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AND BUILDING NEWS

VOL. XXXI.

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DECORATION

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CONTENTS.

EDITORIAL SUMMARY.
AUSTRIAN ARCHITECTURE.—XIV.
APARTMENT-HOUSES.—III.
MANUFACTURE OF TIN-PLATE.—II.
EQUESTRIAN MONUMENTS.—XXXIII.
THE SIXTH LEAGUE EXHIBITION.—I.
BOOKS AND PAPERS.
SOCIETIES.
COMMUNICATIONS.
NOTES AND CLIPPINGS.
TRADE SURVEYS.

ILLUSTRATIONS.

EQUESTRIAN STATUE OF GENERAL ROBERT E. LEE, RICHMOND, VA.
[Gelatine Print issued with the Imperial and International Editions only.]
ST. PAUL'S CHURCH, LYNCHBURG, VA.
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Additional Illustrations in the International Edition.

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[Gelatine Print.]
THE HOPKIRCHE, DRESDEN, SAXONY.
[Gelatine Print.]
MODERN GRANGE, BLACKHEATH, ENG.
RESIDENCES, WAKE GREEN ROAD, MOSELEY, BIRMINGHAM, ENG.
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VOL. XXVI.

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SUMMARY:—

The Coöperative Undertaking at Leclaire, Ill.—An Hydraulic Elevator occupies a Suit.—Proposed Modern "Restoration" of an Ancient Forum at Washington.—The Archaeological Work of the Present Year in Greece.—Rules for the Preservation of Tools.—An Interesting Sarcophagus unearthed at Rome.	17
AUSTRIAN ARCHITECTURE.—XIV.	19
APARTMENT-HOUSES.—III.	20
MANUFACTURE OF TIN-PLATE.—II.	23
EQUESTRIAN MONUMENTS.—XXXIII.	25
THE SIXTH LEAGUE EXHIBITION.—I.	29
ILLUSTRATIONS:—	
Equestrian Statue of General Robert E. Lee, Richmond, Va.—St. Paul's Church, Lynchburg, Va.—St. Mary's R. C. Church, Paterson, N. J.—Design for a Church and Sunday-school Building.—Fourth Baptist Church, Paterson, N. J.—Competitive Design for the Church of the Messiah, Boston, Mass.	30
Additional: One of the Gateways to the Stadtpark, Vienna, Austria.—Villa Koch, Grätz, Austria.—Windows at Toulouse, France.—Morden Grange, Blackheath, Eng.—Residences, Wake Green Road, Moseley, Birmingham, Eng.—St. Giles's Church, Oxford, Eng.—Church of St. Mary-le-Bow, Chapside, Eng.—Church of St. Martin, Ludgate, Eng.	30
BOOKS AND PAPERS.	30
SOCIETIES.	31
COMMUNICATION:—	
Plagiarism.	31
NOTES AND CLIPPINGS.	31
TRADE SURVEYS.	32

AN interesting coöperative scheme is on trial near St. Louis, where the H. O. Nelson Manufacturing Company, which has for several years shared profits with its employés on a very liberal scale, is constructing an industrial village, which is to include the Company's mills, dwelling-houses for the workmen, a club-house, a coöperative boarding-house, and so on. The new village, by the wish of Mr. Nelson, the manager of the Company, is to be called Leclaire, in memory of the great French pioneer in industrial coöperation, and it seems likely to do honor to its name. Very sensibly, everything about the enterprise is, as yet, experimental. No one has any theories to be carried out, apparently, and the principle of management seems to be the excellent one of trying what looks like the best plan, until it develops defects, and then modifying it to remedy the defects. Thus, the coöperative boarding-house, which is managed by a house-committee, like a club, came out at the end of the first month with an alarming deficit. The house-committee took the matter at once in hand, revised the appropriations for marketing and other expenses, and succeeded in making the expenses balance the income, although so prudently that, we are told, "the boarders are still proud of the house." The building for this club, erected by the Company, is rented to the club on curious conditions. It has rooms for only sixteen boarders, and the rent depends on the number of occupants. If the house is full, the rent pays a fair interest on the cost. If only fifteen rooms are occupied, the rent paid is only fifteen-sixteenths of the full amount, and so on, so that the Company, as owner of the building, has a considerable interest—too large a one, most people would say, in making it attractive. In point of fact, however, the house, and an annex recently constructed, are not only well filled, but the demand for accommodation has been such that the choice of rooms is sold at a premium. The regular price of rooms and board, which all the occupants alike must pay into the club treasury, is four dollars a week; but two of the rooms bring an extra premium of thirty-five cents a week, and two more bring twenty-five cents a week. The house has a large dining-room, half of which can be screened off for a parlor when required; a smoking-room, with books and newspapers, and a large open fireplace, and bed-rooms above. Architects will observe that a structure of this kind in Missouri does not represent an enormous investment, and the rent of the building need not weigh very heavily on the minds of the house-committee, if their domestic management is good. Aside from the mill-buildings, the rest of the territory is to be occupied by dwelling-houses. Wide streets have been laid out, and trees planted, and a few

houses have been built, which will be sold to the workmen who need them most. In other cases, only the land will be sold, but money for building will be advanced to purchasers. The land, which was given to the Company by the authorities of a town in the neighborhood, is sold in lots, one hundred feet wide, and from one hundred and twenty to one hundred and seventy-five feet in depth, for two hundred dollars a lot, the purchase-money being used for grading, draining and planting the streets and open places. Incandescent electric lights will be used in the streets, and will be supplied in the houses for twenty-five cents a month for each light. Water-works are already in operation, and all houses are supplied with water at low rates. All the land is sold under restrictions as to the character of the buildings to be put on it, and the use to be made of them, and all houses must stand fifty-three feet back from the street line. This gives space for ornamental planting in front of them, and gardening of this kind is to be encouraged, while kitchen gardening in the front yard will not be favored. It is proposed, later, to warm all the houses by steam from the mill boilers, and, perhaps, to supply fuel-gas for cooking from a central plant. A coöperative kitchen and laundry are also thought of, but we may be permitted to hope that the thoughts of them will not be realized at present. No provision has been made by the company for amusement, beyond the furnishing of land and materials for a billiard-room and bowling-alley, which the men are now building in their leisure hours for themselves; but the club-library is open to all the villagers, and a small hall for entertainments will probably be built. If all the people in the world were as good as they should be, Leclaire would seem to present about as alluring a prospect to settlers as any village we know, and we do not doubt that Satan will have to try hard before he can sow much unhappiness in such a community of the modest, kind and hopeful Westerners. He will be pretty sure to make the attempt, however, and it does not need a prophet to predict that the first weapon which he will use will be alcohol. It is understood that no liquors will be sold in the village; but there is more than one virtuous community in the Southwest which forbids the sale of liquor, but whose members are familiar with ways of getting drunk surreptitiously whenever the fancy seizes them. If the people of Leclaire can keep whiskey, not only out of their village, but out of themselves, every blessing of peace and happiness is within their reach; but if the brown bottle begins to circulate, particularly in the club-house, the days of the coöperative community will be numbered.

A RATHER curious case, depending upon the interpretation of the clauses in a lease relating to the use of an elevator, was recently decided in London. A certain apartment-house known, as Tavistock Chambers, is furnished with a passenger-elevator for the use of tenants. The leases, so far as we can gather from the account in the *British Architect*, recite that the tenants shall have the use of it, with the services of an attendant, from ten A. M. to ten P. M., and the use of it, without an attendant "at other times." One of the tenants found, when he first moved into the house, that, besides the twelve hours during which the attendant was present, he could use the elevator for himself at any other hour of the day or night. Soon afterwards, however, the owner had the water for driving the elevator shut off at twelve o'clock every night, and turned on at eight o'clock in the morning. This arrangement did not suit the tenant in question, who lived on the top floor, and did not fancy having to regulate his hours by those of the elevator; and he brought suit for an injunction to restrain the owner from shutting off the water at any time, and for a declaration that the "at other times" in the lease meant all other times besides the hours between ten in the morning and ten at night. The owner resisted, on the ground that "at other times" meant, at other reasonable times, and that between midnight and eight in the morning was not a reasonable time for using an elevator. The judge held that the case depended simply on the construction to be put on the words "at other times" in the lease. It was contended by the defendant that the use of the lift between midnight and eight o'clock was not a reasonable use, but to this he could not accede. If, for instance, a person on the upper floor was suddenly taken ill between those hours, it would be a most reasonable use of the elevator to send a

servant down, and bring a doctor up, by it. He must therefore, without going into any of the other matters which were suggested, make a declaration as to the meaning of the words "at other times" in the lease, which, he decided, meant that the plaintiff was entitled, during the term of years granted by the lease, to the use, in common with the defendant and the other tenants, of the passenger-lift in question, with the service of an attendant, between the hours of ten A. M. and ten P. M., and at all other times without the assistance of an attendant; and he granted an injunction accordingly, and directed the defendant to pay the costs of the action.

MR. FRANKLIN W. SMITH, of Boston, who has made himself somewhat famous by his Pompeian villa at Saratoga, his Moorish one at St. Augustine, and his scheme, which has not yet been carried out, for a Roman palace at the same place, is, as the daily papers inform us, now in Washington, with a plan more extensive than any of the previous ones. He proposes now, it seems, to erect in one of the parks in the neighborhood of the city a building which, with its terraces, triumphal arches and so on, is to cover an area of one hundred and fifty acres. The idea, we are told, was suggested by an old plate representing a restoration of the Roman Forum, but a Greek flavor is to be imparted to it by making the central motive a reproduction of the Parthenon, while on either side, as well as in front, extend ranges of galleries, divided by a sort of *Via Sacra*, which crosses a bridge, lined with statues, in front of the group, and extends in a straight line to the centre of the Parthenon portico, passing under two triumphal arches on the way, while semicircular colonnades, like those in front of St. Peter's at Rome, are arranged on each side, to diversify the perspective. This decidedly ambitious structure, or rather, group of structures, is intended to serve as a national art museum, and, for economy, is to be built of concrete. Mr. Smith is an enthusiast on the subject of concrete, equally with that of ancient art, and, from a considerable experience with the material in his villas at St. Augustine and Saratoga, thinks that his plan can be carried out at Washington for about five million dollars. According to the *New York Tribune*, this calculation is based on an estimated cost, for the concrete, moulded and in place, of fifteen cents per cubic foot. This seems to us altogether too low for the class of work required, but the idea itself is not a bad one, and a very imposing effect might undoubtedly be obtained in such materials, with a judicious use of stone for certain portions, at a comparatively small expense. Mr. Smith believes that the money can be raised by private subscription, if the Government will give the land, and is ready, in the latter case, to commence operations as soon as the subscription amounts to five hundred thousand dollars.

ACCORDING to the *Builder*, archaeological work is to be very actively prosecuted in Greece this season. Among the incidental operations, the Byzantine mosaics, of the twelfth century, which line the domes of the church of Daphne, near Athens, are to be taken down, while the domes, which are badly cracked, and in danger of ruin, are rebuilt, and are then to be replaced in their original position. This curious piece of work is to be carried out under the advice of Dr. Dörpfeld, who, besides being a most distinguished archaeologist, is an expert architect. Although the mosaic is quite dilapidated, having been exposed to the tender mercies of an encampment of Turkish soldiers, who, after unsuccessfully endeavoring to melt out the gold of the backgrounds by lighting huge fires on the church floor, amused themselves by rifle practice at the principal figures, it has been decided not to attempt to restore or change it in any way, and the whole will be replaced exactly in its present condition. To detach it from the domes, it is first covered, in sections, with a thin coat of plaster-of-Paris, and canvas glued to it. The sections are then roughly cut away, one by one, from the masonry of the dome, and laid separately on a frame shaped to receive them. While the domes are being taken down and rebuilt, exactly to the original lines, the mortar is to be removed from the back of the mosaics, and, after the new domes are completed, the sections, still attached to the canvas, will be pressed into a bed of fresh cement. After the cement is hard, the canvas and plaster will be removed, leaving the mosaics firmly fixed in their places. Although this operation is carried out at the expense of the Greek Government, the German Institute of Archaeology probably deserves, through Dr. Dörpfeld, who is its present Director, a part of the credit of it. The Institute is, however,

to undertake explorations, wholly on its own account, at Magnesia, in Asia Minor. The excavations will be in charge of Dr. Hermann, the explorer of Pergamos, but Dr. Dörpfeld will visit them at intervals. The account does not say which of the several Magnesias in Asia Minor is to be attacked, but any of them will probably give interesting results. The English School is still at work at Megalopolis. Besides the theatre, which was partially unearthed last spring, and is to be laid entirely bare this season, an immense stoa, or portico, five hundred feet long, has been discovered. This consisted of a double row of columns, the outer row Doric, and the inner Ionic, standing in front of a plain wall, which, however, shows two recesses, or exedrae, slightly screened, by a colonnade, from the main portico. None of the columns are standing, but the foundations of them are in place, with one or two of the Ionic bases, and two or three courses of the back wall. This is supposed to be the Stoa of Philippus, mentioned by Pausanias.

SOME practical rules for the preservation of tools are given in the *Bautechnische Zeitschrift* which will be interesting to workmen. According to this journal, the wooden handles of tools should not be polished with shellac, as they often are. This covering soon disappears, and the wood is not improved by it. The proper treatment is to take the handles as they come from the shaping tool, and lay them for a week in linseed oil. After this, for some weeks, they should be rubbed every day with a cloth. The oil soaks through the wood, and dries in the pores, making the object much harder and tougher, and nearly or quite waterproof, while its surface receives, by rubbing, an enduring polish. Architects who have practised painting in oil will remember that a mahogany palette, if treated in this way, becomes as impervious to paint as a sheet of glass, and all good workmen know the satisfaction to be obtained from smooth, tough tool-handles, which can be relied upon not to come to pieces while in use. For preserving the steel part there are many recipes. The solution of India-rubber in naphtha, known as "rubber cement," if thinned with benzine, can be rubbed, like oil, on the metal, and will often preserve it for years from rust. Where a tool must be constantly at hand for use, under all sorts of circumstances, it is prudent to keep it in a bag, or pocket, partly filled with air-slaked lime. Under all circumstances, lime is a powerful preventive of rust. A few lumps of fresh lime, kept in a tool-chest, will do much to preserve its contents; and, when valuable tools are to be put away, they may be dipped in a mixture of air-slaked lime, soft soap, and washing-soda. In many machine-shops, soft soap, mixed with half its weight of potash, and dissolved in boiling water, is kept always at hand in oilers, and applied to screw-cutting dies and other tools which it is desirable to keep from rust. When tools are already rusty, the *Bautechnische Zeitschrift* advises the use of cyanide of potassium. The object to be cleared of oxide is to be laid for a few minutes in a strong solution of the cyanide, until the rust has disappeared, and then rubbed with a paste made of cyanide of potassium, castile soap, chalk and water. It should be remembered, in using this application, that cyanide of potassium is intensely poisonous. A strong solution, if it touches a scratched or blistered place in the skin, will often cause fainting, and scores of deaths have been caused by its incautious use.

A RATHER touching discovery has been made, in the course of excavating the foundations of the new Palace of Justice at Rome. The building covers a part of the ancient gardens of Domitian, and the contractors, while excavating in this portion, uncovered two sarcophagi. One of these was richly sculptured, representing a young girl, dressed as a bride, asleep on a funeral couch, at the foot of which stood a man and a woman with faces expressive of grief. On opening the sarcophagus the remains of the poor young bride, whose name, according to the inscription on the cover, was Crepereia Tryphæna, were found inside. The head was still covered with long and beautiful hair, while a wreath of myrtle-leaves, supposed to have been the nuptial wreath, lay beside it, in good preservation. Near it was a doll, skilfully carved in oak, with jointed limbs. Several rings were found on the fingers; one of which bore the name of "Filetus," perhaps that of the husband, while another had engraved on it two clasped hands, holding an ear of wheat, in allusion, apparently, to the ceremony of *confarreatio*, the more formal marriage rite, in use among Romans of rank. The tomb is supposed to belong to the age of the Antonines, in the second century A. D.

AUSTRIAN ARCHITECTURE.¹—XIV.

THE NINETEENTH CENTURY.



Fig. 1. The Altlerchenfeld Church.

THE Austrian monumental period, including the latter part of the seventeenth century and all of the eighteenth, was followed, at the beginning of the present century, by a period of extreme sterility, when necessity and bureaucratic economy gave the direction to constructive activity and when, it is needless to add, architecture was wholly divorced from art. A single structure of the time, the Burgthor by Pietro de Nobili, a kind of propylæum in a heavy and cold Doric style,

House and the Polytechnic Institute. The old National Bank by Moreau, belongs to the same insignificant type.

It was not until toward 1840 that a timid revolt was started against the existing architectural conditions in Austria. The romantic, eclectic and historic school made its appearance there at this time, a date somewhat later than that of its advent, in other European countries. The different mediæval styles—Byzantine, Romanesque, Gothic and even Moorish—were studied and copied, while, so far as possible, they were adapted to modern needs. The Romanesque was adopted by Rösner, in the church of St. John; by Pichler, in the Geographical Institute and in the building for the Provincial Diet of Lower Austria; by George Müller, in the church of Altlerchenfeld, completed after Müller's premature death by Van der Nüll (Figures 1, 2); this is a Romanesque basilica, the interior of which is decorated with frescos by Führich and Kuppelwieser.

The Jewish synagogue was erected by L. Förster in a Moorish style adapted to the constructive resources of the present day; the women's galleries are supported by iron pillars.

It was during this romantic period that some of the masters who were the leading spirits in the revival of an imposing monumental style in Austria first appeared as the authors of important works. Theophilus Hansen (a Dane, born at Copenhagen in 1813) settled at Vienna in 1846; in his early productions he yielded to the general current in favor of Byzantine and Romanesque mediæval forms. Later, however, he followed the bent of his own taste, as developed by his studies, and adopted almost exclusively a sort of Hellenic Renaissance, similar to that employed by the great Schinkel. In the Klein Palace at Brunn, in the church of the Gumpendorf suburb, and in the Arsenal, all of which he built in conjunction with the architects, Rösner, Van der Nüll, Siccardsburg and L. Förster, Hansen was still true to the Romantic lead. The Arsenal, erected between 1849 and 1854, and treated in the character of an immense Anglo-Saxon castle, has all the requisite appliances and arrangements for the manufacture and storage of guns and cannon; the four angles are occupied by barracks, (Figure 3). Edward Van der Nüll, (born at Vienna in 1812) and Augustus von Siccardsburg (born in 1813 in the same city), inseparable as architects, were also faithful representatives of the Romantic School. They constructed the Karlstheater and the Sophienbad, both in mediæval forms.

Later, the Neo-Gothic style was introduced into Vienna; but in Germany and France the Romantic era had been ushered

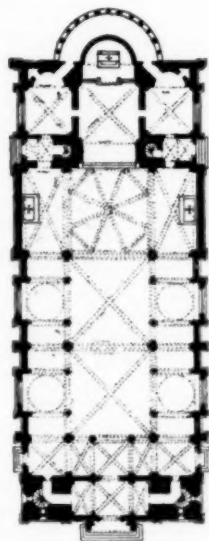


Fig. 2. Plan of the Altlerchenfeld Church.

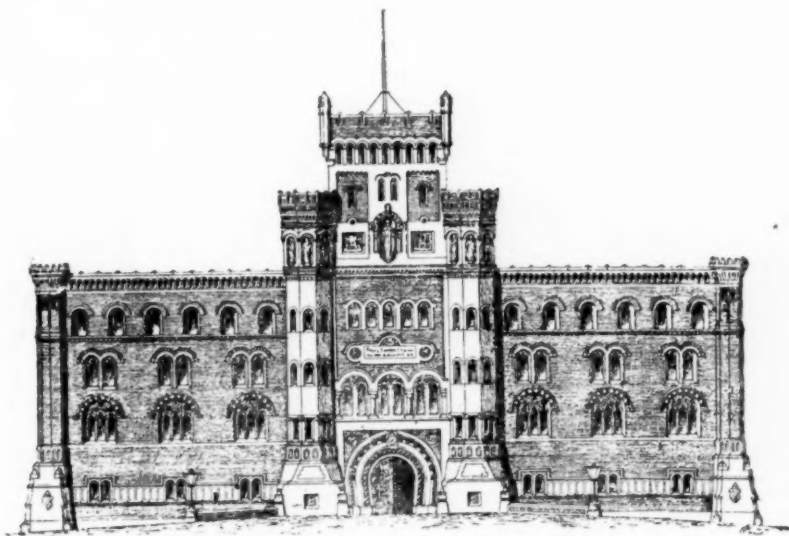


Fig. 3. View of the Arsenal at Vienna.

affected the monumental character of the pseudo-classicism then in vogue at Paris and elsewhere. No other edifice, public or private, in any Austrian city possessed even the merit of aiming at impressiveness of aspect, or anything beyond mere utilitarianism. The chief exponent of this inartistic and tasteless style was the Academic professor, Herr Sprenger, the architect of such common-place buildings as the Mint, the Custom-

in, in one fashion or another, thirty or forty years before. The Viennese structures in this style really belong, however, to the new monumental era. This era was inaugurated by the memorable decree of the Emperor Francis Joseph I, issued December 20, 1857, which ordered that the inner fortifications of the city be demolished. In his rescript, the emperor directed that the land made available by the removal of the fortifications, be sold to furnish the funds needed for the construction of a number of military and other public buildings,

¹ From the French of H. Semper, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 4, No. 784.

the first of which were to be erected along a boulevard occupying the site of the old glacis.

As the result of a public competition for furnishing a general scheme for the enlargement of the city, eighty-five plans were submitted to the committee authorized to receive them; among these, the three by Fr. Stache, L. Förster and Van der Nüll & Siccardsburg were ranked first, though none was accepted for execution. The plan which was finally carried out was drawn up by the aid of these three, in the office of the Minister of the Interior; it obtained the monarch's sanction September 1, 1859. This official scheme, for various reasons quite imperfect, underwent essential modifications and amplifications as the work progressed, especially in regard to the erection of public edifices: the Academy of Art, the University, the Palace of Justice, the Houses of Parliament, the Court Theater, the Exchange and other large buildings were, for example, not included in the original design; but the need of these structures was forced home to the government as the enlargement and adornment of the city took visible shape.

This new era in Viennese — and indirectly in Austrian — architecture may be divided into two periods, the first beginning with the imperial edict mentioned above, and extending almost to the year of the great exhibition (1873), the second covering the time since 1873. During the first period, a certain number of monumental edifices were erected, but it is chiefly remarkable for the great activity displayed in private building enterprises; this suffered a sudden check in the financial crisis (the *Krachs*) of 1873. To the second period belong the superb public structures which make the modern Vienna almost without rival in architectural grandeur and beauty, and these are all the creations of a single generation of artists, moving under the orders of a single monarch.

To the first period may be referred a series of imposing works designed for the adornment of the city, as well as for the service of the public; but its characteristic feature is to be sought in the palatial dwelling-houses erected by building-speculators, and which, at one time, seriously threatened not only to corrupt the taste of the architects and the public, but also to ruin the brilliant opportunity then offered the capital of surrounding itself with a girdle of grand and harmonious structures. And, to a certain extent, grouped as they are, they do detract from the picture which the great masters' creations might have produced, had they been accompanied by correspondingly noble private edifices.

To realize the requisite sums for the erection of the projected public buildings, the commission for the enlargement of the city (Stadterweiterungs Commission) put up at auction the available lands, thus enabling building-speculators to form companies and buy the best sections: it was almost impossible for private individuals to compete with such syndicates for the purchase of the smaller plots, suitable for single dwellings. In many cases the land was bought merely on speculation. The result was, that the prices of land and the wages of the workmen advanced at a frightful rate, and rents went up proportionately; in spite, therefore, of the enormous increase in the number of habitations, there was an actual scarcity of proper lodgings for burger-families of moderate means. These drifted toward the outskirts of the town, and even there they could not escape the general increase in rents. This expansion of the suburban population and the lack of comfortable dwellings at reasonable rates, were the causes which lead to the founding of a colossal new quarter, in the part of the city which was exposed to the inundations of the Danube. An effort therefore had to be made to render the locality healthful, by regulating the flow of the stream.

Another consequence of this suburban growth was the introduction of tramways; but the numerous and much-discussed projects for the establishment of metropolitan railways have thus far failed of execution. Communication between the inner and the outer city was, however, facilitated by the construction of several bridges over the Danube Canal, and by the erection of great railroad stations at various points on the outskirts of the town.

The sanitary condition was improved by building an immense aqueduct, by which pure, cool water from the mountains is now supplied to all the inhabitants, and by opening public baths, several of which are fitted up with all possible comforts, and even luxuries.

Social life was stimulated, public amusements were encouraged, and the cultivation of the arts and sciences was fostered by the erection of numerous halls, society-buildings, fine cafés and

restaurants, grand hotels, several theatres, a Museum of Art and Industry, laboratories, and other scientific establishments. The religious sentiments of the growing population found expression in a number of new churches. And lastly, not to overlook the army, extensive barracks and handsome, administrative quarters were constructed for its use.

We have here a general view of the building activity developed at Vienna, as the immediate result of the removal of its internal fortifications. But the consequent expansion of the population, and its normal increment, encountered serious obstacles in the external fortifications, called the "lines," which divide the city from the suburban districts. It remains for us to examine the chief constructions of this era, taking up the periods in their order, and leaving out of consideration purely specific undertakings.

As for domestic dwellings, and the huge edifices let out to families, it was fortunate that at the outset, before even the speculating companies were formed, several such had been erected by first-class architects. It is due to this fact, that at least one kind of architecturally worthless constructions, which had already appeared on the Ring, was forever banished from it.

[To be continued.]

APARTMENT-HOUSES.¹—III.

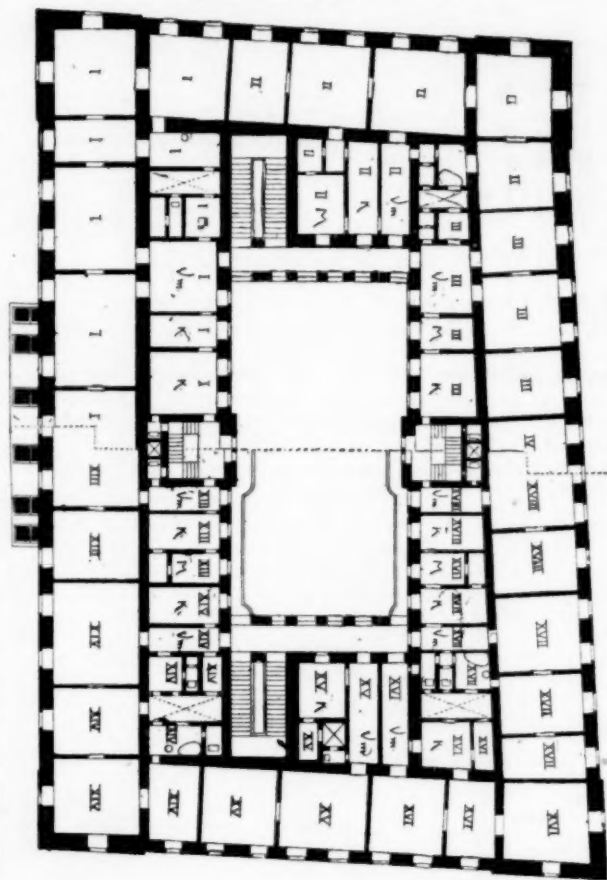


Fig. 14. Apartment-house, Buda-Pesth. After the *Deutsches Bauzeitung*.

A RATHER curious variety among the German apartment-houses is to be found in Hungary, as will be seen from the plan (Figure 14) of a house in Budapest. In this, the doors to the suites open upon a gallery, which sometimes extends entirely around the interior court, as in Figure 13, sometimes only across the ends, as in this case, and is sometimes open to the air. The gallery is approached by a handsome staircase, and, after having once reached it, the visitor is left to find the door of the suite he wants as best he can. The kitchen door opens on the same gallery, close to the door which leads into the ante-room. The ante-room itself is a shapeless enclosure, with a door opposite the entrance, which leads into one of the larger rooms beyond, and all the other parlors, bedrooms and so on, open in succession out of this; so that, out of the nine rooms which form, for instance, the suite marked 11, there is only one which does not form a passage to some other room.

It would be amusing to describe more of the eccentricities which are to be found in the plans of German houses, but there is little to

¹ Continued from No. 777, page 100.

be learned from them, and it would be unfair to judge the men who have, within the last twenty years, done so much to elevate German domestic architecture, from the bungling plans prepared by beginners in the art, for clients who have never learned to expect anything better. The planning of apartment-houses is, moreover, almost a department by itself, requiring special study and experience; and architects, even of distinguished skill, who imagine that they can design such buildings successfully by the light of nature, without taking the trouble to study what has been done before them, often make lamentable failures.

As an example of the way in which such a building may be planned by an architect of considerable reputation, in a country where skill in planning is understood and appreciated, Figure 16 will be instructive.

This is the plan of a very imposing apartment-house in the most fashionable part of London. Although not quite so bad as a German plan, it is bad enough. From the main staircase in the right-hand suite, as will be seen, the visitor enters an ante-room, very feebly

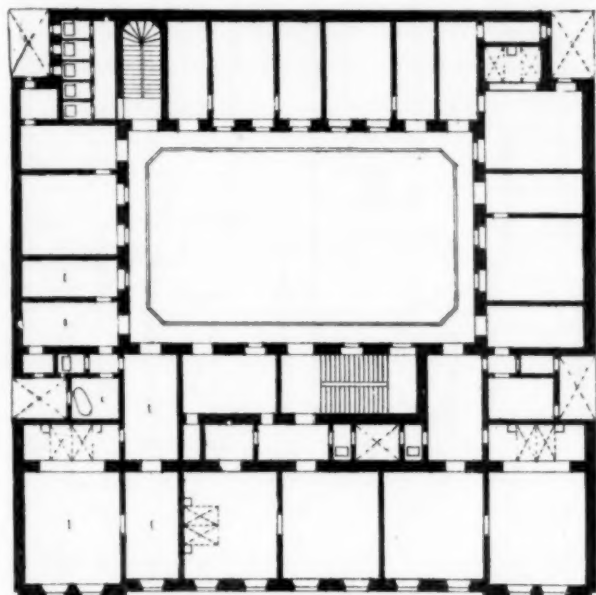


Fig. 15. Plan of Upper Stories of an Apartment-house at Buda-Pesth. After the *Deutsches Bauzeitung*.

lighted, and still more feebly ventilated. Opposite him is the door of the bath-room, and to his left the door of the family water-closet; while the only other issue is afforded by a perfectly dark corridor, the entrance to which can be seen toward the left. Penetrating this gloomy passage-way, he passes successively the doors of all the bedrooms and the kitchen, bringing up finally against a blank wall. On reaching this, two doors are discovered, one to the right, and one to the left, the former of which leads into the drawing-room, while the

rear for every two in front; thus enabling the architect to give two stories of bedrooms in the rear to every alternate suite. A considerable saving of space is effected in this way, especially where the front rooms are large and lofty. The objection to the plan is that in most cases it is necessary to go either up or down from the reception-rooms to the bedrooms, which injures the appearance of the suite; while the heated air from the reception-rooms finds its way up the short flight of stairs into the upper tier of bedrooms: a better arrangement is coming into use in this country, which will be described later.

In considering the fertile subject of American apartment-houses, it will be best to begin with the development of the New York tene-

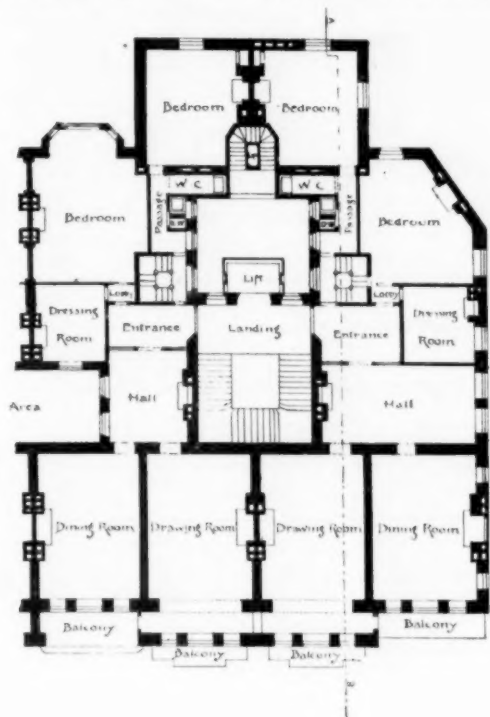


Fig. 17. Plan of Upper Stories of an Apartment-house in London, R. Norman Shaw Architect. After the *Building News*.

ment-house, which dates only from 1879, although some good buildings, based on French examples, had been built earlier than that in New York, and still earlier in Boston, where the "French flat" was popular long before it was introduced into New York. In 1879, the publishers of the *Plumber and Sanitary Engineer*, as was then called the excellent journal which is now known as the *Engineering and Building Record*, took up the cause of the improvement of the dwellings of the poor, and offered large prizes for the best plans of tene-

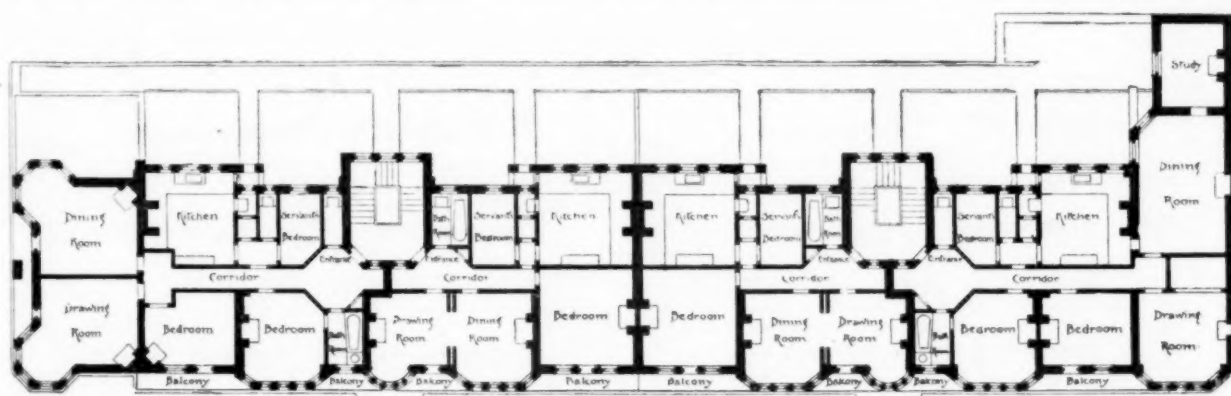


Fig. 16. Plan of Upper Stories of an Apartment-house in London. After the *Builder*.

other conducts him to the dining-room. This suite comprises a "study," which is reached only through the dining-room; about as inconvenient an arrangement as could be devised.

Figure 17 shows a better English plan, by that most distinguished architect, Mr. R. Norman Shaw, which is interesting as presenting an example of the "duplex" arrangement so much used in this country by Messrs. Hubert, Pirsson & Co. Whether Mr. Norman Shaw or Mr. Hubert is entitled to the credit of having originated this arrangement, we will not undertake to say, but it was, in its day, a very successful one. As will be seen by the section (Figure 18), the principle of the plan consists in providing three stories at the

ment-houses on lots of the usual New York size, to be submitted in competition. Figure 19 is the plan which won the first prize. Figure 20 is the fourth-prize plan, which gives rooms better lighted and ventilated than those of the first-prize plan, as well as being free from the defect of using a bedroom as a passage-way, but would be objectionable to tenants on account of having the living-rooms opening on the court, instead of on the street, people of the class which inhabits such houses depending greatly on being able to amuse themselves by leaning out of the front windows.

In both these plans, as will be seen, light and air are supposed to be furnished to the middle bedrooms by means of narrow recesses

in the side walls. These, like the French *courtelles*, are, in practice, found inadequate for the purpose, serving, in most cases, simply to convey to the rooms opening upon them the odors of the decaying rubbish which is thrown into them from above. For this reason, the

stagnation of the air in it, unless it is very large, and architects, becoming convinced of this fact by experience, have within the last few years have generally abandoned the hour-glass type of plan, to adopt what is now known as the "slot system," in which all the interior

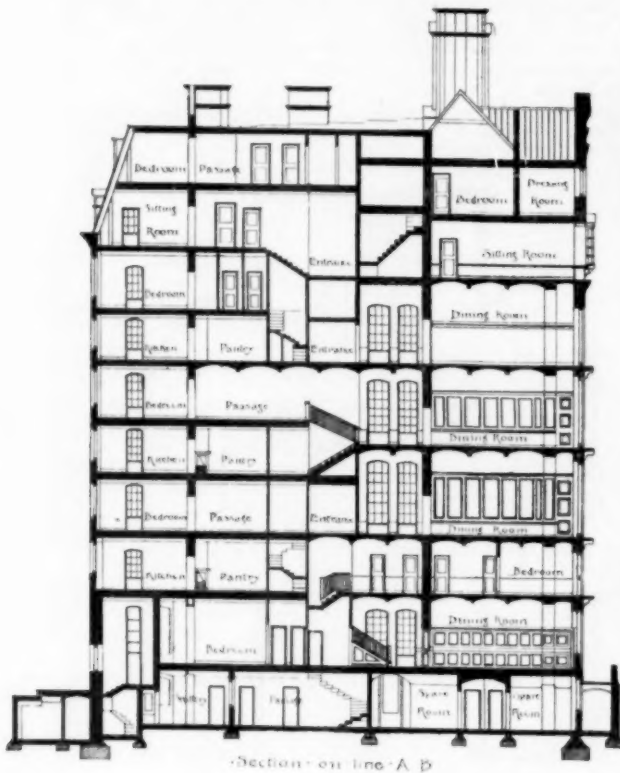


Fig. 18. Section of Apartment-house in London, Mr. R. Norman Shaw, Architect. After the *Building News*.

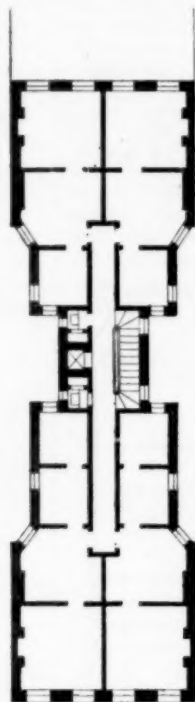


Fig. 21. "Hour-glass" Plan, New York Tenement-house.



Fig. 22. Plan of Small Apartment-house on the "Slot" Plan.

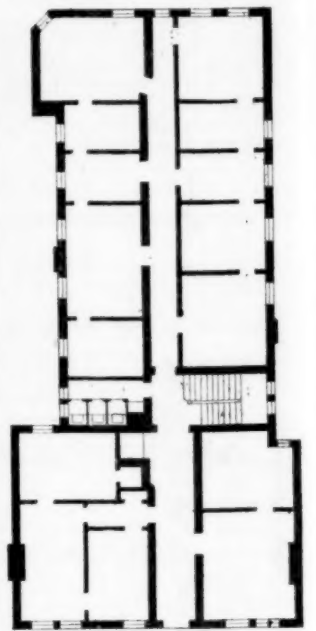


Fig. 23. Double Tenement on the "Slot" System. From Pamphlet of N. Y. Health Department.

prize arrangement of the competition was soon modified into what is known in New York as the "hour-glass plan," in which the middle bedroom receives real light and air from the central court-yard. Although the space through which the light reaches the bedroom

rooms receive light and air from a narrow passage, which communicates directly with the street or the back-yard, so that the wind blows freely through it. Figure 22 shows the slot system as applied to narrow apartment-houses, eighteen or twenty feet wide, and arranged

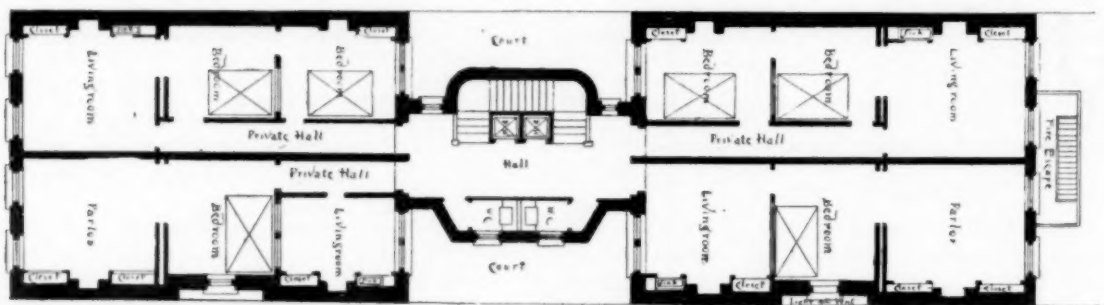


Fig. 19. First Prize Tenement-house Plan of 1879. After the *Plumber and Sanitary Engineer*.

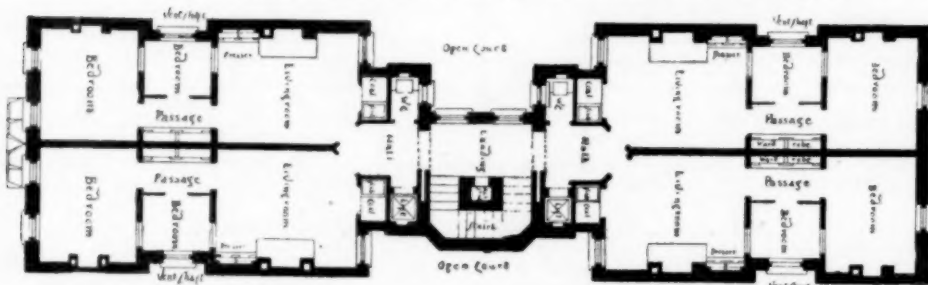


Fig. 20. Fourth Prize Tenement-house Plan of 1879. After the *Plumber and Sanitary Engineer*.

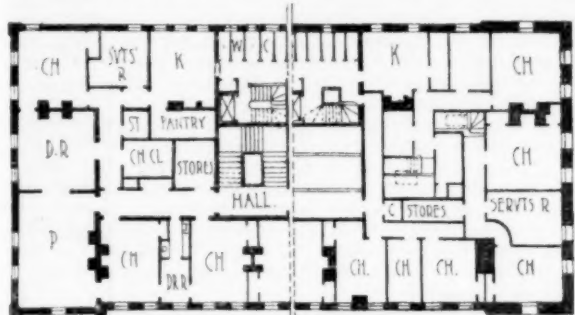
windows is narrow, this defect is more than compensated by its length, and the inner rooms will receive plenty of light, and even sunshine. Figure 21 gives a good example of a house of this kind, and it is hardly necessary to call attention to its infinite superiority to such plans as that shown in Figure 2.

But any court-yard entirely enclosed by walls suffers from the

in pairs, of which hundreds are now built every year in New York and Boston. These are usually planned for two suites, of four rooms each, on each floor, and in them poor people can enjoy a degree of health, privacy and comfort which, it is not too much to say, has never before been within their reach in city dwellings. Figure 23 shows the same system as applied to double-tenements, but these, in

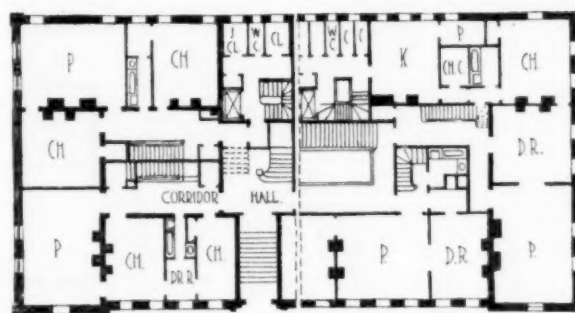
which there is more contact between the various tenants, are, although they save the width of a passage-way, much less popular and profitable than the single-width houses. It will be observed that space is left beside the water-closets for ventilating and other shafts.

Although the apartment-houses just described are of the humblest class, the principles on which they are planned and constructed apply



Half Plan, 2d Floor.

Half Plan, 5th Floor.

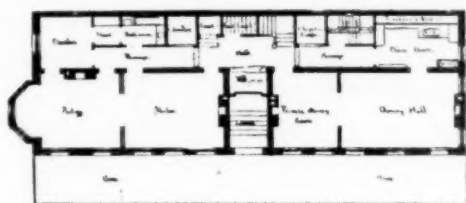


Half Plan, 1st Floor.

Half Plan, 4th Floor.

Fig. 24. Hotel Hamilton, Boston, Mass. Messrs. Ware & Van Brunt, Architects.

equally to the designing of the largest building, and in the subdivision of the huge hotel, or "home club," a knowledge of tenement-house work is very useful. Among the first structures of the kind erected in this country was the celebrated Hotel Hamilton, built by Messrs. Ware & Van Brunt in Boston about twenty years ago. (Figure 24.)



Upper Stories of the Same.

Fig. 25. Hotel Kempston, Boston, Mass. Messrs. Cummings & Sears, Architects.

This was studied, even to the details, from French examples, and proved very successful, and was soon followed by other "French flats" on a large scale, most of which, being carefully planned and built, by skilful architects, have retained their popularity to this day. The original houses, like the French ones, were divided into suites

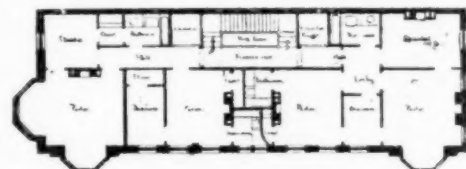


Fig. 26. Upper Stories of the Same.

for housekeeping, each with its own kitchen, but in the Hotel Kempston, built, also in Boston, by Messrs. Cummings & Sears, (Figures 25 and 26), the separate kitchens were omitted from the plan, each suite comprising parlors, bedrooms and bathrooms only, and the tenants taking their meals in a common dining-room on the first floor, as they would in a hotel. Several other houses, in Boston and New York, have since been planned in this way, and such houses, if not too large, are usually popular.

[To be continued.]

MANUFACTURE OF TIN-PLATE.¹—II.



TIN-POT.—After remaining in the hot grease some time, they are removed in parcels and plunged into the tin-pot containing a bath of molten tin covered with palm oil. Here they are allowed to soak for about twenty minutes, the tin-man constantly opening and re-opening the pack with his tongs, thus enabling the molten tin to get at every part of the surface. As a result of the soaking, the iron (or steel) absorbs a certain amount of tin on or into the surface of the sheets. It seems probable that an alloy is formed by those portions of the two metals which come in close contact. A very large proportion of the tin is thus absorbed

and held between the fibres of the iron, as after the pickling and annealing operations the surface of the iron is in a more or less spongy condition. If the tin were simply mechanically held or absorbed by the fibres or pores of the iron, it should be possible to liquefy it out by simply heating the tinned sheet to a temperature slightly above the melting-point of tin—227.8° C., or 458.6° F. If we heat the tinned sheet to a temperature sufficient to volatilize the tin, and then examine it with a microscope, we shall find that a considerable part of the tin persistently sticks to the iron, and if we attempt to burn it out we shall burn the iron also. Of course, where there is a thick coating of tin, it is possible to melt off the outer layers that are not in direct contact with the iron.

Wash-pot.—When the sheets have soaked sufficiently, the tin-man removes them from the tin-pot and hands them to the wash-man, who plunges them in parcels into the wash-pot filled with tin, and allows them to remain there, to keep hot, until he is ready to use them. They are then removed in batches and placed upon a flat iron plate, called the hob. With a thick hempen brush in one hand and tongs in the other, the wash-man brushes the two sides of each sheet in order to remove the excess of tin which has collected between them. The wash-pot is generally divided into two compartments, one larger than the other. The sheets are first put into the larger compartment, which contains a better quality of tin than the tin-pot, and as its temperature is comparatively low, the sheets can be kept in it a considerable length of time without becoming "dry."

To obliterate the marks left by the brush, and to give a polish to the surface, the sheets are dipped, one at a time, into the smaller compartment of the wash-pot.

Patent-Pot.—Then without releasing the sheet from the tongs, it is passed between a pair of steel rolls into the "patent-pot." As soon as the sheet has passed through these rolls into the tin below it is caught, moved along and raised by means of a cradle to meet another pair of rolls revolving in the surface of the tin bath, thus as one sheet is rolled into the bath of tin another is rolled out. The object of these rolls is to squeeze off the surplus tin and give the sheet a smooth, even surface.

The sheets are now placed in a rack to cool, after which they are taken by women and rubbed with sawdust or bran to remove the grease, then polished with flannel or buckskin, and removed to the sorting-room. Here they are very carefully examined and classed according to finish and quality.

The tests of quality are ductility, strength and color; this when in a high degree requires that the iron or steel used shall be of the best quality, and that its subsequent manufacture into sheets and the tinning process through which they go shall be conducted with the greatest care and skill.

Some of the defective sheets, known as "menders," are returned to the tin-house for repair; others, known as "wasters," are sold on the market at a reduced price. After the finished sheets are counted, they are packed in wooden boxes, which are carefully marked to indicate contents.

The use of the oil or grease is to preserve the tin and iron from the oxidizing action of the atmosphere. The chief object, however, of plunging the sheets in the grease-pot filled with heated oil, is to dry the moisture from the sheets, otherwise they would not take the tin so readily.

By melting a little tin or lead in a ladle, skimming off the dross

¹ Continued from No. 784, page 10.

and putting a little oil or grease on the surface of the molten metal, the effect of the grease in cleaning the surface will become evident. The palm oil comes mostly from the west coast of Africa in large casks, holding about a half a ton. It varies in quality somewhat, a preference is given to what is known as "selected Lagos oil," which probably contains less dirt and water than the commoner sorts. Tallow would be equally well adapted for all practical purposes were it not for the very disagreeable smell resulting from it.

It is interesting to notice something of the technical development of the process of tinning since the year 1720, and for that purpose I have drawn largely from Flower's interesting little work on the "History of Tin and Tin-plates." While Mr. Flower has been most thorough and careful in his historical treatment of the subject, it is to be regretted he so carefully avoids giving us anything of the modern technical details.

The old German method of tinning, as first used at Pontypool in 1720, was, of course, very crude and primitive in comparison to that of the present time.

The iron sheets are made by hammering from the bar or billet very much in the same way as the celebrated Russian sheet-iron is still made in the Urals.

The pickling was done in water acidified by the fermentation of barley meal or rye; in order to facilitate this fermentation it was necessary to place the tubs or vats in heated vaults, kept at a temperature of about 100° F. Such an acid solution being necessarily very weak, the process of pickling usually required from two to three

there seems to have been few or no innovations, although of course many improvements have been made in the original inventions.

About the year 1800, the idea of dividing the wash-pot into two parts seems to have been first suggested. The idea of it was simply to keep the scum (consisting chiefly of a mixture of dirt, tin oxide and grease) of the first compartment from getting into the better grade of tin used to finish the sheets in the second compartment. The necessity of skimming off the scum every time a fresh batch of sheets is put into the wash-pot is thus obviated.

The second compartment always contains the purest tin, and, as it becomes contaminated by the iron, is removed to the first compartment and finally to the tin-pot.

Before the patent-pot with its rolls came into general use, the sheets were finished by placing them in a grease-pot or bath of palm-oil to "sweat off" the superfluous tin. They were first placed by the workman on a grate or basket between "pins," so-called, and removed by the grease-boy in rotation; as one sheet came out of the basket another went in, and the number of pins employed therefore regulated the time for remaining in the pot. The fewer the pins the shorter the time, and the heavier the coating, hence the longer they remained the barer the sheet.

It was usual to employ a grate of only five or six pins for charcoal sheets, while as many as thirty-five were employed for cheaper sheets.¹ The quantity of tin thus removed is about two or three times that left on the sheets.

By this arrangement the length of time the sheets remain in the

RESIDENCE: 141 CADAWANE PLACE;
THOS. C. LIAK, ARCHITECT
ST. LOUIS, MO.



days, and sometimes much longer. Vinegar was sometimes used for the purpose, but although stronger, it was doubtless too expensive a substitute for rye-water.

Before pickling came into use, about 1747, the sheets were prepared by scouring with sand and water, and filing off the rough places, then covering them with resin before dipping into the molten tin.

Tallow or grease was used to cover the tin bath, but this produced at times such an unbearable stench that it ultimately led to the universal use of palm oil for the purpose. A little water was always added with the tallow to cause it to swell and foam. The grease or tallow always became better after being used a short time, as it seems to be a curious fact that any kind of empyreumatic fat is better for this purpose than fresh tallow or grease.

Before the rolls, for rolling the sheet out of the bath where it has its last dip (patent-pot), came into use, it was necessary to melt off the ridge or wire (list) of tin which collected on the lower edge of the sheet. For this purpose a shallow trough or pot of iron containing a bath of molten tin about half an inch deep was used. As soon as the ridge was melted off, the sheet was given a smart blow with a stick, which disengaged the superfluous metal, leaving only a faint streak where it was attached.

The most important improvements in the process seem to have followed each other at very long intervals, the first being in 1728, when the process of making the sheets by hammering was replaced by that of rolling. In 1745, the grease-pot for preparing the sheets for coating was first used and, in 1760, barley or rye-meal water was replaced by hydrochloric acid for the purpose of pickling. In 1783, grooved rolls for bar rolling were first used. The annealing-pot was invented by Thomas Morgan, in 1829. About 1865, the use of steel or iron rolls for rolling the sheet out of the last pot (patent-pot), became general, but from that date up to the present time,

pot can be regulated with considerable exactness; thus when the temperature remains constant, the amount of tin removed or left on the sheets is regulated to a nicety.

In old times it was supposed that the addition of a very small amount of copper to the molten tin made it adhere better to the sheets. It was claimed that such an alloy possessed this quality, "because it is a medium fusibility between iron and tin." The use of the copper was known as the "secret" and "you must take care not to have either too much or too little of this secret."² The quantity of copper used seemed to depend equally upon the quality of the tin and of the iron. If too much copper is used the sheets do not look well; if, on the other hand, not enough, the sheets take too much tin. As a rule, two pounds of copper are used to 100 or 150 pounds of tin.

The idea seems to be prevalent in the United States that in order to establish a tin-plate industry in any country, it is requisite for such country to be a metallic tin producer. That such a thing is utterly wrong is, I think, fully demonstrated by the following figures:

It is stated in the official "Mineral Statistics of the United Kingdom of Great Britain and Ireland," for the year 1889:

"The quantity of tin ore mined in Great Britain, in 1889, amounted to 13,809 tons, from which 8,912 tons of tin were obtained, against 14,370 tons of ore mined in 1888, yielding 9,241 tons of tin.

The importations of tin ore and tin in 1889 amounted to 2,008 tons of ore and 30,093 tons of tin, against 2,406 tons of ore and 28,049 tons of tin in 1888."

It will thus be observed that the amount of metallic tin produced in Great Britain, in 1889, was less than one-third the amount imported. In other words, the great bulk of the tin used in this country, in the form of tin-plate, is first imported into England from

¹ "History of Tin and Tin-plates," p. 171, Flower, London, 1880.

² Flower: "History of Tin and Tin-plates," p. 171.

foreign countries, there made into tin-plate, and then exported to the United States for consumption. We have of late years heard much of the large deposits of tin ore discovered in various parts of this country, but the writer has yet to see the first tangible evidences of their existence. It is true, tin ore in small and scattered quantities has been discovered in the Black Hills S. D.; at King's Mountain, N. C.; in Virginia, Georgia, Winslow, Me.; near the town of Jackson, N. H.; Booneville, Idaho, and at San Jacinto, San Bernardino County, Cal. With the exception of those in the Black Hills it cannot be said that any of these deposits have been explored or developed to any extent. According to recent reports the deposits of San Jacinto, Cal., appear to be very promising. There appears to be a great similarity between the rocks and geological features of this district and those of the tin-producing districts of Cornwall.

The tin ore deposits in the Black Hills have possibly been fairly well explored, but up to the present time this district appears to have been more productive of humbugs than tin ore.

Deposits of tin ore (stream tin) have been found in some parts of Mexico, but as they have not been explored to any extent we know little of them.

EQUESTRIAN MONUMENTS.²—XXXIII.

THE LATE SIR JOSEPH EDGAR BOEHM.



J. E. Boehm, R. A. From *Punch*.

IT is not very many years since the Dean and Chapter of St. Paul's declared that it was not proper that Alfred Stevens's monument to the Duke of Wellington should be surmounted with the equestrian statue of the Duke, even though the sculptor considered it to be his masterpiece, and this decision was made in spite of the facts that other sacred buildings had not been held to be profaned by the presence of equestrian sculpture against their walls, that in one transept of the Cathedral itself stands the equestrian group of General Ponsonby, and in the other transept one of General Abercromby, while along the north wall of the nave are several important bas-reliefs in which horses are conspicuous.

How the successors of these dignitaries will behave when the time comes to place over the resting-place of Sir Joseph Edgar Boehm a fitting monument, will be a matter of curious interest, for it seems



"The Mourners," Lough, Sculptor.

as if no monument could befit this sculptor, in which the horse was not a principal feature, for not only was it his fortune to model more equestrian statues than any sculptor save Fremiet, but he was an ardent lover of the horse for its own sake, and treated it as a com-

panion and friend. Indeed, it is said that he had himself trained a beautiful mare, from which he often modelled, to be such a household pet that she was allowed, when not posing—and she would maintain a pose with as much persistency and intelligence as any human—to wander about the great studios at will, her master being sure that she would pick her way between models and casts

without injuring them. For how many statues this horse served as model cannot be told, possibly for many, as there is an unusual degree of family likeness between the equine portions of Boehm's groups; perhaps she was doing duty for the last work the sculptor ever touched—a life-size horse for one of the Rothschilds.

Probably if a sculptured horse should be suggested as part of Boehm's monument—even if it should be so significant a composition as Lough's group in plaster at the Crystal Palace—the authorities of St. Paul's would protest with more or less vehemence, the more that it is reported that, for some undeclared reason, they raised



Carlyle, Boehm, Sculptor.

objections to the sculptor's being buried in the Cathedral, and that it required the Queen's positive command to overcome the objection, which leads to the surmise that an equally positive command would disperse the opposition to the monument we foresee.

Considering the character and quality of the man's work, and still more his social eminence and his friendly relations with the royal family, it was a foregone conclusion that his last resting-place should be either in Westminster Abbey, where it would have the near



The Prince Consort, Windsor Park, Boehm, Sculptor.

companionship of the statues he had made of Lord Beaconsfield, Lord Stratford de Redcliffe, Lord Shaftsbury, and the beautiful reclining figure in marble of Arthur Penrhyn Stanley, Dean of Westminster; or else it must be in St. Paul's, where his work is represented by the statue of Sir Hubert Stewart and the bronze reclining figure of General Gordon.

¹ *Engineering and Mining Journal*, Oct. 18, 1890, p. 450.

² Continued from No. 782, page 188.

It seems as if the Queen had erred in naming St. Paul's as the place, for, though there is abundance of military and naval glory buried in Westminster crypts and vaults, the greater lustre of Poet's Corner will always make it seem that the Abbey is the proper place to lay those who have achieved fame through the practice of the gentler arts and sciences, while the ashes of Wellington and Nelson should call all their noble successors to slumber beside them in St. Paul's, the nation's Walhalla. But the Queen elected otherwise.

How many equestrian statuettes Boehm modelled, and where they now are cannot, at present, be told; probably there were many of them, for it was this class of work which first secured for him the attention and the patronage of the Queen. This step was gained about 1862, at the time of the London Exhibition of that year, where the young sculptor appeared as a successful exhibitor. Up to this time he had been pursuing his studies, first in the studio and then as the travelling companion of his father—a Hungarian medallist of much ability, and director of the mint—and later as a student in Paris, from 1859 to 1862. From his earliest youth he was trained to art, and his proficiency and wonderful prolificness in after life bear evidence to the great value of early and thorough drill and training. But it was this same early and persistent training which gave him a

are his, unfairly remembered to his discredit. Yet in spite of his mechanical facility, Boehm had a real artist's temperament or he could not have made the few fine statues just mentioned, and that he had the true artist's conscience, also, is proved by his replacing, at his own expense, the statue of Lord Lawrence in Waterloo Place, which did not suit him after it was erected, with one which pleased him more. Even his disparagers, and they were numerous in the ranks of the profession—made such, probably, by the sculptor's great social success and the patronage with which the royal family fairly overwhelmed him—allowed that certain of his statues could only have been produced by a man of distinct genius, and that these works fairly earned for him his place in the Royal Academy, an honor to which he was advanced in 1882, after having passed four years only in the grade of Associate. Most English artists would have felt that fortune could have no better gift in store for them, but Boehm, if he was at all an observing man, could hardly have helped wonder-



St. George and the Dragon, Boehm, Sculptor. From the Magazine of Art.



Emperor Frederick, Windsor Chapel, Boehm, Sculptor.



Admiral Drake, Plymouth, Boehm, Sculptor.

mechanical deftness of touch and rapidity and certainty of manipulation, which has prevented him from achieving work which will ensure him a wide and everlasting fame. His too fatal facility enabled him to do with his fingers a prodigious amount of work—too great in mere bulk for his artistic and intellectual capacities to make their fair impress upon, for these should correct the instinct of the hand, that is, should undo for logical reasons, or approve, what the hand has done, and both these processes require time and beget hesitations. It is true that the "Carlyle," on the Thames embankment at Chelsea, is a grand statue, it is true that Dean Stanley's figure in Westminster Abbey is impressively beautiful, and the Gordon monument is far better than the average, and if these, with a few others of his higher grade of work, had been all he had accomplished, Boehm's rank as a sculptor would be much higher than it probably will be, for a man's reputation is not fixed by his highest achievement, nor always by the average of all that he has done, his half-successes and his failures will be, with those who know that they

ing, perhaps even hoping, whether the friendship of the Queen, the Prince of Wales and the rest of the royal family, would not some day enable him to hand down to his posterity the right to write a title of some degree before their names. It is hardly possible, then, that he was taken by surprise when, in 1889, the Queen conferred a baronetcy on him as part of the reward due to him for modelling the equestrian statue of the Prince Consort, which was unveiled by the Queen, on Smith's Lawn, in Windsor Great Park, on May 12, 1890. In 1881 he had been appointed Sculptor in Ordinary to the Queen.

Whether this is to be the last equestrian statue which his devoted spouse will erect to the memory of the husband she would not allow to be a king cannot be determined, but it appears to be, as a work of art, no more successful than the similar figures which at Glasgow, Liverpool, Rugby and London have for years reminded the passer-by that the Queen who, nominally, ruled over them was at heart a German.

Even in death, attention is drawn to the sculptor's friendly relations with the House of Wittin—relations that a man of merely English blood could never hope to achieve, if common report is to be believed—for it was the Princess Louise, at one time his pupil in the art of modelling, who found the stricken and nearly lifeless artist fallen over a chair in his studio, whither she had gone to pay a semi-professional and wholly Bohemian visit. As he was unquestionably



Richard I, a Model: Boehm, Sculptor. From the *Art Journal*.

a good courtier he could have aspired to no more desirable a witness for the passing of his spirit, which, on December 12, 1890, left the body it had inhabited ever since 1834.

Boehm did not confine himself to any special phase of sculpture but executed whatever commissions were brought to him and in the indicated manner, as witness his statues of the Queen at Windsor and other statues there of Leopold of Belgium, the Duke of Albany, the Prince Imperial—placed there, because the sentiment of the English people declared itself vehemently in opposition to the son of



Lord Napier of Magdala, Calcutta, Boehm, Sculptor.

a fatherless adventurer being placed in Westminster Abbey—the Dean of Windsor, and the Emperor Frederick which was unveiled a day or two after its author's death; his Darwin in the Natural History Museum; the William Tyndale on the Thames Embankment; the Queen's body-servant, John Brown, at Balmoral, Sir Francis Drake at Plymouth, Archbishop Tait at Canterbury Cathedral, Lord Northbrook and Sir Ashley Eden at Calcutta; busts of Ruskin, Gladstone, Huxley, Lord Wolsley and a host of other busts, statues, monuments, tombs, statuettes and medals. His industry was marvellous and it is not to be wondered at, in view of the amount

of work done, that the average is hardly above the commonplace. Whether it was ambition of a low order or greed for gain or mere good nature that caused him to do so much work in mere bulk and in so many cases neglect the quality of it, will probably come to light as time passes. We incline to the belief that good nature was the lodestone which deflected him so often from the true path, for the man's temperament was good humored, social, buoyant, and such men are prone to give a promise and fulfil it so far as they can find time and means, when a refusal would have been better for them in the long run.

Although Boehm made statues of all kinds his specialty was unquestionably equestrian sculpture, and it is singular that with so strong a natural bent he did not succeed in making at least one great equestrian group. The group which pleased him most, the one by which he expressed a willingness to have his reputation measured was the unexecuted model of Richard I, which, as has been previously pointed out,¹ is good because it is so close an adaptation of the pose of the Colleoni at Venice.

Next to this his best equestrian group is the statue of Lord Napier of Magdala, at Calcutta, which is much better than the average statue but still lacks the qualities of greatness both in conception and execution. The hero of the relief of Lucknow offered an inspiring subject and seems to suggest rather eager haste than leisurely contemplativeness, but as Lord Napier did other things of note beside relieving Lucknow, perhaps that event was not in the sculptor's mind. The horse is posed standing quietly, but alert in every fibre, and so adds one more to the lengthening list of statues which have gained in sculptural interest through Chantrey's "invention."

In one other group Boehm used essentially the same pose: in the remarkably unsuccessful statue of the Duke of Wellington set up at



Sir J. E. Boehm. From the *Graphic*.



The Duke of Wellington, Hyde Park Corner, London, Boehm, Sculptor.

Hyde Park Corner a couple of years ago to replace Wyatt's mammoth group on Burton's arch. A more insignificant, more commonplace creation it would be hard to discover anywhere, but the sculptor has the excuse that he was under compulsion to make a

¹ See the *American Architect* for September 21, 1889.

statue which would be altogether different from Wyatt's group—which had character, at least—and he seems to have felt that he could best fill his order by making a group which should not have what the other did have, and so left out the character. The horse is indifferently well executed, the Duke looks like a stuffed dummy



The Prince of Wales, Bombay, Boehm, Sculptor.

whose backbone had got twisted, and the four figures about the pedestal have been given so much importance in the composition that everything is thrown out of scale. The sculptor recognized that he had not made a success, yet his plea in extenuation was that it was very difficult to ascertain the exact form and nature of the accoutrements of these four pedestrian figures, seeming to feel, evidently, that they, and not the Duke, were the all-important feature of the composition. This is to practice rather the art of the costumer than of the sculptor; indeed, in much of Boehm's work one sees the clothes rather than the man inside them. He was at his best when he had no clothes to consider—that is, in his portrait-busts—for, after all, he was a better hand at portraiture than at idealization, and in the matter of his equestrian groups, one seems to recognize that the horses are portraits of actual animals, and not creations evolved in heroic mould from the sculptor's imagination. The manner in



Clydesdale Stallion, Luton Hoo Park, Boehm, Sculptor.

which Boehm fell short when, as he rarely ever did, he attempted idealization, is shown by his tame, smooth, unpoetic model of "St. George and the Dragon," which was modelled in 1876, and apparently was made to do service later when the sculptor was called on to design the new sovereign, minted in honor of the Queen's jubilee, a work of art which has called out much derisive comment.

The same "prettiness," the same evident concern to produce exact representation of costume, detracts from the merit which one would like to accord to the colossal equestrian figure of the Prince

of Wales, which Sir Albert Sassoon, C. S. I., caused to be set up in Bombay in July, 1878, in honor of the Prince's visit to India in 1875-6. In this case, the excellence of the horse's figure is due to its being a portrait of an Arab horse that the Prince carried back to England with him. The cost of this statue, with its pedestal, was \$50,000, which happens to be, also, the cost of the new statue of the Prince Consort at Windsor, and one cannot help thinking that, with \$100,000 at his command, Fremiet would have produced two much more attractive groups, even though the Prince of Wales and his father are not particularly inspiring themes for a sculptor's imagination to work upon, as in neither case have their public activities extended far beyond observing the ornamental rites that attend the laying of corner-stones. The sculptor could find no more inspiring scenes to depict in the bas-reliefs on the pedestal of the Bombay statue than the reception of the Prince by the native chiefs on his landing at the dock-yard for one, and a procession of native children for the other.

Of his large equestrian groups, the two that have found their home in India are far and away the best that he did.

There was another class of equestrian sculpture in which Boehm



"Cremorne," Boehm, Sculptor.

was more successful, and his success here was almost entirely because in these his facility at catching a likeness came most in play. It is said that what first drew the Queen's attention to the Hungarian immigrant was his equestrian statuettes, and of these he made many, of various sizes, for those who desired to preserve a good likeness of some favorite hunter or race-horse. In fact, his



"Citadel," Eaton Hall Stable Yard, Boehm, Sculptor.

specialité, so far as equestrian sculpture goes, was the making of portrait-statues of unmounted horses. Of these he made several, which were cast in bronze at a large scale: a "Clydesdale Stallion," in the act of rearing, at Luton Hoo Park; "Cremorne," made for Mr. Augustus Savile; "St. Simon," the property of the Duke of Portland; "King Tom," at Mentmore Park; a "Suffolk Punch and Blacksmith," "Johnnie Armstrong," and at Eaton Hall, the country-seat of the Duke of Westminster, a groom with a rearing horse, which the stable-men say is "Citadel," but to which

the authorities give the name of "Doncaster." Besides these, he showed at the Royal Academy in 1867 a group called "Wilhelm and Lenore," which was purchased by the late Empress of Russia. In addition to these groups that are well-known—in the case of the "Clydesdale Stallion," the "Suffolk Punch" and "Cremorne," even famous, common report ascribes to Boehm a number of similar statues made for many different people, whose merits have not won for themselves the same degree of attention. Whatever else he did, Boehm has certainly preserved for posterity faithful portraits of the thoroughbred horse of his time, and so has deserved immortality at the hands of the Houyhnhnms, who would surely have set the grieving image of one of their race over his grave, and we hope that a symbolization that Dean Swift would have approved may not be wanting to his monument in St. Paul's.

LOUGH.—John Graham Lough was born at Greenhead, Northumberland, in 1806, and in early life was apprenticed to a stone-mason. After working as a stone-carver at Newcastle, he went to London, where he studied the Elgin marbles at the British Museum, and in 1826 sent to the Royal Academy a relief of "The Death of Turnus." The following year he exhibited a statue of Milo, which won the praise of B. R. Haydon, and which he afterwards, with a companion statue of "Samson," reproduced in marble for the Duke of Wellington. In 1834 he went to Italy, and spent several years in study there. His portrait-works include a statue of the Queen in the Royal Academy, one of Prince Albert at "Lloyd's," one of Dr. Broughton in Canterbury Cathedral, and a colossal statue of the Marquis of Hastings at Malta. He also executed the monument to Southey in Keswick Church. Among his ideal sculptures are "Duncan's Horses," "The Lost Pleiad," "Night's Swift Dragons," "Comus," "The Mourners" (exhibited with an equestrian figure of Edward I at Westminster Hall in 1844); ten full-length marble statues of characters in Shakespeare, with several bronze groups illustrating the same author; a series of marble reliefs from Macbeth and "The Tempest"; and a colossal group in plaster of the combat between the centaurs and Lapithæ, now in the Pennsylvania Academy of the Fine Arts. Lough died in 1876.

PRINCE OF WALES.—Albert Edward, Prince of Wales, born at Buckingham Palace, London, November 9, 1841. Visited the United States and Canada in 1860; travelled in the East in 1862; married the Princess Alexandra of Denmark in 1863; visited India in 1875-1876.

NAPIER.—Robert Cornelius Napier, the youngest son of Major Charles Frederick Napier of the Royal Artillery, was born at Ceylon, December 6, 1810. He was educated at Trinity College, Dublin, and entered the Bengal Engineers as Second Lieutenant in 1827. He served with distinction in the Sutlej Campaign of 1845-6, at the siege of Multan, at Goojerat, and at the capture of Lucknow in 1858. The same year he defeated the Sepoy rebels at the battle of Pownee, and was made a Knight Commander of the Bath and received the thanks of Parliament. He commanded the second division of the China Expeditionary Force in 1860, when he was present at the surrender of Peking, and for his services again received the thanks of Parliament, was promoted Major-General for distinguished conduct, and appointed Member of the Council of the Governor-General of India. In 1867 he was given the command of the expedition to Abyssinia, which ended in complete success with the storming of Magdala and the death of King Theodore. For this he was raised to the peerage in 1868 as Lord Napier of Magdala. He was successively commander-in-chief of Bombay, India, and of Gibraltar, a field-marshal of the army, and Constable of the Tower of London from 1886 until his death, which took place on January 14, 1890.

(To be continued.)

THE SIXTH LEAGUE EXHIBITION.—I.



THE sixth year of the League Exhibition might be expected to show certain changes, or, perhaps, tendencies, in the matter of exhibitions of architectural drawings, which it would be profitable to note for future guidance; and we think that some such tendencies can this year be observed. In the earlier years of the Exhibition, the drawings hung on the walls might, in general, be divided into three classes—the very good, the creditable, and the bad. More recently, and most of all this year, the first and the last class have been disappearing

together. We do not mean to say that the exhibition has deteriorated, — on the contrary, the average level of design and draughtsmanship has certainly risen; but we miss the beautiful and deeply-thought works with which Stanford White, R. S. Peabody, E. K. Rossiter and some others used to delight us, and no one seems as yet ready to supply their places. It is true that Mr. Rossiter shows this year some of his own drawings, but he has changed his style of design, no doubt in deference to the wishes of his clients, to the cold and formal "Colonial," and it is easier to make a statue dance than to impart warmth and poetry to a "painted, blinded and clapboarded" box, however fashionable such a habitation may be. Mr. Kirby, too, whose picturesque fancies formed a part of the attraction of so many exhibitions, this year shows little, and that little is not his best; and we miss the splendid rendering, and rich, heavy, Spanish design which made the Cathedral drawings of Messrs. Carrère & Hastings so conspicuous in last year's exhibition.

For this year, there is no set of drawings quite so interesting as those of the Cathedral competition, but their place is partly supplied

by the competing designs for the front of the building of the American Fine Arts Society, and those of the Grant Memorial. As these competing works occupy, for the most part, the portion of the galleries nearest the entrance, we will touch upon them first, pausing for a moment to express a regret that the careless proof-reading of the catalogue should again have been permitted to mar the perfection with which the exhibitions have been arranged and carried out. To a mere typographical error, here and there, we should not take much exception, although even such errors leave an unpleasant impression on the mind of the reader of a book so beautifully printed as the League Catalogue, but we find here worse mistakes, — such grotesque alterations of the names of people and places as to leave even a tolerably well-instructed visitor in doubt as to who or what is meant. For example, we will confess to having been at a loss to conceive what classic fragment could be described as a "Temple Wike, Apteros, Athens"; and it was not until we discovered a sketch of the familiar little temple of Niké Apteros that the mystery was explained. In a similar way, the Bargello at Florence appears as the "Bargello"; Wells Cathedral has a superfluous "e" inserted in its name; "Hessia," "Andunach," "Douanworth" and "Machelen" are given as places in Germany or Belgium, and "Trastavere," "Oahn," "Kilanea" and "San Mimato" are mentioned in other countries. The beautiful elevation of the Boston Public Library is catalogued as the "elevator," and among the persons whose names are ill-treated in the same way, perhaps no one suffers more than that admirable sculptor, Mr. Niehaus, whose model of the Hooker statue for the Hartford Capitol is credited to "Wichaus," while even in the list of exhibitors he appears as "Nichaus." It should be remembered particularly that, in a document of this kind, such transformations of an artist's name may do him appreciable injury, even if it were not desirable to avoid them on other grounds.

Having thus fulfilled our duty in regard to the catalogue, we can turn with a clear conscience to the competing drawings for the Fine Arts Society Building. A glance at these is enough to show in a curious way the change in fashion of design which has been going on within the past few years. Five years ago, probably at least one-half of the competing projects for a four-story city front would have been broken up with gables, bays, tourelles, recesses and so on, to get what was then regarded as a "picturesque outline," or "shadow," or something of the sort. To-day, the "picturesque outline" craze, as applied to city fronts, appears to have vanished from architects' offices, and out of nearly forty designs shown, only one, that by Messrs. Stephenson & Greene, shows any attempt to break the "sky-line" by irregular gables. The attempt is quite successful, and the design is pretty and well-studied, but the tide is evidently so strongly against this fashion of designing that even such devoted lovers of picturesque as Messrs. Mellen & Kirby send a symmetrical front, in which their favorite French Transition style appears to great disadvantage, while the two little oriels which they allow themselves are so suppressed in the rendering that it is only by studying the profiles that one can discover that any projection is intended. In the same way, Messrs. Babb, Cook & Willard, who once figured among the most earnest expounders of Italian Gothic, and were second to none in their feeling for picturesque effect, send a Classical design, highly studied in proportion, and considerably ornamented in a "correct" manner, but chilling and unattractive.

Evidently, many of the designers felt that they had no chance of success unless they clothed their idea in a Classical garb, and, as evidently, many found this garb ill-fitting and inconvenient. Why they should have felt so is not very plain, since no restriction whatever was placed on competitors, but it is quite possible that the success of such recent Classical work as the Boston Public Library, and other noted structures, imposed upon the undecided taste of the younger men, and led them to sacrifice their own better, because more instinctive, taste to an unfamiliar and commonplace treatment of archivolts and pilasters.

A great deal might have been made out of the subject with these, if skilfully managed, and Mr. Parfitt, Mr. Ely, Messrs. Gilbert & Taylor, Mr. Clinton and Mr. Tuckerman send beautiful work, but the greatest force of inspiration seems to have been left for those who kept strict Classicism least in mind. Among these, Mr. Hardenbergh and his collaborators, whose design has been selected for execution, stand unquestionably first. Their prettily contrasted grouping of windows, though anything but Classical, would be charming in itself, but to this they have added a profusion of rich and beautifully-drawn detail, in a nondescript style, which might, perhaps, be called Elizabethan, with a French flavor. No doubt some purists will grieve over the mixture of stopped-chamfers around the first-story windows, and archivolts with acanthus leaves on the keystones in the second story, and if the design were crude or coarse it would be unbearable; but all is delicate, pretty and interesting, and the sternest critic cannot help being pleased.

Another design, conceived with the same freedom, but shown, unfortunately, only by a slight sepia sketch, is that of Mr. C. Y. Mott. This received an honorable mention in the first competition, and well deserved some recognition of its clever and interesting treatment. Among the others, Mr. H. Langford Warren's attracts the attention of experts by the delicate feeling with which the front, in brick, in an Italian Romanesque manner, is studied. The detail is small and unobtrusive, so that nearly all the effect depends on the proportion and grouping of the openings, and the design is a model of what can be done to please the artistic sense by this means. Mr. Bruce Price

has a design in which a somewhat forced effect is obtained by sinking some of the openings in a recess, but, although the detail is good the effect is disappointing, while some others, which use similar recessing, with detail not so good, are still more so.

This by no means exhausts the list of interesting designs, but other things claim our attention, and we must turn to the drawings of the Grant Monument competition, which stand in the next room. Messrs. Le Brun & Son, Clinton, Ord, and Duncan show their designs, all beautifully rendered in sepia. On the whole, most people will probably agree with the judges, in giving the first place to Mr. Duncan's design, which has been terribly misrepresented in the daily papers. Instead of a clumsy, coarse affair, as the rude cuts in the newspapers show it, we find a beautifully proportioned design, splendidly rendered, and monumental to a degree that none of the others, unless, perhaps, Mr. Clinton's, approach. This last quality, no doubt, particularly recommended it to the judges. Messrs. Le Brun & Son's design, though charming, has a little effect of a State-house or a cathedral.

(To be continued.)



[Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.]

EQUESTRIAN STATUE OF GENERAL ROBERT E. LEE, RICHMOND, VA. M. MARIE-JEAN-ANTOINE MERCIÉ, SCULPTOR.

[Gelatine Print issued with the International and Imperial Editions only.]

THE particulars concerning this group will be given in due course in the series of papers on "Equestrian Monuments," but it will be so long a time before the period of the War of the Rebellion is reached that it is thought best to publish this view now before the freshness of the interest in the subject is entirely worn out. The group symbolizes the loving admiration that the women of the South have for one of the greatest leaders the unfortunate conflict developed. It was not selected as the most satisfactory solution that the several competitions produced, but was awarded to the Frenchman namely on the strength of his general reputation. The equestrian portion is of bronze, the pedestal of granite, the shafts of the columns being polished. The only inscription is the single word "Lee," on the large bronze panels on either face of the pedestal. The unveiling took place May 29, 1890.

ST. PAUL'S CHURCH, LYNCHBURG, VA. MR. FRANK MILES DAY, ARCHITECT, PHILADELPHIA, PA.

ST. MARY'S R. C. CHURCH, PATERSON, N. J. MR. CHARLES EDWARDS, ARCHITECT, PATERSON, N. J.

DESIGN FOR A CHURCH AND SUNDAY-SCHOOL BUILDING. MR. T. C. LINK, ARCHITECT, ST. LOUIS, MO.

FOURTH BAPTIST CHURCH, PATERSON, N. J. MR. ISAAC PURSELL, ARCHITECT, PHILADELPHIA, PA.

COMPETITIVE DESIGN FOR THE CHURCH OF THE MESSIAH, BOSTON, MASS. MESSRS. CRAM & WENTWORTH, ARCHITECTS, BOSTON, MASS.

[Additional Illustrations in the International Edition.]

ONE OF THE GATEWAYS TO THE STADTPARK, VIENNA, AUSTRIA.

[Gelatine Print.]

VILLA KOCH, GRATZ, AUSTRIA. HERR HANS PRUCKNER, ARCHITECT.

[Gelatine Print.]

WINDOWS AT TOULOUSE, FRANCE.

[Copper-plate Etching.]

THE brick and stone architecture at one time used in France has an entirely different effect and color value from any similar combination in use in this country, and a charm and artistic quality our architects would do well to imitate. When the buildings were new the effect was possibly in some cases disagreeably "spotty," but

when once fairly weather-stained the effect is quiet and pleasing. At Toulouse are to be found many charming examples of this mode, from one of which these details are taken.

MORDEN GRANGE, BLACKHEATH, ENG. J. BELCHER, ARCHITECT.

RESIDENCES, WAKE GREEN ROAD, MOSELEY, BIRMINGHAM, ENG. MESSRS. ESSEX & NICOLL, ARCHITECTS, BIRMINGHAM, ENG.

THESE residences have recently been erected. The elevations are in red bricks, relieved with Bath stone dressings and Bracknell rubber bricks. The roofs are covered with brindled tiles. The detached house cost about £2,000, and the pair of semi-detached houses cost about £1,900.

ST. GILES'S CHURCH, OXFORD, ENG.

CHURCH OF ST. MARY-LE-BOW, CHEAPSIDE, ENG.

CHURCH OF ST. MARTIN, LUDGATE, ENG.



THIS is a very interesting and valuable contribution to the Science of Heating and Ventilation written by a practical engineer of large experience and sound judgment.

The work¹ is in two volumes of 300 pages each, handsomely illustrated with diagrams, figures, and forty-nine plates, partly in color. The first volume treats of combustion, reviewing the solid, liquid and gaseous fuels in use, and of boilers and furnaces; and the second of radiators, hot-water furnaces and of the ventilation of buildings.

The author being himself an inventor and manufacturer, as well as a conscientious investigator in all the departments of which he writes, is fully equipped to deal with it in a most thorough manner, since there is no critic so searching as he who has dissected his subject with a view to improving and perfecting its details. Being both modest and honest, he shows in his work a remarkable impartiality and justice in dealing with the works of other inventors in the same line with himself, and therefore the conclusions of the author bear the stamp of reliability in every part, and should be studied by every one who assumes charge of building operations.

Under the heading "combustion," the first chapter treats of "heat," its nature and source. It treats of the principal sources of heat, the sun, its mechanical and chemical action; and of its effects, expansion, liquefaction and vaporization, and finally considers scientifically the composition of wood and the value of its different kinds for heating purposes.

The second chapter contains a very interesting essay on coal, its various kinds, formation and physical properties, showing the relative heating value of different varieties.

The third chapter is on the general laws of combustion, as a chemical process, showing in a very interesting manner how the union of the four elements, oxygen, hydrogen, nitrogen and carbon employed in combustion produces heat, light and power.

Chapter four treats separately of the four elements employed in combustion, and shows what takes place among the atoms when a fire is kindled.

Chapter five treats of the nature of perfect combustion, showing how the fuel separates into its constituent parts previous to combustion, the gaseous parts burning first, and afterwards the carbonaceous, and how a free supply of pure air is necessary for perfect combustion. "In the natural state of bituminous coal," says our author, "the bitumen and carbon are united and solid. If we take a piece of charcoal and immerse it in boiling pitch or rosin until its pores are filled with these substances, we should have a material resembling bituminous coal. On entering into combustion the rosin would be separated from the charcoal before the former could be converted into flame or the latter ignited, nor would the charcoal burn until the resinous matter had been consumed. The wick of a lamp does not burn while there is a supply of oil. Alcohol may be burned on a piece of paper, but the paper will not be consumed nor acted upon in the least while there is a supply of alcohol; but after the alcohol has been consumed the paper will take fire. This is the case with bituminous coal. It is not a homogeneous mass which is to enter into combustion, and the conditions and wants of each part are essentially different. This is a primary distinction which demands special attention, for to the neglect of this may be attributed many of the erroneous practices into which so many have fallen in the construction and management of furnaces."

Mr. Mills thus founds all his reasoning upon simple first principles, and by so doing makes his subject, generally thought difficult to comprehend, perfectly clear even to the ordinary reader.

Chapter six treats of the volatile constituents of coal, and shows the loss of heat sustained if the gas is expelled unconsumed. The structure of flame is explained by illustration from that of the

¹ "Heat, The Warming and Ventilation of Buildings," by John H. Mills, Press of the American Printing & Engraving Co.

common lamp or candle. This chapter gives also cuts of anthracite coal and gas coke.

In the seventh chapter, the qualities of coke are considered, and the volume of air required for its complete combustion; two hundred and forty thousand cubic feet of air being required for the combustion of the coke in a single ton of coal. This chapter shows the loss of heat sustained through excess of air-supply. This chapter gives nine very interesting colored diagrams ingeniously illustrating the chemical principles of combustion, showing the close contact of the atoms composing the fuel required for perfect combustion.

The second part of Mr. Mills's work consists of a treatise on the solid liquid and gaseous fuels, and on the proper construction of furnaces for the perfect combustion of fuel.

Chapter eight gives the scientific principles which should guide us in the construction of furnaces, and shows that inventions in furnace construction are so often unsuccessful through deficient knowledge or principles. As a result, the combustion in most furnaces is very incomplete and wasteful. Mr. Mills enumerates sixteen sources of loss in the ordinary modes of burning bituminous coal. He shows how hot air might be introduced above the coals to burn the smoke, and illustrates the Jarvis furnace by a full-page colored plate, and explains how the essential conditions for perfect combustion are met in this furnace. The important work of Sydney Smith is reviewed in this connection.

The next six chapters treat of pulverized, liquid and gaseous fuels, pulverized, or waste coal, petroleum and natural gas, and of the various kinds of furnaces constructed for their combustion.

Part Three is on safe and unsafe boilers. The first chapter in this part gives a record of the terrible boiler-explosions resulting from the use of wrought-iron "shell" boilers, showing that the wrought-iron shell is the dangerous part of these boilers, and strongly warning the public against their use. This is a very important chapter which no architect or engineer should fail to read. It is "a record of human frailty, ignorance and cupidity." But since the wrought-iron shell boiler requires eternal vigilance and unusual intelligence on the part of its engineer, absolute security is unattainable where it is used.

The next two chapters are on safety sectional-boilers, and gives illustrations of several of the best kinds.

The second volume is on the distribution of heat. The first part treats of radiators, their construction, use and value, explaining the laws of the transmission of heat by radiation and convection.

The second part treats of hot-air and steam furnaces, and of water and steam as heating mediums. It also contains descriptions of various forms of water-apparatus, ancient and modern, and of their pipe-lines, radiators and appurtenances.

The last part is on the ventilation of buildings, the first chapter being historical, the second treating of the condition of public school-buildings, and the amount of air required. The second, on the method of securing ventilation through the movement of heated air in flues and chimneys, and the two last on mechanical and power-ventilation, describing, in a most interesting manner, the method employed by bees in ventilating their hives. "The worker-bees perform the office of ventilators, and the number at one time varies from eight or ten to twenty or thirty, according to the state of the hive and the heat of the weather. I have frequently watched their proceedings with interest. They station themselves in files within the entrance of the hive, with their head towards the entrance, while another, and larger party, stand a considerable way within the hive with their heads also toward the entrance.

"They plant their feet as firmly as possible on the floor of this hive, stretching forward the first pair of legs, extending the second pair to the right and left, while the third, being placed near together, are kept perpendicular to the abdomen, so as to give that part a considerable elevation; then uniting the two wings of each side by means of the small marginal hooks with which they are provided, so as to make them present as large a surface as possible to the air, they vibrate them with such rapidity that they become almost invisible. The two sets of ventilators, standing with their heads opposed to each other, thus produce a complete circulation of the air of the hive, and keep down the temperature, to that point which is fitted to the nature of the animal."

Thus the book is enlivened by interesting descriptions of natural phenomena, rendering an otherwise rather dry subject entertaining to the unprofessional reader, as well as very profitable, if not even indispensable, to the architect, engineer and builder.



[The editors cannot pay attention to demands of correspondents who forget to give their names and addresses as guaranty of good faith; nor do they hold themselves responsible for opinions expressed by their correspondents.]

PLAGIARISM.

BOSTON, January 4, 1891.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—While plagiarism is an offence very clearly defined and very severely punished in the realm of Literature, it would seem that no such crime is known to the Architectural Code. If it be, I have never succeeded in discovering what constitutes it.

The architect who, in indulging a penchant for literary work, would attempt to apply to it the same standard of ethics which seems to govern architectural composition would proceed somewhat after this fashion. Let us suppose that, in writing some essay, he has occasion to describe a certain aspect of nature and that his powers of description prove unequal to the task: well, he has an extensive library and is not at all disheartened. Selecting a few glowing passages from Ruskin, he inserts them in the composition without any acknowledgment of the source from which he borrowed, or having borrowed at all, and beneath he boldly signs his name. When threatened with the dire penalty which Literature inevitably imposes on such a transgressor, he proceeds to justify himself on the ground that the borrowed part was so cleverly incorporated in his own work as to seem naturally to be a part of it. This excuse is about as likely to be found acceptable as was that of the housemaid, who, upon being discovered publicly masquerading in her mistress's Paris bonnet, sought forgiveness on the plea that she "allus did like dat bonnet, it was so defined and folks *did* say as how it fitted just as do' she was made for it." This young woman probably thought that the "defined" taste which she displayed in the selection of her millinery did not meet with the appreciation which it merited, notwithstanding that it justified, in her mind, any peculiar means which she may have taken to gratify it. Yet, this is the morality which evidently obtains in architectural practice, where a person needs no permission to borrow (?) anything he admires and if his taste be only of the "defined" order of the lady before mentioned, he may indulge it to the top of his bent by wearing the nice things of other people, and, instead of being visited with the retribution generally meted to an offender, he receives the enconiums which are usually reserved for a benefactor.

He who would aspire to a place (however humble) in the literary sphere must have ideas of his own, at least he must express them in his own way and thus, by stamping his individuality on the work, stand or fall on his merits. He cannot borrow the art of another. In architecture, on the other hand, we find decorative designs to consist in a more or less coherent arrangement of everybody's ideas but the designer's, the latter being evidently under no obligation to even modify them or to alter the language (if I may say so) in which these ideas are conveyed. The feasibility of architectural copyright (which we sometimes hear discussed) is involved here. Copyright is a peculiar right by which the property of the privileged person is protected from those who respect not the moral law *per se*, but who are compelled to submit to it under penalty, when it is enforced by civil government. This copyright law regulates literature and science and the result is that individualism, which our social philosophy recognises as the grand motive of all human labor. Copyright would be a necessity in architecture if individualism were a possibility. But a law cannot be enforced when it doesn't exist. It may be claimed that the elements of architectural expression are of such peculiar character as to make the application of such a principle a serious hindrance to architectural progress. If this be so, whether for the reason suggested or some other, then it is absurd to consider the feasibility of copyright, which can never be if the socialism which characterizes architectural endeavor be, not an abuse, but a normal condition, which is essential to a healthy architectural life.

This letter is written, not in a spirit of controversy, but of inquiry, since a person is likely to be diffident about protesting against a certain order of things which has received the weighty sanction of tradition and, so far as he knows, the universal approval of the architectural world.

CHAS. D. MAGINNIS.



THE SALT LAKE CITY INSTITUTE OF ARCHITECTS.

THE Salt Lake City Institute of Architects was organized December 19, by fifteen local architects, with the following officers and Board of Directors:—Henry Monheim, *President*; M. D. Kern, *Vice-president*; Fred. A. Hale, *Secretary*; W. S. Hedges, *Treasurer*; W. E. Ware. FRED. A. HALE, *Secretary*.



LONG-SPAN BRIDGES.—At a recent meeting of the American Association for the Advancement of Science, Mr. Gustave Lindenthal read an interesting paper on the "Economic Conditions of Long-span Bridges, with Special Reference to the proposed North River Bridge at New York City." Mr. Lindenthal holds that the bridges of one hundred years ago were in no particular superior to, even if they were as good

as, those dating from ten centuries or more back. The stone bridge, for instance, erected over the Adda, at Trezza, in 1380, has never been surpassed, its span being 251 feet, whilst the Cabin John bridge, the largest of the type now existing, has a span but 220 feet. Passing to other types, a wooden arched bridge 4,000 feet long, and with spans of 170 feet, was erected over the Danube in 104 A. D., and the remains of its piers can still be seen. Since the introduction of iron, however, progress has been rapid. In the present state of applied mathematics, it is possible to calculate beforehand the stress on each member of the structure, and to predict how much a bridge will deflect under certain loads, or under temperature effects. The relative advantages of different types of structure are therefore becoming better understood and many imperfect forms are disappearing. Mr. Lindenthal considers that an ordinary truss bridge loses its advantages when the span exceeds 500 feet. After this comes the cantilever or the continuous girder bridge, the practical limit to both these types being about 2,000 feet. With an ordinary arch bridge of steel, Mr. Lindenthal considers that spans of 4,000 feet could be constructed, the largest actually in existence being, however, of 550 feet span only. For the very largest spans, however, the suspension bridge stands prominent, but in many instances such bridges have been built without proper stiffening, and popular opinion has therefore condemned them as not rigid enough for railroad traffic. In general, where stiffening is attempted, it is done by stiffer trusses, which, however, on a long span, require to be very heavy and substantial. A better way is to split the cables and insert between them the bracing of the stiffening trusses, the weight of the chords of these trusses being then entirely saved, and the braced cables form a true inverted arch rib, capable of resisting deformation. On this system spans of 6,000 feet could be constructed for railway traffic, with steel cables having a tensile strength of 170,000 pounds per square inch, which is that of the cables used in the Brooklyn bridge. At the present time, however, suitable wire could be obtained having a strength of 240,000 pounds per square inch, and with this even larger spans could be built. The proposed bridge over the North River has been designed with a central span of 2,850 feet, and two side spans of 1,500 feet each. The roadway is to be carried at a height of 150 feet above the water. The arched ribs are to be made of steel wire cables with bracing between them as described above, the cables being 50 feet apart. There will be but two such ribs to each span, though there will be six tracks of railway on the platform of the structure. The rigidity of the proposed ribs is so great that no perceptible deformation will be occasioned by a procession of locomotives across the bridge on each track. Mr. Lindenthal points out that the durability of long-span bridges is greater than that of shorter, for two reasons, one being that the maximum designed lines occur much less frequently on long-span bridges than on the others, and the other that the dead load bears a higher proportion to the live load. On the other hand though, we may remark, that the wind load becomes of very much greater importance in long spans, the stresses due to it increasing in some ratio approximating to the third power of the span in bridges of similar types, and it will be interesting to learn what method of wind bracing Mr. Lindenthal proposes for his gigantic undertaking. — *Engineering*.

THE TELEPHONE SUGGESTED IN 1854.—In the *Didaskalia*, a weekly paper published at Frankfort-on-Main, dated September 28, 1854, was printed the following article on "Electrical Telephony." In the second edition of Comte Theodore du Moncel's "Exposé des Applications de l'Electricité," published in Paris in 1857, Vol. III, p. 110, is given a description of a telephone by Charles Bourseul, but du Moncel gives no reference to the original paper describing the invention. The article in the *Didaskalia* is as follows:—"The number of miracles with which electricity has astonished us lately is said to have been increased by one which would not only cause a revolution in electrical telegraphy, but would add considerably to its utility. The invention in question is nothing less than the electrical transmission of the 'spoken word.' The idea was conceived by an educated and modest young man named Charles Bourseul (now living in Paris), who was a private in the African army in 1848, where he brought himself under the notice of the Governor-General by a course of mathematical lectures which he gave to his comrades in the garrison of Algiers. Possibly Bourseul's scheme, of the practicability of which he is perfectly convinced, may be one of those which learned men will afterwards declare very simple, and which, if troubled about, would have been brought out much sooner. The principle of electro-telegraphy, as is well-known, is the following:—An electric current passing through a metal wire surrounding a piece of soft iron, transforms the latter into a magnet. The magnetic properties of the iron vanish when the electric current is discontinued. This magnet, called the electro-magnet, can, therefore, alternately attract or repel a movable plate which, by its forward and backward movements, produces the conventional signals used in telegraphy. It is further known that all sounds are transmitted to the ear through the air vibrating; and that, therefore, sounds are virtually vibrations of the air, and that the infinite variety of sounds is solely dependent on the rapidity and strength of these vibrations. If it were possible to construct a metal plate, sufficiently sensitive and flexible to admit of the reproduction of the vibration of sounds (like the air), and if this plate could be connected with an electric current in such a manner as to alternately interrupt and continue it according to the vibrations of the air to which it would be exposed, it would be equally possible to electrically affect a similar metal plate so as to repeat exactly and simultaneously the vibrations of the first plate. This would create the impression as if the speaker had spoken in immediate vicinity of the second plate, or, if put differently, the ear would be affected in a similar way as if it had received the sounds through the first metal plate. Electrical telegraphy, which was once academically declared to be almost an absurdity, is now almost universally established; and if we investigate this new idea of the young scientist on the principles of physics, we find that not only no objection could be raised against the soundness of his theory, but that its practicability is more probable than that of electrical telegraphy was only a short

time ago. If the theory should prove a success, electrical telegraphy will attain a position of general usefulness. No special knowledge or apparatus will be required except a galvanic battery, two suspended plates and a metal wire. Without any other preparation one person will have to speak into one of the plates, while the other person places the second plate close to his ear, thus enabling them to converse as if in private. The youthful inventor is confident of the success of his invention, and challenges scientists to prove the impracticability of his theory on scientific grounds. In the meantime the invention fully deserves the attention which will, no doubt, be bestowed on it."

FIRE-RESISTING DOORS IN THIS COUNTRY AND IN ENGLAND.—While in the United States the superior fire-resisting qualities of doors and window-shutters properly built of wood and hermetically encased in tin, over the iron ones, is generally conceded, the English underwriters still pin their faith upon iron constructions and will have none of the new-fangled devices, not even taking the trouble to test their capabilities by fire. This piece of conservatism led recently in London to a rather amusing compromise between the views of the insurance men and the insured. It appears, according to an insurance contemporary, that a well-known firm equipped its premises with a number of tinned wooden doors, constructed strictly after the specifications of our factory-mutual insurance companies, as described and illustrated recently in *Fire and Water*. Considerably to the annoyance and surprise of the firm, the insurance surveyors declined to approve the new doors and refused to pass the risk unless iron doors were put up. And so, the firm having no faith in these, in order to obtain insurance, settled the question by leaving its tinned wooden doors in position, but erecting others of iron in front of them. And this in England, the very home of fire underwriting! — *Fire and Water*.

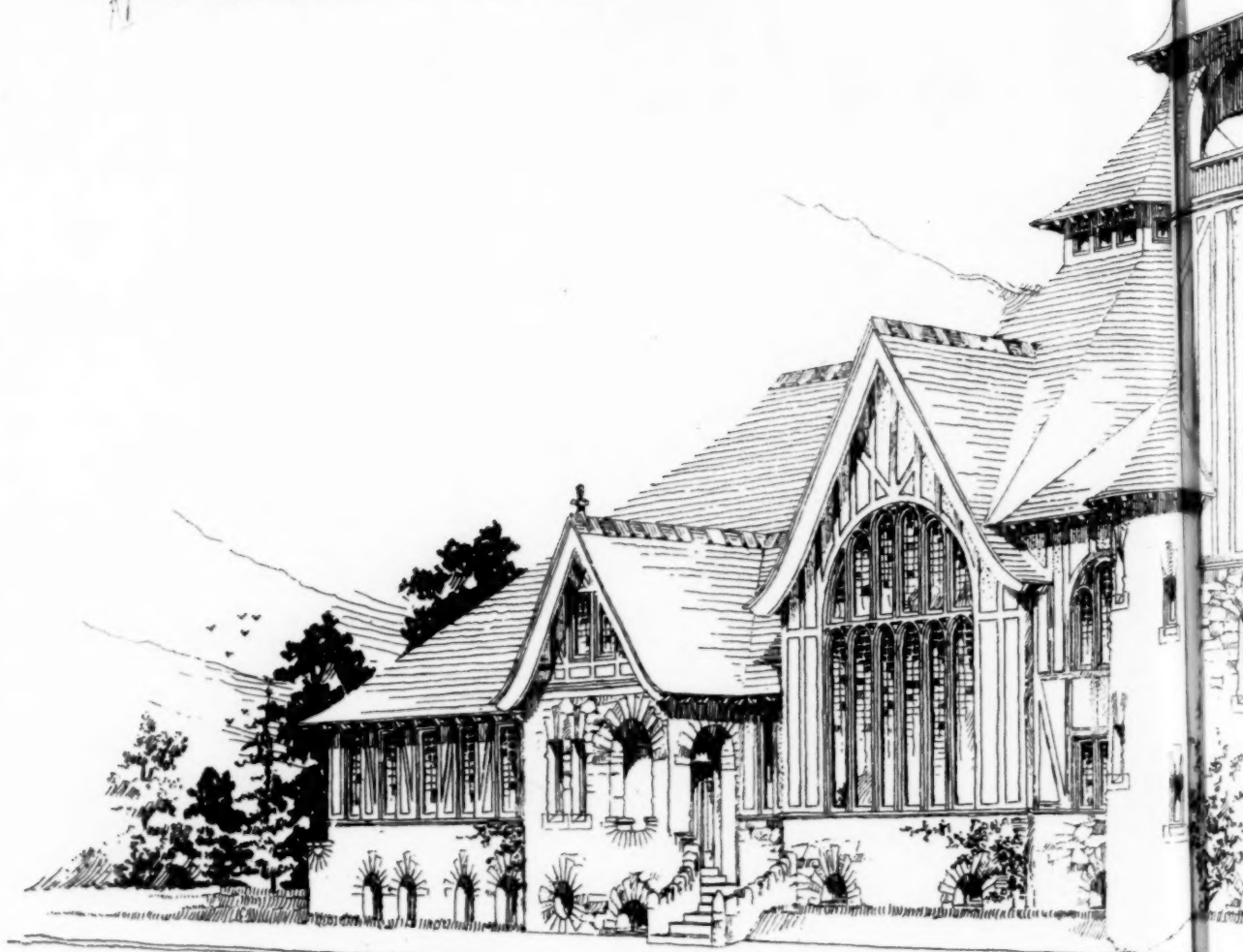
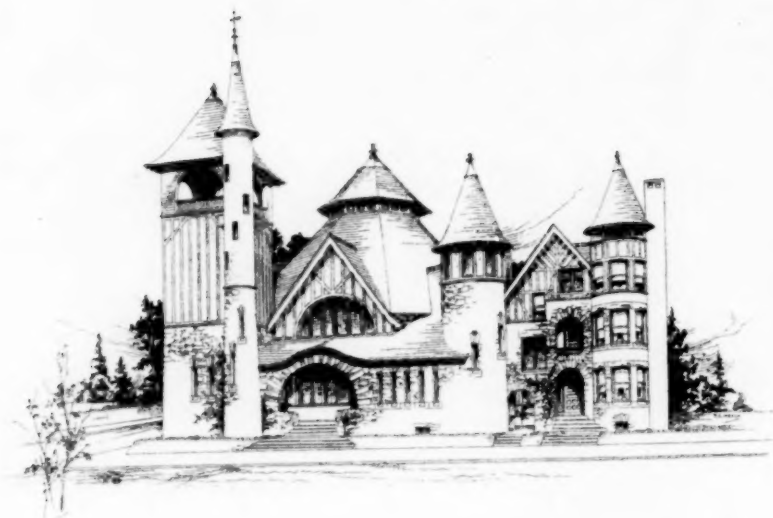
TRADE SURVEYS

BUSINESS men everywhere are scrutinizing very closely just now the possibilities of overdoing in trade and production. The conclusions already arrived at are, in brief: that at present there is no overproduction; that prices are satisfactory; that it is uncertain whether the general advance of six per cent made last year can be maintained this year; that there is a general expansion going on in productive capacity; that the bulk of the investments made during the past three or four years are productive; that speculative values are almost unknown; that railway affairs are shaping up all right; that there is too little rather than too much money; that economic legislation has yet to be tried to know its value, and that there is a general desire, as soon as matters settle down a little more, to rush into new work of all kinds. On the other hand, there is a good deal of money hidden and being hidden away, and there is a disposition to restrict buying to the closest limits. The liquidation which has taken place has been productive of good, but it is by no means over. It has been confined to channels where the greatest risks were taken. The commercial failures clearly indicate that the damages done have been done mainly among more or less speculative interests. The volume of business was about four thousand million dollars over that of the previous year. The liabilities were about forty millions greater. Stock-speculations at New York, about the same; gross earnings for eleven months on one hundred and forty-three lines of railroad were thirty-five million dollars greater. One thousand million dollars' worth of securities were listed at the New York Exchange, and nearly seven hundred million dollars' worth of securities stricken from the list. Exports of flour, wheat and corn fell off largely, raw material of all kinds and building material were produced greatly in excess of 1889. Iron, steel, lumber and petroleum and coal were thrown on the market more freely, and without any perceptible accumulation of stocks. Manufacturing capacity was enlarged from ten to fifteen per cent, as measured by horsepower. Builders built more house and shop room, and manufacturers of equipments enjoyed a year of exceptional activity. These facts speak for themselves, and furnish material for the forming of opinions and the drawing of inferences which no other sources could furnish. It is a disputed question among many as to what extent there is a scarcity of money, if any at all, that would accrue from the adoption of one of the best and safest schemes for expansion. The discussions on this vital matter threaten, unfortunately, to take a political turn, and, if such should be the case, further inconvenience will be suffered before a solution is reached. A few labor disturbances are interfering with plans. The North Alabama miners have finally effected a compact organization, and negro labor is to some extent profitably used, but it is only a question of a short time before both white and black labor there will join hands. Several thousand miners in Western and Central Pennsylvania are just now heading for the Bad Lands, and may yet give their employers some trouble, for bituminous coal is in very active demand. Mill-labor and shop-labor generally is content, and, while some labor leaders find nothing more conducive to interest in labor associations than the discussion of strike projects, there is really very little desire upon the part of the rank and file to seriously consider a suspension of work. The miners who are striking in Western Pennsylvania have for thirty years selected the time to strike when coal was not urgently needed. There is at present a spirit of indifference among the members of the building trades as to strikes, and leading contractors in the larger cities do not look for trouble except in isolated trades. Reports from quite a number of trade schools show that there has been a marked improvement in attendance during the past year, and a high standard of efficiency has been attained. No impression has been made yet on the supply of skilled labor, but all competent boys find employment, though they are by no means welcomed by the unionists. The friends and promoters of this system of practical instruction are encouraged, and various plans are under consideration in quite a number of cities and towns to extend the system of manual training. The defect of the system as thus far developed is to be found in the fact that most boys seek this instruction as a good stepping-stone into positions involving supervision of labor. But even here there is a field to fill, and the advocates of the new method are pointing to the fact that their schools do furnish good foremen and superintendents. The year opens with all conditions healthy, and with markets that are able to absorb large additional stocks. Trade and manufacturing organizations are acting as automatic brakes on production.

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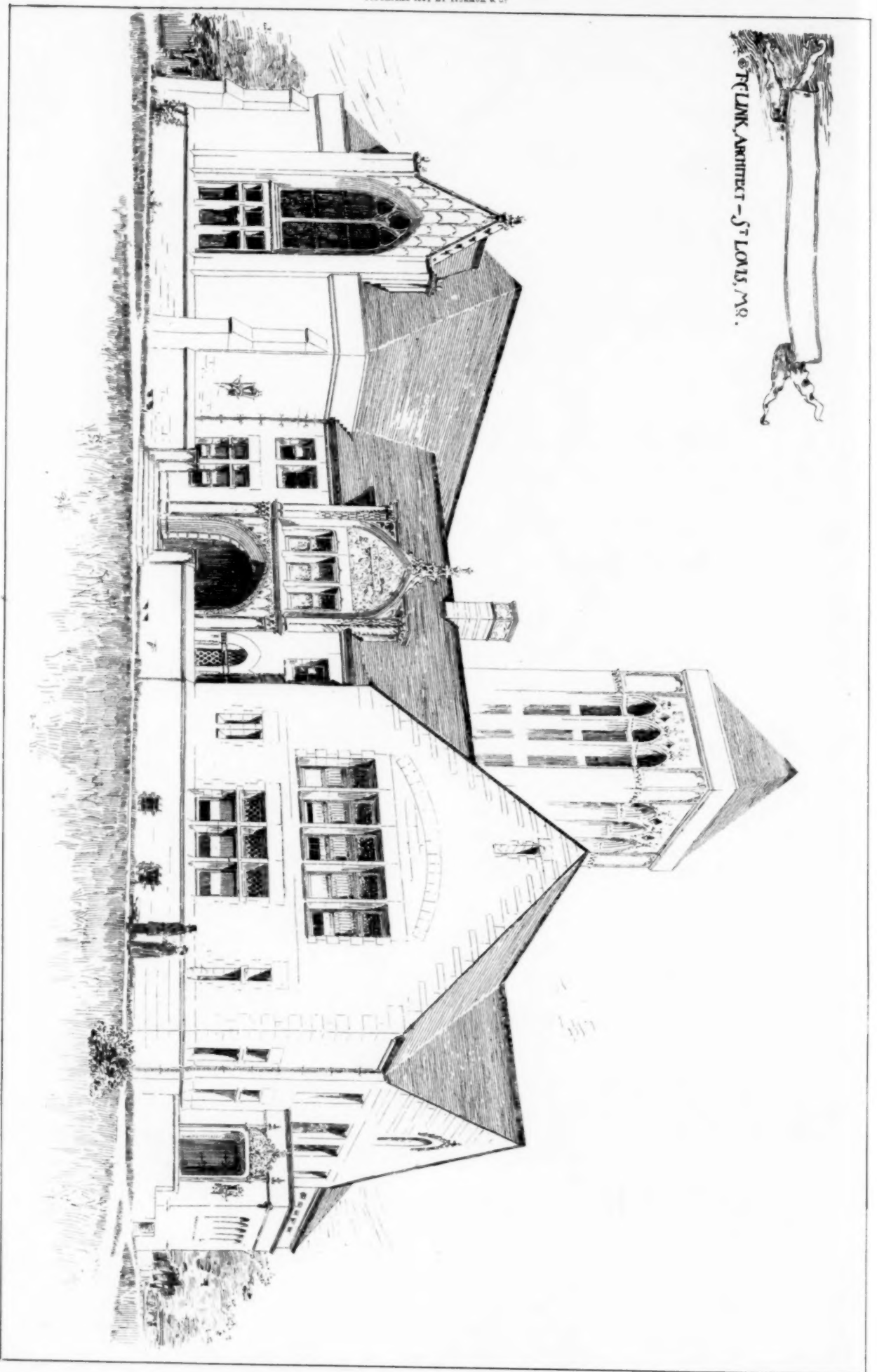


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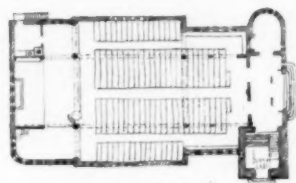
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1/4" = 1' plan



ST. PAUL'S P.E. CHVRCH
LYNCHBURG VA.

Frederick M. Day
architect 125 North 1st St.
Richmond Va.

St. Mary's R.C.
Church.

Paterson.

N.J.

Charles Edwards, Architect.

