ment, I ask your permission to go back at once to the very oldest of the known forms. They come down to to us from the golden era of Greek decorative art—from the forth or fifth century B.C.,—when the older simple styles of architecture were supplanted to styles characterised by a greater richness of structure and more developed ornament. A number of flowers from capitals in Priene, Miletus, Eleusis, Athens (monument of Lysicrates), and Pergamon ; also flowers from the calathos of a Greek caryatid in the Villa Albani near Rome, upon many Greek sepulchral wreaths, upon the magnificent gold helmet of a Grecian warrior (in the Museum of St. Petersburg),—these show us the simplest type of the pattern in question, a folded leaf, that has been bulged out, inclosing a kob or a little blossom (see Fig. 3 and 4). This is an example from the Temple of Apollo at Miletus, one that was constructed about ten years ago, for educational purposes. Here is the specimen of the flower of the monument to Lysicrates at Athens, of which the central part consists of a small flower or fruits (Figs. 5 and 6.)

The form passes over into Roman art. The larger scale of the buildings, and the pretensions to a greater richness in details, lead to a further splitting up of the leaf into Acanthus-like forms. Instead of a fruit-form a fir-cone appears, or a pine-apple or other fruit in an almost naturalistic form.

In a still larger scale we have the club-shaped knob developing into a plant-stem branching off something after the fashion of a candelabra, and the lower part of the leaf, where it is folded together in a somewhat bell-shaped fashion, becomes in the true sense of the word a campanulum, out of which an absolute vessel-shaped form, as *e.g.* is to seen in the friese of the Basilica Ulpia in Rome, become developed.

Such remains of pictorial representation as are still extant present us with an equally perfect series of developments. The splendid Græco-Italian vessels, the richly ornamented Apulian vases, show flowers in the spirals of the ornaments, and even in the foreground of the pictorial representations, which correspond exactly to the above-mention Greek relief representations. [The lecturerer sent round, among other illustrations, a small photograph of a celebrated vase in Naples (representing the funeral rites of Patroclus) in which the flower in question appears in the foreground, and is perhaps also employed as ornament (Figs. 7 and 8).]

The Pompeian paintings and mosaics, and the Roman paintings, of which unfortunately very few specimens have come down to us, show that the further developments of this form were most manifold, and indeed they form in conjunction with the Roman achievements in plastic art the highest point that this form reached in its development, a point that the Renaissance, which followed hard upon it, did not get beyond.

Thus the work of Raphael from the loggias follows in unbroken succession upon the forms from the Thermæ of Titus. It is only afterwards that a freer handling of the traditional pattern arose, characterised by the substitution of, for instance, maple, or whitethorn, for the Acanthus-like forms. Often even the central part falls away completely, or is replaced by overlapping leaves. In the form of this century we have the same process repeated. Schinkel and Böttticher began with the Greek form, and have put it to various uses ; Stüler, Strack, Gropius, and others followed in their wake until the more close resemblance to the forms of the period of the Renaissance in regard to Roman art which characterises the present day was attained (Fig. 5.)

Now what plants suggest this almost indispensable form of ornament, which ranks along with the Acanthus and Palmetta, and which has almost become so important by a certain fushion with the structural laws of both ?

We meet with the organism of the form in the family of the Araceæ or Aroid plants. An enveloping leaf (bract), called the spathe, which is often brilliantly coloured, surrounds the florets, or fruits, that are disposed upon a spadix. Even the older writers—Theophrastus, Dioscorides, Galen, and Pliny—devote a considerable amount of attention to several species of this interesting family, especially to the value of their swollen stems as a food-stuff, to their uses in medicine, &c. Some species of Arum were eaten, and even nowadays the value of the swollen stems of some species of the family causes them to be cultivated, as, for instance, in Egypt and India, &c., (the so-called Portland sago, Portland Island arrowroot, is prepared from the swollen stem of *Arum maculatum*). In contrast with the smooth or softly undulating outlines of the spathe of Mediterranean Araceæ, one species stands out in relief, in which the sharply-marked fold of the spathe almost corresponds to the forms of the ornaments which we are discussing. It is *Dracunculus vulgaris*, and derives its name from its stem, which is spotted like a snake. This plant, which is pretty widely distributed in olive-woods and in the river-valleys of the countries bordering on the Mediterranean, was employed to a considerable extent in medicine by the ancients (and is so still nowadays, according to von Heldreich, in Greece). It was, besides, the object of particular regard, because it was said not only to heal snake-bites, but the mere fact of having it about one was supposed to keep away snakes, who were said altogether to avoid the places where it grew. But, apart from this, the striking appearance of this plant, which often grows to an enormous size, would be sufficient to suggest its employment in art. According to measurements of Dr. Julius Schmidt, who is not long since dead, and was the director of the Observatory at Athens, a number of these plants grow in the Valley of Cephisis, and attain a height of as much as two metres, the spathe alone measuring nearly one metre. [The lecturer here exhibited a drawing (natural size) of this species, drawn to the measurements above referred to.]

Dr. Sintenis, the botanist, who last year travelled through Asia Minor and Greece, tells me that he saw beautiful specimens of the plant in many places *e g.* in Asses, in the Neighbourhood of the Dardanelles, under the cypresses of the Turkish cemeteries.

The inflorescence corresponds almost exactly to the ornament but the multipartite leaf has almost had a particular influence upon its development and upon that of several collateral forms which I cannot now discuss. The shape of the leaf accounts for several as yet unexplained extraordinary forms in the ancient plane-ornament, and in the Renaissance forms that have been thence developed. It first suggested the idea to me of studying the plant attentively after having had the opportunity five years ago of seeing the leaves in the Botanic Gardens at Pisa. It was only afterwards that I succeeded in growing some flowers which fully confirmed the expectations that I had of them (Fig. 10 and 11.)

(To be continued.)

THE VITIATION OF AIR BY DIFFERENT ILLUMINANTS.

The following table, prepared for the *Engineering and Mining Journal*, shows the oxygen consumed, the carbonic acid produced and the air vitiated by the combustion of certain bodies burnt so as to give the light of twelve standard sperm candles, each candle burning at the rate of 120 grains an hour :

Burnt to give light of 12 candles equal to 1120 grs. per hour.	Cubic feet of oxygen consumed.	Cubic feet of air consumed.	Cubic feet of carbonic acid produced.	Cubic feet of air vitiated.	Heat produced in lbs. of water raised 15°
Cannel gas	3·30	16·50	2·01	217·50	195·0
Common gas	5·45	17·25	3·21	348·25	278·6
Sperm oil	4·75	23·75	3·33	356·75	233·5
Benzole	4·46	22·30	3·54	376·30	232·6
Paraffin	6·81	34·05	4·50	484·05	361·9
Camphine	6·65	33·25	4·77	510·25	325·1
Sperm candles	7·57	37.85	5·77	614·85	351·7
Wax	8·41	42·05	5·90	632·25	383·1
Stearic	8·82	44·10	6.25	669·10	374·7
Tallow	12·00	60·00	8·73	933·00	306·4
Electric light	none.	none.	none.	none.	13·6

GAS ENGINES AND ELECTRIC LIGHTING.—Sufficient experience, says the *Leeds Express* of the 20th inst., has now been gained of the lighting by electricity of a portion of the Leeds new municipal buildings in Calverley Street to place its success beyond doubt. This result is the more gratifying, inasmuch as the employment of gas engines in driving the dynamo-machines which generate the electric current was, for long, the subject of strong opposition, and it was only by prolonged and persistent investigation, and after much trouble that those who pinned their faith to gas engines secured their adoption. The employment of steam engines and boilers would be inconvenient and expensive, while the cost of conveying the power from an out-building to the place intended to be lighted would not only have been considerable, but in transmission a serious proportion of the power would be lost Thus, it was calculated that, supposing the copper in the mains for conducting the