

lines, as 8 and 9, are marked for the other side of the thread, these lines, 7, 8 and 9, projecting until they cross each other. Line 10 is then drawn, making a flat place at the bottom of the thread equal in width to that at the top. Line 12 is then drawn square across the bolt, starting from the bottom of the thread, and line 13 is drawn starting from the corner *f* on one side of the thread and meeting line 12 on the other side of the thread, which gives the angle for the tops of the thread. The depth of the thread may then be marked on the other side of the bolt by the *d* and *e* and the line 14. The tops of all the threads may then be drawn in, as by lines 15, 16, 17 and 18, and by lines, as 19, etc., the thread sides may be drawn on the other side of the bolt. All that remains is to join the bottoms of the threads by lines across the bolt, and the pencil lines will be complete, ready to ink in. If the thread is to be shown curved instead of drawn straight across, the curve may be obtained by the construction in Fig. 55, which is similar to that in Fig. 54, except that while the pitch is divided off into 16 divisions, the whole of these 16 divisions are not used to get the curves, some of them being used twice over; thus for the bottom the eight divisions from *b* to *i* are used, while for the tops the eight from *g* to *o* are used. Hence *g*, *h* and *i* are used for getting both curves, the divisions from *a* to *b* and from *o* to *p* being taken up by the flat top and bottom of the thread. It will be noted that in Fig. 54 the top of the thread is drawn first, while in Fig. 55 the bottom is drawn first, and that in the latter (for the U. S. standard) the pitch is marked from centre to centre of the flat of the thread.

### FRENCH AND ENGLISH WROUGHT IRONWORK.

We have at different times called attention to the possibilities in wrought ironwork in the art line, and have occasionally presented some examples of work showing what has been done and may be done in this direction. Our first-page illustration this month shows two very handsome designs, the one on the left being a specimen of wrought ironwork from the establishment of M. Baudrit, of Paris. It is original in design and admirable in execution. There is a charming variety in the work, characteristic of the highest productions of French artists. The lower portion is solid, as the foundation of the terminal post of a balustrade should be, but it lies on the stairs naturally and elegantly. The upright pillar and hand-rail are sufficiently massive, while the decorative portion has all the light elegance of a flower.

In this country our designers are wont to draw work of this kind for execution in cast iron, and so accustomed have we become to casting all ornamental work of a similar character that our blacksmiths scarcely know what it is possible to accomplish with the hammer and anvil. The second illustration, which we present herewith, is not less striking, and is an example of work in good taste for a similar purpose to that shown in the first instance. It is as unlike it, however, in character and execution as the two nations from which these pieces of work come. The second engraving represents a continuous balustrade executed by Messrs. Batcliff & Tyler, of Birmingham. An oval in the centre is very happily arranged panel fashion between the scroll work which serves the purpose of pilasters. The design is neither too ornamental nor is it poor. The connecting links of the work, including the attachment to the stairs, are graceful and effective. This pattern also, if made in this country, would very likely be executed in cast metal, and would lose all those peculiar characteristics that render it attractive, and, as at present, considered an example of true art workmanship. Our only purpose in presenting objects of this kind from time to time is to stimulate the effort that is now being put forth to increase work of this kind in this country. The mechanical ingenuity of our smiths is universally acknowledged, but in artistic taste and in the ability to execute ornamental work they are very much behind those of other nations.

**THE GUTTA PERCHA SUPPLY.**—Reports from Brazil show that the supply of gutta percha, which is used in insulating underground wires, is fast giving out and will be exhausted in 30 years. It is said that this prospect of a scarcity in insulating material is one of the chief reasons for the strong opposition by interested parties to underground telegraphy.

**POLISHING BLACK ASH.**—Give it a coat of shellac, and then one of boiled linseed oil.

## Architecture.

### RITUALISM IN CHURCH ARCHITECTURE.

It is good and gratifying in these days of general architectural license to revert to "first principles" to find a solid foundation under our feet—to revert to the classical orders, or to our more national Gothic, with its sound principles. It is likewise good, when weary with the effort to discriminate between the many-spired and Gothic-windowed buildings put up by our too-numerous Protestant sects and the Established Church of the land, to perceive the aims of a section of our national Church members, which appear to be very much the assertion of a ritual.

Mr. Street writes of the artists of the Middle Ages:—"They were men who had a faith and hearts earnestly bent on the propagation of that faith," and questions his readers, "Have we less to contend for—less faith to exhibit or less sacrifice to offer than they?" Surely not a less "faith" because freer from superstition. The Ritualistic movement is one which pervades not the clergy only, it seems like a call from the Church's members to open all these "silent sepulchres" and let human sympathies be allied with the principles of worship and artistic with spiritual aspirations.

When we refer to the origin of Christian ritual in the rites of the Tabernacle of Moses, we can observe at the same time the assimilation in the plan of their churches, of the general arrangement of the Divinely-appointed type. Whether this was adopted from perception of this as a key or type, or whether the earliest Christians approximated the Jewish form and plan in order not to offend the Jewish converts, it is not easy to affirm. We observe the arrangement of their Church plans as follows:—The Narthex, or vestibulum, where the penitents and catechumens stood; the Naos, or temple, where the communicants were seated; and the Bema, or sanctuary, of the clergy. After entering the magnum or great porch in front, there was a large court or atrium, in the centre of which stood a fountain and round which a colonnade or cloister was built; under the cloister stood those who were not allowed to enter the church: here they sought the prayers of the faithful as they went forward to church. In the early churches it was customary to separate the sexes, the women generally having the galleries appropriated to them. Theambo or reading desk stood in the middle of the nave, and was used sometimes as a pulpit, though the rising steps of the altar was the recognized place for preaching. In the nave also stood the canonical singers, and here the clergy administered the first service, called the missa catechumen.

In the time of St. Augustine, too, the ritual involved or included high ceremonial and all that tended to promote exalted taste and feeling and desire for the appropriate adornment of the churches.

The development of the Liturgy in England through slow centuries, and its eventual almost general acceptance in the form of the Sarum Breviary and Missal of A.D. 1085, witnessed wonderful advances in church architecture simultaneously going on, and from that date our architectural remains speak for themselves, suffice it to say, that same Liturgy with occasional emendations, continued in use during the attainment of ecclesiastical art and architecture to their climax during the three following centuries. Referring to the Decorative Period, Paley exclaims, "This was the glorious age of church architecture. It was the climax beyond which Christian art was never carried. Though all that riches and devoted piety and sublime talents it could effect was done to sustain its consummate excellence, it followed the universal law, and having once reached perfection, began gradually to decline." And soon followed the revival of the Sarum use—in 1516-31-33-40, in the latter revision, the lessons appointed to be read in the English tongue. The various stages in the transition of the Liturgy from the Catholic to its Protestant form must be left for the student's own reference, it will not be fruitless, if he is not already well acquainted with them. Cranmer's "Rationale" of the ceremonies to be used in the Church of England, together with an explanation of the meeting and significance of them, including a list of the vestments to be worn by the officiating clergy, with their distinctive meanings and significance, still preserve to us the reverence observed for the hallowed uses of the Church, and the realization of the emblematical meanings in them. In such crises as the Reformation, which was a work of development, we know that there was a paramount exercise of passion as well as reason, as the dissolution and spoliation of the Pri-