

## III.

THE ARCHÆOLOGY OF LIGHTING APPLIANCES. By J. ROMILLY  
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The rapid advances made in science by the present generation have been the means of effecting improvements in every kind of appliance that ministers to the wants of man, and amongst the various new inventions which have been introduced none are of more importance than those connected with artificial methods of illumination.

At the beginning of this century gas was taking the place of animal oil for lighting purposes, and now towards its close gas itself seems destined to be superseded by petroleum or electricity. The tallow candle and rush-light, with which our forefathers were familiar, are already things of the past. The old Scotch crusie is becoming so rare as to be prized by collectors of antiquities, and is hardly to be found except in museums. Development and evolution seem to go on amongst human inventions very much as in the animal or vegetable world. Although development and evolution go on amongst human inventions, the conditions are in many ways different from those existing in the animal and vegetable world, and the same laws do not apply in both cases, so that the analogy must not be pushed too far. Of course, all theories founded on facts connected with the reproduction of species, limited supply of food, &c., only hold good with regard to living creatures or plants; but the invention, like the animal, which is best suited to its environment, will survive the longest, and extinguish forms which are not so well adapted to circumstances.

In the same way that the old English grey rat existed for hundreds or perhaps thousands of years in this country, but became suddenly extinct when the brown Norwegian rat appeared upon the scene, the tools and appliances used by man sometimes remain unchanged for centuries, until an improvement is suggested by accident, or invented by an individual of exceptional brain power. The force of habit is, however, so great, and man is so naturally conservative in his instincts, that

he often continues to employ the same weapons of defence which his ancestors did until better forms are introduced by a conquering race.

At a period like the present, when changes seem to be taking place with unusual rapidity, it is the duty of the archæologist to preserve a record of every human invention as it becomes extinct, so that future generations may be able to trace the progress of its development, and in order to reduce the objects in our museums labelled "of unknown use" to the smallest possible number.

In tracing out the history of the various appliances used by man, as is done to a certain extent in Tylor's *Anthropology*, each invention should be taken in the order in which it becomes absolutely necessary to our existence, as we pass from the lower forms of civilisation to the higher. First of all come the appliances required for obtaining food, for striking fire, for cooking, for the manufacture of clothes, for making dwellings, and after these, especially in a northern climate, would come the appliances for producing an artificial light, by means of which the portion of the night not required for rest could be utilised for work or amusement.

Artificial illumination is usually effected by burning some solid, liquid, or gaseous substance, so as to cause a flame; but light can also be obtained from a solid in a state of incandescence—that is to say, not actually burning, but sufficiently heated to become visible in the dark. Lastly, certain insects and decaying matter, in a particular condition, possess the property of emitting light known as phosphorescence.

We shall now proceed to describe the different kinds of lighting appliances used from the earliest times.

#### LAMPS.

A lamp is an apparatus for giving light by burning a fibrous wick saturated with an inflammable fluid, a continual supply of which is kept up from a reservoir provided for the purpose.

In its more perfect form a lamp consists of the following essential parts:—the receptacle for the oil; the tube for the wick; the stand or hook for suspension; the handle for carrying.

Contrivances are also required for bringing the oil to the wick; raising or lowering the wick; catching the superfluous oil; facilitating

combustion by a draught of air; protecting the flame from currents of air.

The above are either attached to the lamp or form part of it, but separate instruments are used for trimming the wick; extinguishing the flame; replenishing the supply of oil.

In some lamps adjustments are introduced for altering the position of the flame in relation to the object on which the light is required to be thrown, bringing the point of suspension over the centre of gravity of the oil vessel.

The different varieties of lamps will now be described in the order of their development, showing how the more complicated forms were arrived at by a gradual process of improvement.

*Open Cup Lamps.*—The simplest kind of lamp consists of a shallow cup, about 3 inches in diameter, filled with oil. The light is obtained from a cotton wick dipped in the oil, and hanging over the edge of the cup.

The earliest specimens are made of stone or rude pottery, and date back to the neolithic period, but the same primitive type is still used at the present day in China and other Eastern countries. Chalk cups, which most probably served the purpose of lamps, were discovered in the ancient flint mines called "Grimes Graves" at Brandon, in Suffolk,<sup>1</sup> and in similar excavations at the camp of Cissbury, near Worthing in Sussex.<sup>2</sup>

In the York Museum there is a rude clay lamp of cup shape on a stem and provided with a handle, found at Danes Graves, near Pocklington, in Yorkshire.<sup>3</sup>

The first step in the improvement of the cup lamp was to provide a separate hollow for the wick to lie in. This stage of development was reached in the stone lamps of the Iron Age, found in the brochs and weems in Scotland, of which there are numerous examples in the Museum of National Antiquities in Edinburgh. The stone lamps from the brochs of Kettleburn and Okstrow,<sup>4</sup> in Orkney (figs. 1, 2), are oval

<sup>1</sup> Boyd Dawkins, *Early Man in Britain*, p. 277.

<sup>2</sup> *Jour. Brit. Archaeol. Inst.*, vol. xxxi. p. 54.

<sup>3</sup> *Catalogue of York Museum*, p. 152.

<sup>4</sup> Dr J. Anderson's *Scotland in Pagan Times*, p. 241.

lumps of sandstone, with two circular depressions running into each other, the larger one being intended to hold the oil, and the smaller one

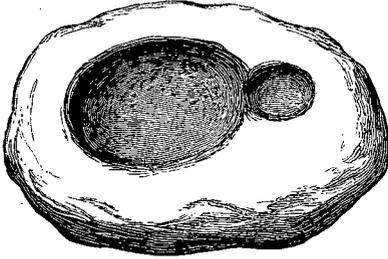


Fig. 1.

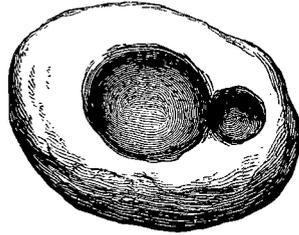


Fig. 2.

Stone Lamps, from Brochs or Kettleburn and Okstrow.

for the wick. A more finished specimen (fig. 3) was found in an underground house at Tealing, in Forfarshire, which has the outline of the stone neatly cut to suit the shape of the hollows.

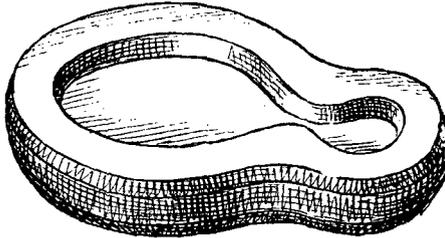


Fig. 3. Stone Lamp, from an Earthhouse at Tealing.

In the British Museum there are several Roman lamps of the same pattern, made of lead, bronze, and pottery,<sup>1</sup> some with handles (as fig. 4), and others with hooks for suspension.

Open cup lamps of stone are employed by the Eskimo tribes at the present day, but they are of different shape from those just described, and much longer, being intended for giving heat as well as light.

<sup>1</sup> Found in London, Colchester, Lincoln, and elsewhere.

Specimens may be seen in the Christy Collection in the British Museum, and an accurate account of their use is given by Baron Nordenskiöld in the *Voyage of the Vega*.<sup>1</sup> The form of these lamps is peculiar, and difficult to realise without a drawing. It consists of a bowl

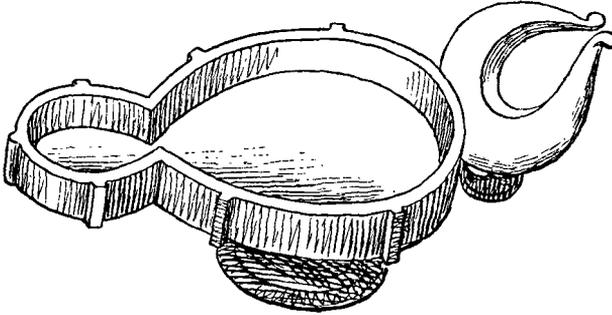


Fig. 4. Open Lamp, Bronze (Roman), found at Bayford, now in British Museum.

(as seen in fig. 5), shallow in front and deep behind. In plan the front is straight and the back semicircular. Near the front edge is a raised ridge, running parallel to it, and dividing the lamp into two parts. The shallow trough thus separated off from the rest is for the wick to lie in, along the straight edge in front. The oil is contained in the back part, and is admitted to the front by three or four notches cut in the dividing ridge. The wick is of dried moss, and the fuel consists of train oil. A stick of wood or bone, with a curved end, is used for trimming the wick. The oil bowl of the lamp rests on two other stones, the upper one forming a stand on which the bowl can be tipped up so as

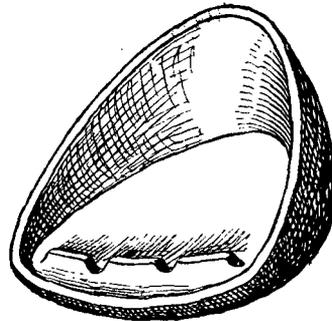


Fig. 5. Esquimaux Lamp of Stone (Brit. Mus.).

<sup>1</sup> Vol. ii. p. 22.

to bring the oil towards the front when it gets low, and the lower one being a tray to catch the superfluous oil.

Baron Nordenskiöld<sup>1</sup> says that amongst the Chukches of north-eastern Asia, "the interior of the sleeping chamber is lighted and warmed by lamps, whose number varies according to the size of the room. A moderately large chamber has three lamps, the largest right opposite the entrance, and the two others on the cross walls." Also<sup>2</sup> that "in the tent the women have always a watchful eye over the trimming of the lamp and the keeping up of the fire. The wooden pins she uses to trim the wick, and being naturally drenched with train oil, are used when required as a light or torch in the outer tent, to light pipes, &c. In the same way other pins dipped in train oil are used. I have also seen such pins, also oblong stones, sooty at one end, which after having been dipped in train oil, have been used as torches, laid by the side of corpses in old Eskimos graves in north-western Greenland. Clay lamps are made by the Chukches themselves, the clay being well kneaded and moistened with urine. The burning is incomplete, and is indeed often wholly omitted."

The picture here given of the domestic life of the Eskimos at the present time enables us to form a tolerably correct idea of the way in which the inhabitants of the Scottish brochs lighted their dwellings during the long winter nights two thousand years ago. The practice of placing lights on graves also suggests the possibility that some of the cup-shaped hollows found on the sepulchral monuments of the Stone and Bronze Ages may have been used as lamps. In Syria, lights are placed on graves to frighten away the jackals. Before leaving the subject of open cup lamps, the curious cresset stones still found in some churches in England and Sweden<sup>3</sup> should be mentioned.

*Cresset Stones.*—In many churches, both in this country and in Sweden, certain stones with cup-shaped hollows in the top have been found. Their use was for a long time a matter of speculation amongst archæologists, but the Rev. J. Lees has, in a paper read before the British

<sup>1</sup> *Voyage of the Vega*, vol. ii. p. 23.

<sup>2</sup> *Ibid.*, vol. ii. p. 118.

<sup>3</sup> At Lewannickin, Cornwall; Llanthony; Furness Abbey.

Archæological Institute,<sup>1</sup> conclusively proved that these curious objects are nothing more than ecclesiastical lamps. Prof. Skeat, in his *Concise Etymological Dictionary of the English Language*, tells us that "Cresset is the Middle English word for a cup or vessel containing light fixed on the top of a pole, and comes to us through the Old French *crasset*, a cresset; *croiset*, *creuset*, a cruet, pot, crucible (with which last word it seems most reasonable to ally it), from the Old Dutch *kruyse*, a cup or pot." Cresset may also be compared with the Scotch word *crusie*, a lamp. The Rev. J. Lees, in the paper already alluded to, makes the following quotations from the *Rites of Durham*, published by the Surtees Society,<sup>2</sup> describing the three cresset stones used in the church and monastery of Durham:—"Also there is standinge on the south pillar of the Quire doore of the Lanthorne, in the corner of the same pillar, a foure-squared stoun, which hath been finely wrought, in every square a large fine image, whereon did stand a foure-squared stone above that, which had twelve cressets wrought in that stone, which was filled with tallow, and every night one of them was lighted, when the day was gone, and did burne to give light to the monks at midnight, when they came to matins." Other cresset stones are specified as being used in the monk's dormitory.

Cresset stones exist at the following places:—Calder Abbey, Yorkshire; Furness Abbey, Lancashire; Dearham, Cumberland; Lewannick, Cornwall; Wool, Dorset; St Mary's, Monmouth; St Mary's Abbey, York; Llanthony Abbey, Monmouthshire; Carlisle Cathedral.

There are four specimens in the Stockholm Museum from churches in Sweden. The cresset stone at Lewannick is circular, but the others are rectangular, varying in diameter from 1 foot to 1 foot 9 inches, and in thickness from 5 to 7 inches. The number of holes vary from one to sixteen.

In the Edinburgh Museum of Antiquities there are some tailors' candlesticks of stone, one dated 1634 (shown in fig. 6), which resemble the cresset stones in appearance, having four hollows in the top for candles, and a large central hollow for the snuff.

<sup>1</sup> *Journal*, vol. xxxix. p. 392.

<sup>2</sup> Vol. xv. This book was written in 1593.

*Closed Lamps.*—The well-known classical type of lamp is an improvement on the open kind just described, in having the cup and the spout for the wick covered over, so as to prevent the oil from spilling. Thousands of these objects are to be found in British and foreign museums,

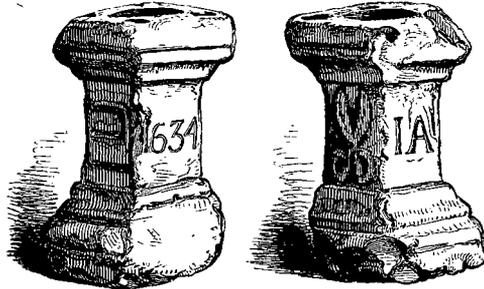


Fig. 6. Tailor's Candlestick of Stone, front and back view.

owing their preservation partly to the durability of the terra-cotta of which they are made, and partly to the artistic character of their decoration. The body of the lamp is a shallow circular vessel for containing the oil. At one side a spout projects for the wick, and at the other is a small handle for carrying. Sometimes this class of lamp is provided with two or more wick spouts. The top of the oil vessel is slightly concave, and has a small hole for filling. The ornamentation is generally concentrated upon the circular top of the oil vessel, and consisted in pagan times of mythological subjects, but in the early centuries of the Christian era scenes from Scripture were substituted.

There is in the Guildhall Museum, in London, a clay mould used in the manufacture of the Roman terra-cotta lamps for impressing the ornamental pattern.<sup>1</sup>

*Hanging Lamps.*—For many purposes a hanging lamp is more convenient than one provided with a foot or stand. In order that a hanging lamp may remain horizontal, it is absolutely essential that the point of suspension shall lie directly over the centre of gravity of the oil vessel. This may be effected in three different ways (as shown in fig. 7):—

<sup>1</sup> For further information on this subject, see Birch's *History of Ancient Pottery*.

(1) The suspending rod or chain may be straight, passing vertically through the centre of gravity of the oil vessel, and be attached to the top or bottom of the lamp.

(2) The suspending rod may be attached to one side of the oil vessel, and be bent at right angles, so as to bring the end over the centre of gravity.

(3) The suspending rod may be semicircular, and attached to two opposite sides of the oil vessel, like the handle of a bucket.



Fig. 7. Hanging Lamps, three ways of suspension.

The first method is objectionable, as it generally involves making a hole through the oil vessel, which may leak. The third method is sometimes used, as in the annexed example (fig. 8). The second method is by far the commonest, and is that employed in the Scotch crusie. This form of hanging lamp can be traced back to the time of the Romans, there being several specimens in the Guildhall, London (one of which is shown in fig. 9), and British Museums.<sup>1</sup>

In a painting of the third or fourth century, in the catacomb of St Callistus at Rome, Diogenes Fossor is represented carrying a lamp of this description.<sup>2</sup> The bent bar is usually made in one piece with the oil vessel, and has a hole in the top for attaching the swivel and hook for suspension. Hanging lamps exactly resembling the Roman ones are, or were until quite recently, used in Italy and some parts of France.

The Scotch crusie (fig. 10) probably owes its origin to the Roman lamp just described. The only difference between the two is that the crusie is provided with a second open vessel to catch the drippings of the

<sup>1</sup> Found at Whittenham Hills, Berkshire; Bartlow Hills, Essex; Bayford, London.

<sup>2</sup> Northcote and Brownlow's *Roma Sotterranea*.

oil. The crusie type of lamp is used in many other places besides Scotland, being found in Iceland,<sup>1</sup> the Scilly Isles,<sup>2</sup> Auvergne<sup>3</sup> in France,

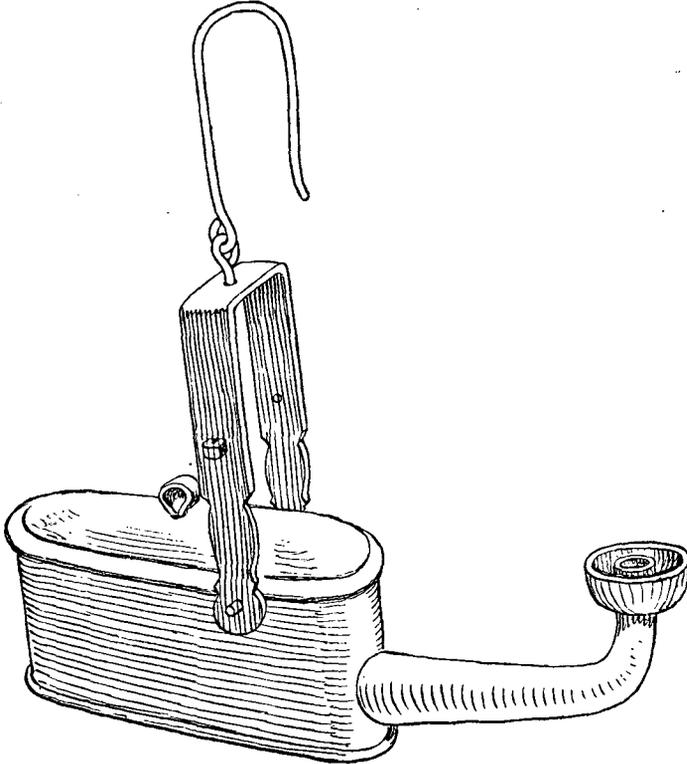


Fig. 8. Brass Hanging Lamp.

Algiers, and doubtless elsewhere. The method of manufacture of the Scotch crusie is a matter of some interest. The wrought-iron oil cup is shaped by being hammered into a mould. Mr Gilbert Goudie, Honorary Treasurer to the Society of Antiquaries of Scotland, possesses a stone

<sup>1</sup> Specimen from Reykjavik, in the Edinburgh Industrial Museum.

<sup>2</sup> *Jour. Brit. Archaeol. Assoc.*, vol. xxxiii, p. 192.

<sup>3</sup> Specimen in Pitt Rivers Collection, at Oxford (see fig. 15).

mould which was used for this purpose in Shetland, and there are other specimens in the Edinburgh Museum of Antiquities.<sup>1</sup> In France lamps of this kind are made of tin.

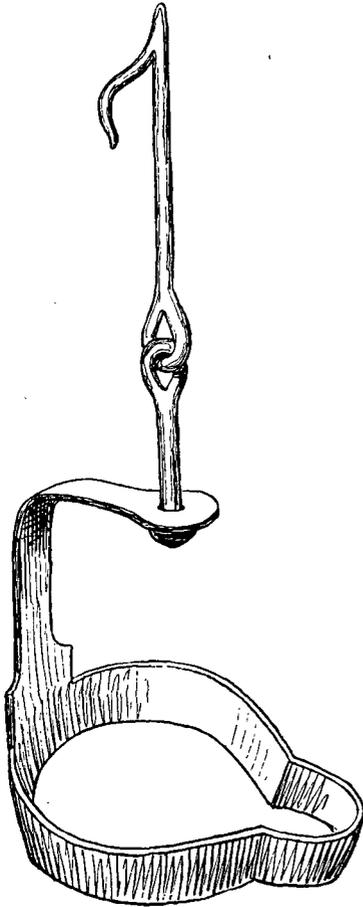


Fig. 9.  
Roman Hanging Lamp or Crusie.

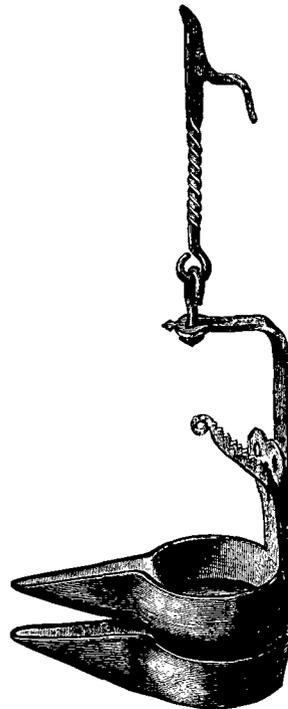


Fig. 10.  
Modern Crusie, from Shetland.

<sup>1</sup> See the previous paper of Mr Goudie, pp. 70-78.

In lamps which are arranged to hang against a wall, it is not necessary that the point of suspension should be vertically over the centre of gravity of the oil vessel.

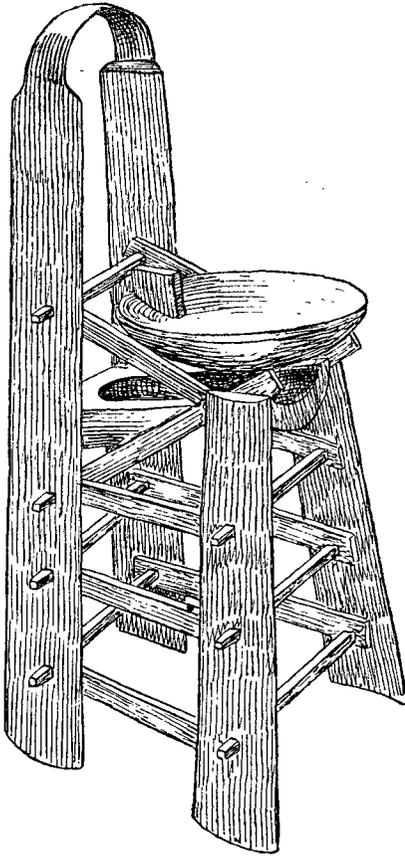


Fig. 11.

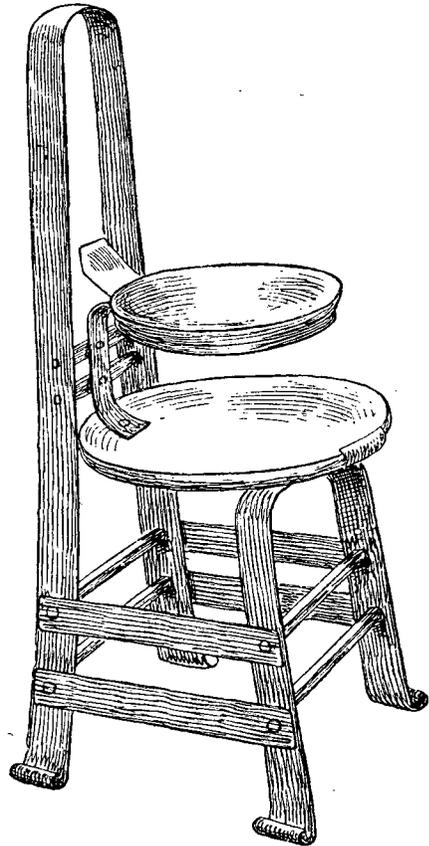


Fig. 12.

Chinese Lamps, with stands of bamboo and sheet-iron.

In the British Museum there is an Abyssinian lamp supported on a

wooden bracket hung against the wall. The wooden part consists of an upright bar hung to a nail, and it has two wings projecting from the lower end, on which a pottery oil cup is placed.

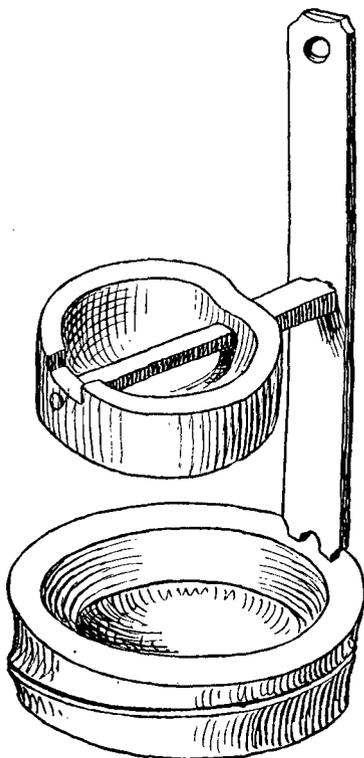


Fig. 13. Chinese Lamp, made of sections of bamboo.

*Lamps on Stands.*—The ordinary kind of lamp stand consists of a solid stem supported on a foot immediately under the centre of the oil vessel, and forming part of the lamp.

In the Guildhall Museum, in London, there are some triangular

pottery stands<sup>1</sup> for placing under the Roman terra-cotta lamps. The Chinese make some ingenious lamp stands out of bamboo or thin sheet-iron (see figs. 11 and 12). In the Edinburgh Museum of Antiquities there is a stand for a crusie lamp.

*Contrivances for Catching the Superfluous Oil.*—It is almost impossible to regulate the supply of oil to the wick so exactly that the whole of it may be burnt, and therefore some contrivance is necessary for preventing what runs over from being wasted. The contrivances are of two kinds—(1) where the oil is caught in a separate vessel, and (2) where the oil is conducted back into the reservoir from whence it came. As instances of the first kind, there is the primitive Chinese lamp (fig. 13), made out of sections of bamboo, as shown on the accompanying drawing, the oil which drips over being caught in the cup which forms the stand, and the Cornish “chil.”<sup>2</sup> The same method is adopted in the Scotch crusie, which resembles the Roman lamp already described, except that it is provided with two vessels of similar shape, one below the other, the oil being burnt in the upper one and the drippings caught in the lower one. Both vessels are provided with spouts, in one case for the wick to lie in, and in the other to facilitate the pouring back of the superfluous oil when a sufficient quantity has collected. The lower vessel is made in one piece with the bent bar for suspension; and the upper vessel is hung over it upon a projecting hook, so that it can be removed when it is necessary to pour back the oil. A similar contrivance survives in the tin lamp (fig. 14) used in engine rooms and by fishermen. It consists of two cylindrical vessels fitting one above the other by means of a socket, the upper one having a closed spout like that of a coffee-pot for the wick, and the lower one having an open spout immediately under it to receive the drippings. Sometimes these lamps have two spouts for wicks, on opposite sides. This lamp affords a remarkable instance of the way in which archaic contrivances are preserved in consequence of their special fitness to be used under certain circumstances where the surroundings are unsuitable for more highly developed appliances.

<sup>1</sup> Found in Tokenhouse Yard in 1866.

<sup>2</sup> “Description of an Ancient Lamp, called in the Meneage district a Chil,” by R. Blight (*Jour. R. Inst. of Cornwall*, vol. for 1875, p. 150).

Another way of catching the superfluous oil in a separate vessel, is to be seen in a bronze lamp found in the Steel Yard, Lower Thames Street, London, and now in the Guildhall Museum. This lamp is suspended from the centre, and has six open spouts for wicks all round. A small cup hangs from a hook beneath, so that as the oil trickles



Fig. 14.  
Tin Lamp in the Museum.

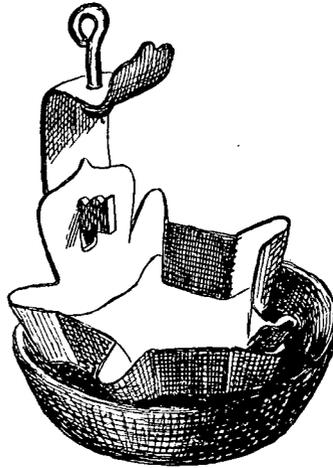


Fig. 15.  
Tin Lamp, with five spouts, from  
Auvergne (Pitt Rivers Coll.).

down along the under side of the spouts it is prevented from falling on the ground. The same contrivance will be noticed in a lamp (fig. 15) from Caen, in Normandy, in the Pitt Rivers Collection at Oxford, in a bronze lamp dug up at Lincoln;<sup>1</sup> and is also used in Mohammedan countries.

There are two common methods of catching the superfluous oil without having recourse to a second oil vessel. One is employed in the iron and tin lamps from France (fig. 16), resembling the Scotch crusies in

<sup>1</sup> Illustrated in *Jour. Brit. Archæol. Assoc.*, vol. x. p. 83.

shape, but covered over at the top. Here the wick, instead of hanging

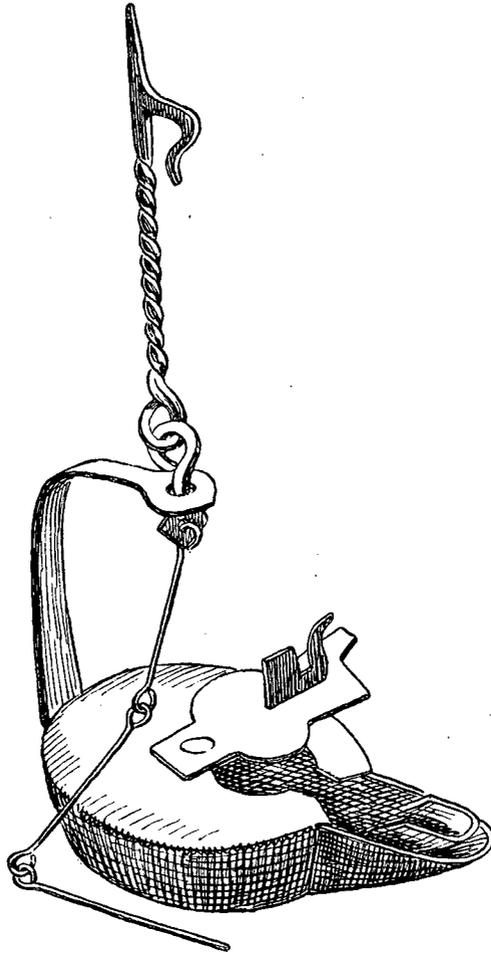


Fig. 16. Covered Lamp of iron, from France.

over the edge of the spout, is kept slightly back from it by a little piece of metal like the nib of a pen fastened to the bottom of the lamp,

and inclined at an angle of about 45 degrees to the horizontal. The object of this double lip is to make the oil fall back into the lamp instead of over the edge.

The other contrivance is applied to lamps with closed spouts, and consists of a projecting lip forming a ring round the wick to catch the oil, there being a hole to allow it to run back (as in fig. 8). There is an example of this method of economising oil in the terra-cotta lamps used in Treves at the present day.<sup>1</sup>

*Contrivances for bringing the Oil to the Wick.*—The oil is raised from the vessel in which it is contained to the level of the flame partly by the capillary attraction of the fibrous wick, but as the oil is consumed this is insufficient, and it becomes necessary to counteract the force of gravity in some other way. The Scotch crusie is provided with an exceedingly ingenious contrivance for bringing the oil to the flame. The shallow vessel containing the oil is hung up on a hook having a series of notches, so that it can be tipped forward gradually as the oil burns down. The same thing may be effected by placing the oil vessel upon a stand, the friction against which is sufficient to keep the vessel in any position. It then may be tipped up by degrees. In lamps suspended from one point at the side, the inclination of the oil vessel may be altered (as in fig. 17) by having a slot or a series of perforations in the top of the bent bar by which it is hung (as in fig. 14), so that the position of the point of suspension above the centre of gravity of the oil vessel may be changed. In lamps suspended from two points on opposite sides the inclination of the oil vessel may be made self-adjusting, as the oil burns down, by carefully weighting one side with metal, and making the capacity of the oil vessel correspondingly greater on the other (as in fig. 8). The result of this is, that although the oil vessel remains level when full it gradually becomes inclined as the oil gets low. The other methods of bringing the oil to the flame, which have been applied in more modern lamps, are by placing the oil reservoir above the level of the flame, as in the ordinary reading lamp, or by pumping up the oil by clockwork, as in the lighthouse lamps, or by an oil pump worked directly by a spring, as in the moderator lamp.

<sup>1</sup> Roach Smith's *Collectanea Antiqua*, vol. ii. p. 152.

In recent times the difficulty of raising the oil has been avoided by using paraffin and other more volatile fluids.

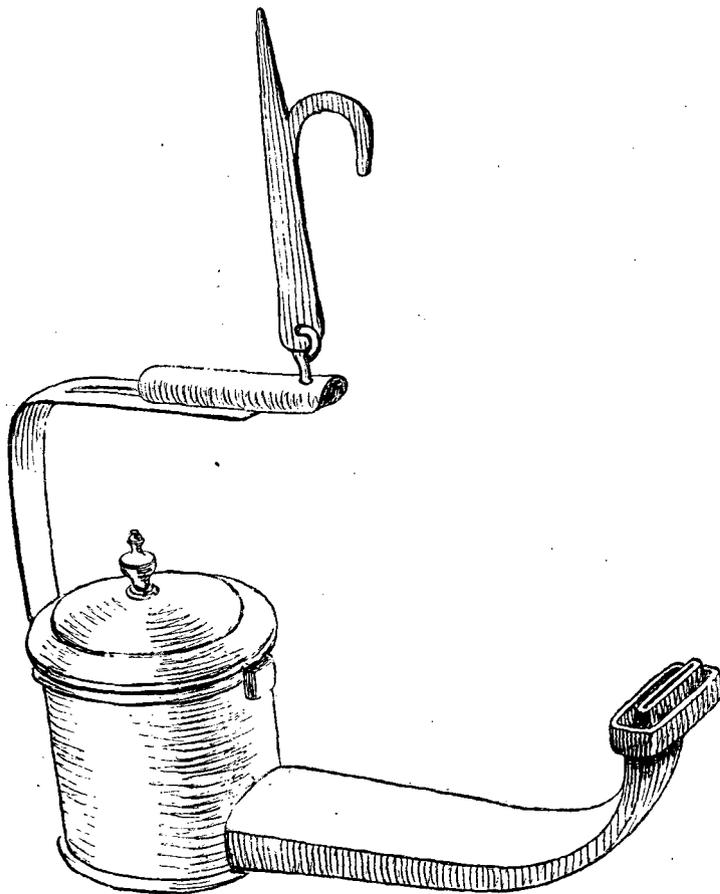


Fig. 17. Brass Hanging Lamp, with Slot for adjustment.

*Contrivances for Raising and Lowering the Wick.*—In the commoner kind of lamps the wick is raised, when it has burnt down, by means of the same instrument which is used for removing the charred portion.

In the more highly developed kinds, however, the two operations of trimming and raising the wick are performed separately. The latter is generally effected by means of a small toothed wheel pressed hard against the wick, and turned by a milled head held between the first finger and thumb.

*Contrivances for facilitating Combustion.*—In modern lamps circular wicks, double wicks, glass chimneys, and other improvements have been introduced, with a view to increasing the supply of oxygen to the flame, and thus increasing the brilliancy of the light.

The most recent inventions in connection with artificial illumination are founded on the new principle of using the flame, not to give light directly, but to heat some other incandescent substance.

*Miners' Lamps.*—Sir Humphry Davy and George Stephenson, independently, invented a form of safety lamp for avoiding explosions in coal mines, the flame being protected by a cylindrical gauze case through which the gas is unable to pass.

Special kinds of small oil lamps, which can be attached by a hook to the hat of the miner, are used in many places in this country and abroad.

*Rush Candles.*—The use of rush candles was common in many parts of England, especially in Sussex, up to the end of the last century, and Gilbert White gives an admirable account of this "very simple piece of domestic economy" in his *Natural History of Selborne*.<sup>1</sup> The common soft rush (*Juncus effusus*) is most suitable for the purpose, although the bulrush (*Scirpus lacustris*) is sometimes employed. The rushes should be gathered in the height of summer, taking care to select the longest and largest specimens. The method of preparation is as follows:—The rushes must be thrown into water as soon as they are cut, so that the peel may be more easily stripped off. The whole of the peel is removed with the exception of a narrow rib running from top to bottom, which is left to support the pith. The cores thus obtained are laid out on the grass for a few days to bleach and dry in

<sup>1</sup> Letter xxvi. Other descriptions will be found in the *Sussex Archaeological Collections*, vol. vii. p. 188; *Gentleman's Magazine*, Sept. 1852, p. 273; and J. Lucas, *Studies in Nidderdale*, p. 27.

the sun. Finally, they are dipped in scalding grease until thoroughly saturated, and after being allowed to cool are ready for use.

The rush candle is too long and not sufficiently rigid to stand in a socket, and has therefore to be supported by a special contrivance whilst burning.

The simplest kind of rush-holder is made by splitting a stick and placing the rush diagonally within the cleft. Mr J. Lucas<sup>1</sup> states that this primitive apparatus was employed in the north of England not long ago. The split stick probably suggested the rush-holder on the same principle made of iron, of which there is a specimen from Brittany in the Pitt Rivers Collection at Oxford.

The most common kind of rush-holder, however, consists of a pair of nippers supported on a stand. The rush is placed in the jaws of the nippers, and the necessary pressure given either by a spring or a bent lever and a weight. Sometimes the whole is made of iron, but often the upper part only, the nippers being inserted in a block of wood. The Sussex rush-holders (fig. 18) generally have a socket at the end of the bent lever of the nippers, which serves a double purpose, acting both as a candlestick, and also by its weight keeping the jaws pressed tight together upon the rush. Sometimes the rush-holder is arranged to hang from a nail (fig. 23) instead of to stand on a table, and in this case there is a rack to adjust the height.<sup>2</sup>

Gilbert White<sup>3</sup> states that it takes 6 lbs. of grease to dip 1 lb. of rushes, or 1600 individuals, and that a good rush about 2 feet 6 inches long burns an hour.

*Rush Lights.*—A rush light is a tallow candle with a rush in the middle of it instead of a cotton wick. The rushes are prepared in the same way as in the case of rush candles, but instead of being dipped into molten grease so as to absorb it, they are coated with tallow by several successive dippings. The rush wick has also two ribs of the peel left on each to support the pith instead of one, the object being to

<sup>1</sup> *Studies in Nidderdale*, p. 27.

<sup>2</sup> Specimens of rush-holders may be seen at the Guildhall Museum, London; at Lewes, Chichester, Ipswich, Derby, and other museums.

<sup>3</sup> *Natural History of Selborne*, Letter xxvi.

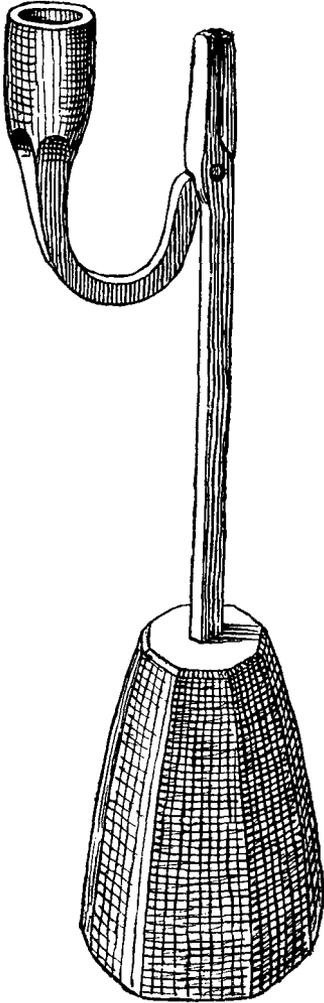


Fig. 18.  
Rush-Holder and Candlestick  
combined.

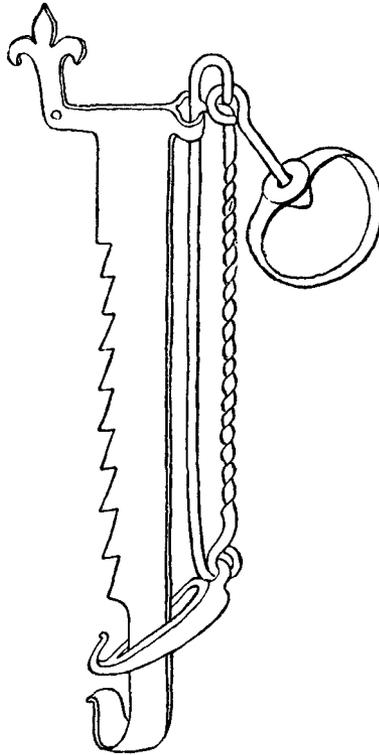


Fig. 19.  
Rack Adjustment for Hanging  
Cooking-Pot, used in Brittany  
(Pitt Rivers Coll.).

retard combustion. Gilbert White<sup>1</sup> says that the rush coated with tallow sheds a dismal light—"darkness visible," and is not near so economical as the rush soaked in melted fat. Possibly, however, the rush light had the advantage over the rush candle in being more easily carried about (fig. 20).

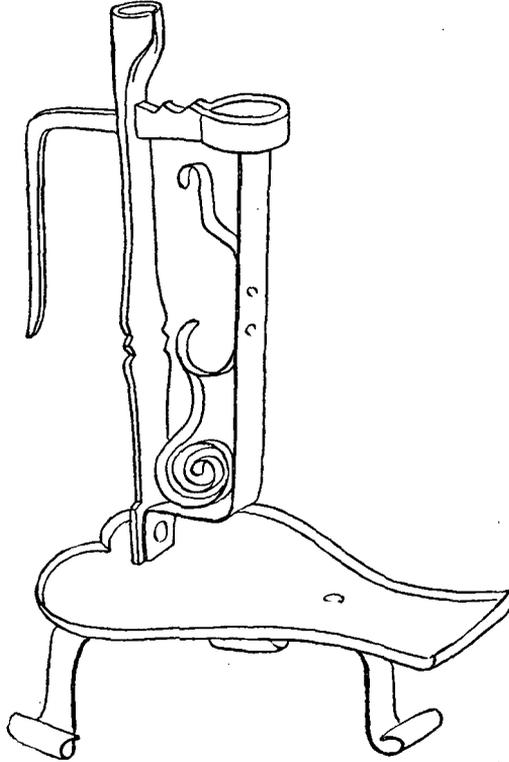


Fig. 20. Candlestick with Spring Fastener for adjustment.

*Tapers.*—A taper is a kind of small candle, with a very thin coating of wax round the wick.

Taper-holders are made on the same principle as the rush-holders

<sup>1</sup> *Natural History of Selborne*, Letter xxvi.

already described, but the pincers which clip the taper are placed horizontally instead of vertically.

There is a good specimen of an iron taper-holder in the Museum of National Antiquities in Edinburgh. The holders for the thicker sort of taper are generally made of brass, and have a circular hole in the jaws of the pincers to allow the taper to pass through. The jaws are kept together by a spring.

*Candles.*—A candle is a cylinder of solid grease with a wick running longitudinally from end to end through the middle of it.

The materials formerly used were for the better kind of bleached bees' wax, and for the commoner kind animal fats. Tallow has now been almost entirely abandoned in favour of stearine,<sup>1</sup> which is produced from it by removing the glycerine. Other substances, such as spermaceti, paraffin, ozokerit, &c., are also used.

Tallow candles were made by dipping a twisted cotton wick into melted fat, and allowing it to cool. The process was repeated several times until the candle was of sufficient thickness. Candles are now made in moulds by special machinery. The chief improvement which has been made in the present century is the substitution of plaited wick for a twisted one. When first introduced under Palmer's patent, the turning over at the end was caused by saturation with pulverised metallic bismuth. The same result is now obtained more simply by tightening the plait on one side, and thus making the tension unequal. The invention of the plaited wick has rendered instruments for trimming it quite unnecessary; and snuffers, which were once indispensable to every household, are being relegated to museums. The origin of the candle is lost in the mists of the past. The word occurs in numerous instances in our version of the Scriptures, but it is probably a mistranslation for lamp. The so-called seven branched candlesticks of the Jews, of which there are representations on Hebrew coins and on the gilded glass vessels of the third or fourth centuries in the catacombs at Rome, are evidently lamp stands.<sup>2</sup> In the text in Leviticus xxiv. 4, "He shall order lamps upon the pure candlestick," the two are confused together.

<sup>1</sup> Discovered by Chevereuil in 1811.

<sup>2</sup> Martigny's *Dict. des. Ant. Chrét.*, p 113.

In China lampstands of the same shape as a candlestick are used at the present day. The late Mr Thomas Wright describes in his *Uriconium* the discovery of Roman candles in old lead workings at Shelve Hill, Shropshire, which are now preserved at Linley Hall. He says that they were made, not by the process of dipping, but that a flat sheet of wax was rolled round the wick. In the same book an illustration is given of a Roman socket candlestick found in a villa at Petit Fresin, in Belgium, and of an iron one from Wroxeter. Candles are referred to by Juvenal (*Sat.*, iii. 286) and Pliny (*Nat. Hist.*, lib. xvi. c. 70).

The oldest post-Roman candlesticks of which specimens are to be found in museums in this country, are those used for ecclesiastical purposes, in the twelfth and thirteenth centuries. They belong to the class of "pricket" candlesticks (*i.e.*, ones where the candle is held in position by a vertical spike), and are generally very beautifully decorated with chasing and enamel.

Socket candlesticks of the Commonwealth period are not uncommon, there being a fine example made of glazed pottery in the British Museum, dated A.D. 1651. There are also in the same collection some fourteenth century socket candlesticks of metal, ornamented with arabesques and heraldic shields of Venetian workmanship.

In mediæval times candles were used for lighting churches, as well as for ceremonial purposes. An example of a wrought-iron bracket with prickets for candles exists in the Church of St Peter at Rowleston, in Herefordshire.<sup>1</sup> In many cases the chandelier consisted of a circular corona round which the lights were placed, hung by chains from the roof of the building.

*Candlesticks with Adjustments for raising or lowering the Level of the Light.*—In most machines adjustments are required by means of which the relative position of certain points may be altered by lengthening or shortening the rigid connection between them. The origin of the adjustments used in machinery at the present time may be traced back to those domestic appliances in which a contrivance of this kind first

<sup>1</sup> *Architectural Association Sketch Book*, vol. iii. See also specimen in Copenhagen Museum, illustrated in J. A. Worsaae's *Catalogue*, p. 136.

became necessary, as for example that for tightening the cords of a tent, that for raising or lowering a cooking-pot over a fire (figs. 19 and 21), and that for raising a candle in its socket as it burns down. The Japanese use the same device for altering the height of their cooking-pots above the fire which is seen in England for tightening tent-cords. The tension of the cord is applied in a very ingenious manner to prevent the little perforated rocking lever, by which the length is altered, from slipping.

An adjustment, or contrivance for increasing or decreasing the distance between two points of a machine, is not complete without a locking apparatus for fixing the length of the rigid connection between the points after it has been changed.

A common adjustment for cooking-pots and also for rush-holders consists of a rod sliding parallel to a rack, and having a loop of metal at the end, which catches on the teeth of the rack as soon as the rod is allowed to fall by its own weight (figs. 19 and 23).

Another adjustment for candlesticks is founded on the screw principle. The socket in which the candle is placed has a projecting stud, which works between the threads of a screw formed of thin bar iron twisted spirally round the candle.

Some kinds of candlesticks have cylindrical sockets in which the candle can slide up and down, being kept in any required position by the friction against the sides produced by a spring (fig. 20), or by a notch. The necessary friction may also be obtained by thin metal rods pressing against the socket which slides between them.

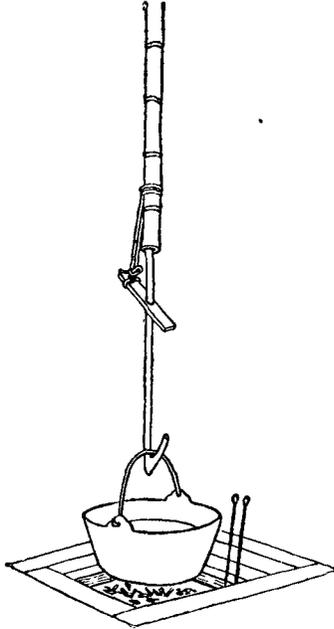
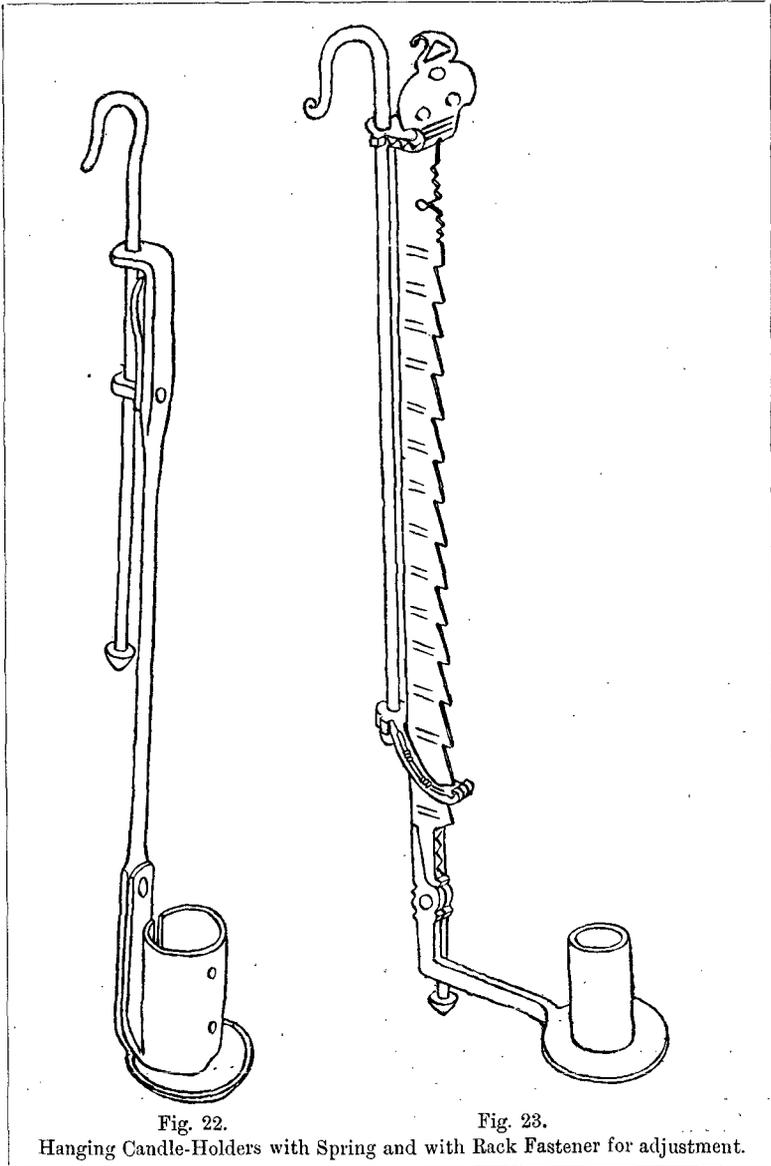


Fig. 21. Contrivance for raising or lowering a Cooking-Pot over a fire, used in Japan.



*Instruments for extinguishing Lamps and Candles.*—Lights are usually put out by means of a conical cap, called an extinguisher, which excludes the air when placed over the flame. Extinguishers appear to be of modern origin, as they are not found associated with ancient remains. Large iron extinguishers of the eighteenth century, for putting out torches, are to be seen on each side of the doorways of some of the older houses in London and Edinburgh. A pair of pincers with a circular end about the size of a shilling, called a pair of “dampers,” are sometimes used for extinguishing candles.

*Instruments for trimming the Wicks of Lamps and Candles.*—Although the number of ancient lamps discovered from time to time is very great, the instruments used for trimming the wick are seldom found along with them. One of the few examples which has come under my notice is in the Guildhall Museum in London, and was dug up in Tokenhouse Yard in 1865. It is a bronze pin 3 inches long, pointed at one end, and attached to a chain at the other. At each side are projecting hooks, one near the point and the other near the head.<sup>1</sup> The rarity of wick trimmers is probably due partly to the small size of such objects, which would cause them to be lost or overlooked by discoverers, and also to the fact that pointed instruments originally intended for other purposes may have been used. The wick trimmer of the Eskimo stone lamp, consisting of a bent piece of stick with a curved end, has been already described. For the more primitive kinds of metal lamps such as the Scotch *crusie*, a small bit of wire is employed for the purpose.

Before the invention of the plaited wick for candles, pairs of snuffers were to be found in every household, but they are now becoming rapidly obsolete. A pair of snuffers (fig. 24) consists of a pair of scissors provided with a small box on the top to receive the snuff of the candle when cut off. The oldest specimens which now exist date back to perhaps the sixteenth century,<sup>2</sup> and have a box of heart-shape at the

<sup>1</sup> Pins of similar shape have been found in France (see *Mémoires de la Société des Antiquaires du Midi de la France*, vol. viii.) and at Pompeii (see E. Trollope's *Pompeii*).

<sup>2</sup> See pair with arms of Cardinal Bainbridge, *circa* A. D. 1510, illustrated in *Jour. Brit. Archæol. Inst.*, vol. x. p. 72, now in the British Museum.

end, sometimes of brass ornamented with Scripture subjects.<sup>1</sup> The modern kind is very ugly, having a rectangular box, and a point at the end for separating the strands of the wick or removing pieces of charred cotton from the melted grease at the top of the candle. The snuffers

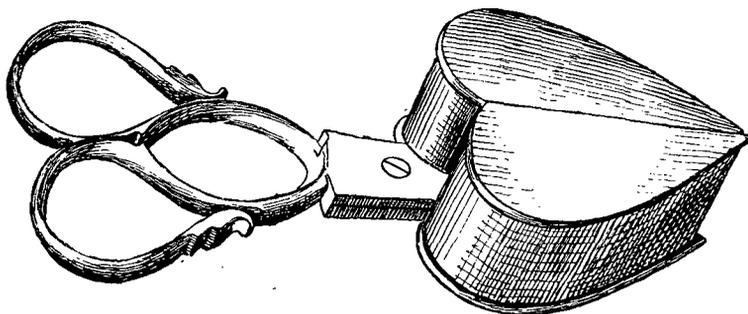


Fig. 24. Pair of Brass Snuffers.

are placed either on a tray by themselves or on the candlestick. There is in the South Kensington Museum an elegant stand for a pair of snuffers, made of wrought iron.

*Lanterns.*—A lantern is a contrivance for protecting the flame of a lamp or a candle from being blown out by the wind when carried in the open air. It consists of a cylinder, either entirely or partly made of some transparent substance, surrounding the flame and having the top and bottom closed with metal plates, perforated so as to admit the amount of air required for combustion.

In this country the windows of lanterns are made either of horn or glass, but in the East, paper and oiled canvas have been used from time immemorial. Very few specimens of lanterns are preserved in museums, and none of great age. Probably the oldest now existing is that used by Guy Fawkes, in his unsuccessful attempt to blow up the Houses of Parliament, which is now in the Bodleian Museum at Oxford. Lanterns were known in Saxon times, as there is a picture of one in Ælfric's *Heptateuch* in the British Museum (Claud B. iv. fol. 27), illustrating Abraham's *Dream of the Lamp* (Genesis xv. 17).

<sup>1</sup> Specimen with Adam and Eve in the British Museum.

Lanterns occur amongst the accessories of the scene of the Betrayal of Christ (John xviii. 3). "Judas then having received a band of men, and officers of the chief priests and Pharisees, cometh thither with lanterns and torches and weapons," as in the twelfth century Life of Christ in the MS. in the British Museum (Nero, c. iv. fol. 21), and in the Saxon Benedictional of Æthelwold.<sup>1</sup> Dark lanterns provided with a shutter for rendering the light invisible are used by the criminal classes, such as burglars, poachers, and smugglers.

Some curious specimens of salmon poachers' lanterns were to be seen at the late International Fisheries Exhibition in London. At the same Exhibition was shown a lantern made out of an ordinary spirit glass, which was used for beach work at Polpero, in Cornwall, a hundred years ago.

*Torches.*—The torch is probably the most primitive of all lighting appliances. The flame is produced by burning a piece of wood or other dry vegetable substance, impregnated with resin or coated with pitch to make it more combustible. In a savage state of society a brand plucked from the fire used for cooking or heating purposes would naturally suggest itself as the simplest kind of portable light. Torches are often made of pine wood, taken from a tree which has had an incision made in it so as to cause the resin to flow and form a coating over the lower part of the trunk.

Torches were known in classical times, the Greek word for one being *λυχνος*, and the Latin "tæda." Representations occur of torches held by the personifications of the Sun and Moon, and in other instances. Before the streets of our large towns were lighted by gas, link boys carried torches in front of persons going out after dark, and the iron extinguishers with which the light was put out are still to be seen at each side of the doorways of the older houses in London. Even at the present day the dense London fogs necessitate the occasional revival of this extinct method of illumination. Processions are also still held by torchlight in some instances.

Mr Bruce Peebles lately delivered an address before the Royal Scottish

<sup>1</sup> *Archæologia*, vol. xxiv.

Society of Arts on the progress of artificial methods of lighting, in which he described the use of torches made of fir wood in Scotland as follows:—"Another and more primitive device for giving light in a dwelling was shown in a few specimens of 'peer men,' an article at no very remote period in common use in Scottish country households. Its purpose was to hold the 'fir cannell' or split of resinous fir, by the flame of which the family had supper and the head of the house 'took the books.' The rudest form of the 'peer man' was that of a stout staff of about three feet long, placed in a hole bored into a large stone, and having a piece of slit iron fixed at the upper end for holding the 'cannell wood.' The split of fir, taken from a stock on a frame kept within the 'ingle' that they might be thoroughly dry, would of course be fixed in the slit in a horizontal position, and the light could in a degree be regulated by raising or lowering the burning end. The name 'peer man,' or poor man, is supposed to have originated in the custom of assigning the duty of holding the light to a beggar man who might be within the gates in the day before the contrivance referred to had been devised. Other forms of 'peer men,' made of iron, and having several hinges after the manner of a gas bracket, were also shown, and are known to have been in use in Mid-Lothian and Lanarkshire within living memory. They were constructed for fixing on the upper bar of a grate, but the illuminant in this instance was not 'cannell wood' but 'cannell coal.' This, as is well known, takes fire easily and gives a good light; the splinter of coal was laid upon the 'peer man'; it was kept ablaze by being held near to the fire, and the fumes would escape by the chimney."

In British Columbia a species of smelt called the candle fish is sufficiently rich in oil to be used as a torch or candle. The dried fish is stuck, tail upwards, in a lump of clay or a cleft stick and a light applied to it. Sometimes a piece of rush pith or a strip from the inner bark of the cypress tree is drawn through the fish by means of a wooden needle.

At the Indian and Colonial Exhibition, held in London in 1886, a sort of vegetable torch called a "damar," fixed in a wooden stand, from the Straits Settlements, was shown.

*The Invention of Gas.*—Although it is not proposed to describe the

appliances used for gas lighting in the present paper, the name of the inventor of this improved system of illumination, and the time when it was introduced, deserves to be recorded. Coal gas as an illuminant was invented by William Murdoch, partner in the firm of Bolton and Watt, Soho Works, Birmingham, and he first exhibited it in public on the occasion of the Peace of Amiens in the year 1802.<sup>1</sup> William Murdoch was born at Bellow Mill, near Auchinleck, Ayrshire, August 21, 1754. He lighted his own house and offices at Redruth, in Cornwall, with gas in 1793.

Electricity and paraffin, for purposes of illumination, are of too recent origin to be treated of in the present paper.

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MONDAY, 13th February 1888.

PROFESSOR DUNS, D.D., in the Chair.

A Ballot having been taken, the following Gentlemen were duly elected Fellows :—

JAMES FLEMING, jun., Kilmory, Skelmorlie.

GEORGE REID, R.S.A., 17 Carlton Terrace.

REV. ALEXANDER THOMSON, D.D., Constantinople.

The following Donations to the Museum and Library were laid on the table, and thanks voted to the Donors :—

(1) By Miss FRASER, 60 Hogarth Road, London.

Gold filigree Watch-Case, said to have belonged to King James VI.

Gold filigree Tablet-Cover, said to have belonged to Queen Anne.

Small Pin-Cushion, said to have belonged to Queen Mary, but not of the time of Mary Queen of Scots.

Sleeve-Link, with hair inserted in a square, with gold border, on

<sup>1</sup> See letter by Mr S. Adams, an eye-witness, in the *Standard*, July 3, 1883.

which is a crown and the letters J.R., and round it GOD SAVE THE KING.

Miniature in oils of the Prince James, son of James VII., as a child.

Small Miniature of Prince Charles Edward Stuart, forming a locket, with some of his hair gummed down on the back.

In a letter announcing the donation, Miss Fraser gives the following particulars of the history so far as known of these objects :—

60 HOGARTH ROAD, LONDON, *Oct.* 13, 1887.

SIR,—I am sending some Stuart relics which I have decided to present to the Edinburgh Museum of Antiquities. These treasures were bequeathed to me by my aunt, Mary Bagot, who received them from Mrs Bowdler, then a widow, the survivor of all her children. My aunt wrote down what Mrs Bowdler told her about the treasures, but there is no clue to their history from the time of the Stuarts to our own times. I find in my aunt's journal that her maternal grandfather "the Rev. William Ward, was a Non-juring minister, and as such officiated for many years as chaplain in the family of Thomas Bowdler, Esq., and Elizabeth Stuarda, his wife, both families being amongst the most devoted adherents of the ejected royal race. Mrs Bowdler was the daughter of R. Cotton of Conington, Huntingdonshire. Her husband's stock was one of the most ancient in Salop, of Hope Bowdler, near Church Stretton."

Mary, the only daughter of the above mentioned Rev. William Ward, was left an orphan, and brought up by Mr Bowdler. She became the second wife of the Rev. Walter Bagot of Bathfield, my maternal grandfather, and her family and the Bowdlers remained on terms of intimacy as long as any of the latter survived.

The miniatures and the watch-case and tablet-cover were exhibited at a loan exhibition at the South Kensington Museum, I think in 1866.

(2) By Sir HERBERT EUSTACE MAXWELL, Bart., M.P., F.S.A. Scot.

Carle, or wooden Candlestick, formerly used with the big spinning wheel, from Glenkens, Galloway. [See the subsequent communication by Sir Herbert Maxwell.]

(3) By Dr ROBERT DE BRUS TROTTER, Tayview House, Perth.

Stone Cup, of micaceous sandstone, 5 inches diameter, with flat handle  $2\frac{1}{2}$  inches wide, projecting  $1\frac{1}{2}$  inches from the side, pierced vertically with a hole  $\frac{3}{4}$  inch in diameter. The cavity of the cup measures  $3\frac{3}{4}$  inches in diameter and  $2\frac{1}{2}$  inches in depth. The brim is

slightly rounded, and the exterior is ornamented with a band of herring-bone work 1 inch in width, extending horizontally round the circumference immediately under the brim. It was found near Needless, on the west side of Perth, in making an extension of Queen Street.



Stone Cup found at Needless (5 inches diameter).

Bronze Pin,  $4\frac{1}{2}$  inches in length, with cylindrical head placed at right angles to the stem, found in digging the foundation of a house in High Street, Perth.

(4) By JOSEPH BISSETT, 67 Hanover Street.

Three Arrow-Heads of flint, from the Culbin Sands, Morayshire.

(5) By W. IVISON MACADAM, F.S.A. Scot.

Bead of a bluish-black vitreous paste, from Strathlachlan. Its shape is oval, 1 inch by  $\frac{3}{4}$  inch and  $\frac{1}{2}$  inch in thickness, the central hole  $\frac{1}{4}$  inch diameter, and the exterior ornamented with a plait of two strands in yellow, with greenish spots in the openings of the plait.

(6) By EDWIN MILLIDGE, F.S.A. Scot., Jeweller, Princes Street.

Jewel-Box or Coffier of wrought iron, 9 inches in length by  $4\frac{3}{4}$  inches in height and  $4\frac{1}{2}$  inches in width. The lid hinged on three straps riveted down the back, and ornamented on the top with raised quatrefoils, the lock on the inside of the lid, and the key-hole in the middle strap, with a guard turning on a pivot over it.

(7) By ARTHUR ANDERSON, C.B., M.D., F.S.A. Scot., Pitlochry.

Stone Axe of greenstone, 4 inches in length by  $2\frac{1}{2}$  inches across

the cutting face, the upper part roughly chipped, the cutting face rubbed smooth, from Northern Australia.

(8) By the SECRETARY OF STATE IN COUNCIL, of India.

The Buddhist Stupas of Amaravati and Jaggayapata, Archæological Survey of Southern India. Vol. I.

(9) By Major WILLIAM BRUCE ARMSTRONG, the Author, through R. B. ARMSTRONG, F.S.A. Scot.

Notes on the Baronial House of Bruce of Airth. By Major William Bruce Armstrong. Privately printed.

(10) By EDWIN BROCHOLST LIVINGSTON, F.S.A. Scot., the Author.

The Livingstons of Callendar and their principal Cadets; a Family History. Part 1. 4to. Privately printed.

(11) By PATRICK DUDGEON, F.S.A. Scot.

"Mac's" in Galloway. 8vo, pp. 15. Dumfries, 1887.

There were also Exhibited :—

(1) By Lady MAXWELL.

Carle, or wooden Candlestick, with round base supported on three short feet. [See the subsequent communication by Sir Herbert Maxwell.]

(2) By Major-General The Hon. A. STEWART, F.S.A. Scot.

Carle, or wooden Candlestick, with round base supported on three long feet. [See the subsequent communication by Sir Herbert Maxwell.]

(3) By Sir HERBERT EUSTACE MAXWELL, Bart., M.P., F.S.A. Scot.

Portion of a large collection of Antiquities in stone and bronze, from Wigtownshire and Kirkcudbrightshire, now presented to the Museum; to be described along with the remaining portion to be subsequently sent for presentation to the Museum.

(4) By DAVID MARSHALL, F.S.A. Scot., Kinross.

Old Curling Stone, or Channel Stane, a natural boulder, with indented hollows instead of a handle, found in Lochleven, Kinross-shire.

The following Communications were read :—