ornament, no doubt, but also as a remedy, forasmuch as amber is deemed good for affections of the tonsils and the fauces, the throat and the neighbouring parts of the body being subject to maladies produced by the different kinds of waters in the neighbourhood of the Alps. From Carnuntum, in Pannonia, to the coast of Germany, whence amber is brought, there are six hundred miles, a fact not known till recently. There still lives the Roman knight who was sent to procure amber by Julianus, superintendent of the gladiatorial games given by the Emperor Nero. This knight travelled over the markets and the shores of the country, and brought back such an immense quantity of amber that the nets intended to protect the podium from the wild beasts were studded with buttons of amber. Adorned, likewise, with amber, were the arms, the biers, and the whole apparatus for one day. The largest piece the knight brought weighed thirteen pounds. It is certain that amber is also a growth of India. Archelaus, who reigned in Cappadocia, states that from that country (India) amber is brought in the crude state, and still adhering to the pine bark. It is polished by being sodden in the fat of a sucking pig. What proves that the amber first flows as a liquid is, that owing to its transparency different objects may be seen in the interior, such as ants, small flies, lizards. It is manifest that those objects got entangled in the amber when it was still in the liquid state, and that they remained imprisoned when the amber hardened. There are many kinds of amber: the white is that which has the sweetest scent; but neither the white nor the wax-coloured is worth much. The deep yellow *(fulvus, tawny, fallow)* is the most esteemed. Though the transparency of the deep yellow amber is a recommendation, intense brilliancy is objectionable. To please there must be present, not fire but the resemblance of fire. The amber most in request is the Falernian, so called because it has the colour of Falernian wine. It is transparent, and has a softened splendour. Certain kinds attract by a tender shade, like the tint of boiled honey; but it ought to be known that any colour can be given to amber that is thought fit. A particular dye can be given to it by means of kid fat, or of the anchusa root; it can even be made to take a purple tinge. Moreover, when, by being rubbed in the hand, amber is enriched with an animating heat, it attracts straw, dry leaves, thin bark, just as the loadstone attracts iron. Bits of amber in oil burn with a brighter and more enduring flame than wicks of flax tow. Such is the excessive commercial value of this substance, that a small human effigy in amber is sold for a higher price than living and vigorous men. But this single ground for censure is not enough. In the objects called Corinthian, copper mixed with silver

PLINY ON AMBER—*Continued.*

and gold pleases; in carved objects the skill and genius of the artist delight. We have shown what recommends murrines and crystals. Pearls are worn upon the head; gems on the fingers. In short, in all foolish superfluities there is either the satisfaction of vanity or there is real use; but as regards amber there is nothing to charm beyond the consciousness of possessing an article of luxury. Domitius Nero (the emperor), along with his numerous other absurdities, had given the name of amber to the hair of his wife Poppæa, and he had even celebrated the hair as amber in some verses; for fine names are never lacking for corporeal defects. From that moment amber was a third * colour, much in request with the (Roman) ladies. Amber, however, is found to be of some value in medicine; but that is not the reason why women are fond of it. Worn as an amulet by children, amber is advantageous. According to Callistratus, whether taken in a drink or worn as an amulet, amber at all ages is medicinal in cases of madness and dysuria. This writer mentions a fresh variety, which is called chryselectrum, and which is (as the name indicates) of the colour of gold, and in the morning presents the most charming gradations of hue. For fire it has a signal hunger, and if it is near fire it catches flame and burns with immense celerity. This amber (if we may believe Callistratus) cures fever and other diseases, if it is worn on the neck; cures affections of the ear, when powdered and mixed with honey and oil of roses; cures dimness of sight, when ground with Attic honey; cures affections of the stomach, either when taken in a powder alone or drunk in water along with mastic. Moreover, amber can be efficiently and extensively employed in imitating translucid precious stones, especially amethysts; for, as we have said, it can be tinged of every colour."

In that part of Pliny's work which is devoted to geography, there are allusions to amber. He says:—"We must now leave the Pontus, that we may depict the exterior parts of Europe. Having traversed the Raphæan mountains, we must follow to the left the shores of the ocean till we arrive at Cadiz. Numerous nameless islands situated in those regions are spoken of. To them belongs, facing the Scythia, called Raunonian, an island which, according to Timæus, is distant a day's navigation, and on which, in spring, electrum is thrown in by the waves."

Elsewhere, after mentioning a number of islands, he proceeds;—"Facing them, and dispersed over the Germanic ocean, are the Glessariæ, which the Greeks have called Electrides, because they produce amber."

In the notice on Pliny prefixed to the edition of Pliny's "Natural History" we have used (that of Littré), there is a very fair estimate of the famous Latin author, whose zeal for science was the cause of his death, the circumstances whereof are so well known that they need not here be recorded. Pliny was a voluminous writer; but all his works have perished except his "Natural History," which, however, is not so much what the name indicates as a kind of

* The other two were golden and pearl-coloured.

PLINY ON AMBER—*Continued.*

Cyclopædia—a repertory of all the facts connected with almost all subjects which an insatiable curiosity could collect. Buffoon seemed inclined to praise a writer who, in some respects, resembled himself, but whose parallel is rather to be sought in Vincent de Beauvais, a learned and laborious Dominican of the thirteen century, who put into huge compilations everything he knew. Cuvier, Blainville, and other real men of science, have been very severe on Pliny. As a man of science, judged by men of science, Pliny deserves the condemnation. But Egger, Littré, and Pliny's more generous critics, have maintained that we should look at Pliny in his whole individuality. He was a Roman not unworthy of Rome's best days, though he lived at a time of corruption, degeneracy, and scepticism, when even the rule of a Titus could not hide numberless and deepening evils. In peace, and in war, Pliny had served his country well; and at the very moment when the irruption of Vesuvius occurred, which cost him his life and was so disastrous to famous cities of Compania—which have recently been dug from their sepulchres—he was commanding one of the Roman fleets. It is not denied, besides, that the genius of the literary artist was eminently his, if the genius of the scientific explorer and expositor was not. Neither is it denied that there are a thousand things in the life of the ancients which would have been wholly hidden from us if we did not possess Pliny's vast, diversified, entertaining, though unquestionably unscientific, production. The credulity of Pliny is childish, no doubt, and the more childish that, like all the men of his period, he was a sceptic. But we see in our own day that the most advanced, the most enlightened, science is compatible with the grossest or most childish superstition. As regards amber, Pliny is instructive from the really solid information he furnishes, and amusing from his scientific pretentiousness, contrasted with his scientific ignorance. It is ludicrous to hear him scoffing at the fables of the Greeks, seeing that, alone of the ancients, the Greeks knew the character and the requirements of science; and it is more than ludicrous to behold him rebuking Sophocles and other poets, as if fables of every kind were not part of the poetical stock-in-trade; and as if the fables of the poets ever bore any scientific authority. However, in respect to the nature and origin of amber Pliny was essentially right, spite of his fantastic pictures and dreams.

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