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JANUARY 3, 1891.



SUMMARY:—

The Second *American Architect* Travelling-Scholar. — Death of Dr. Henry Schliemann. — An Owner overreached by an Insolvent Contractor. — The Contractor seeks the Aid of the Walking-delegate. — Death of M. Frank Buchser, Artist. — The Transmission of Power in Europe and in America. — Artificial Rubies and Sapphires. 1

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ON the sixth of December the second holder of the *American Architect* Travelling Scholarship, Mr. Albert Kahn, sailed from this country to spend the ensuing twelve months in deriving as much benefit as possible from his studies and travels in Europe. Like his predecessor, Mr. Kahn is of foreign parentage — more than this, of foreign birth — only just turned of age, and has received all his training in the same office, that of Messrs Mason & Rice of Detroit, where he has spent ten or twelve years, rising from one position to another until he was practically the head-assistant. It is a curious commentary on the value of the various travelling-scholarships that have been established with the view of doing good that there are so few young men who appreciate the opportunities that these foundations put within their reach. Two years ago Mr. Bacon was the only applicant for the Rotch Scholarship, and this year Mr. Kahn was the only one who applied for the *American Architect* Scholarship. Fortunately in both cases the applicants were able to satisfy the founders that their merits were equal to their opportunities, in spite of the fact that they won through a "walk-over."

THE whole civilized world will hear with regret of the death of Dr. Henry Schliemann, the most enthusiastic and successful, if not the most scientific, of all modern archaeologists. Dr. Schliemann's life was a most interesting and romantic one. His father was a Lutheran pastor in the village of Ankershagen, in Mecklenburg, a poor man, but well read, and fond of the old Greek myths and stories, which he repeated to his little son. While the latter was still very young, his father lost his parish, and it became necessary to place the boy in a grocery store, where he could earn something toward his support. His extraordinary energy and ability showed itself even in this humble position. He devoted his leisure time to learning languages that might be useful to him in business, and some of his friends interested themselves in advancing him to a position as bookkeeper for a firm in the wider commercial field of Amsterdam. His new employers, who carried on a large trade with Russia, soon found that their new bookkeeper understood Russian, and turned over to him their correspondence in that language, and, later, sent him to St. Petersburg as their representative. Although he was then only twenty-three years old, he managed the affairs entrusted to him with his

usual fidelity and success, and, before long, established himself in business there on his own account. Although he made money rapidly, and invested it carefully, he found time, not only to master the modern language of every country which his business obliged him to visit, but to study earnestly and deeply the Greek classics, and such Oriental literature as illustrated Grecian life and history. About 1867, as he himself says in one of his books, the dream of his life was realized, and he was able to wind up his affairs, and devote himself and his ample income to researches into Greek antiquity. His first investigations were on the site of the ancient Troy, where he excavated sufficiently to convince himself of the position of the Homeric city, but, having no official permission for exploration, could not undertake extensive researches. In 1870, he returned to the Troad, armed with official authority, and spent three years in making the investigations which are described in his first book, "*Troy and its Remains*," published in 1874. During the same year, he obtained permission from the Greek Government to explore the site of Mycenæ, but, owing to various complications, it was not until 1876 that he discovered and opened the subterranean chambers described by Pausanias as the tombs of Agamemnon and his royal companions, and found therein the skeletons of men of great size and strength, with gold crowns around the skulls, and, lying beside them, gold ornaments, designed in a style unknown elsewhere in Greece, and resembling that of certain objects found on the site of Troy. It may be imagined that the report of the discovery of the skeleton of a king whose grandfather rode upon a winged horse, whose wife was hatched out of an egg, and whose daughter was carried a thousand miles through the air by the goddess Diana, did not meet with an enthusiastic reception from the strictly scientific archaeologists; but as the race of kings of Mycenæ was extirpated, under Agamemnon's grandson, by the returning Heraclidae, about eighty years after the capture of Troy, and as the style of design used by the Heraclidae and their successors until now is perfectly familiar, and is entirely different from that of the Mycenæ remains, it is hard to say who the royal skeletons could have belonged to, if not to the persons who had, for a thousand years, been believed, at the time of Pausanias, to be lying in the tombs. It is only fair to Dr. Schliemann to say that many of the doubters have, within a few years, been converted to his opinion in regard to the discoveries, both at Mycenæ and Troy, and recent investigations have tended to confirm it still more. After the Mycenæ explorations, Dr. Schliemann established himself at Athens, where he built a beautiful house, and received most kindly the American scholars who visited the city. During the favorable season in each year, he devoted himself to further investigations, and was making preparations for continuing the extended excavations at Troy which he began last summer, when he was taken ill at Naples. He wrote to his wife at Athens that the illness was slight, and that he would join her in a few days, but unfavorable symptoms appeared, and the physicians ascertained that an abscess existed on the brain, and, while they were consulting about the necessary treatment, the nurse, who had been left with the patient, came in and told them that all was over. Dr. Schliemann was an American citizen, having been naturalized here during a two-years' residence after the war. He was twice married. His first wife was a Russian; the second was a Greek, who has been, since 1870, the faithful companion of all his labors.

A VERY curious case was decided the other day in the City Court of Brooklyn, N. Y. A Mr. Begley, a lawyer, contracted some time ago with one O'Connor, of Brooklyn, for the erection of a number of tenement-houses in that city. O'Connor made sub-contracts for various parts of the work, including one with a plumber named Marrin, for the plumbing in the houses. While the buildings were going on, O'Connor kept coming to Begley for advances of money, to give to the sub-contractors, as he said, and to pay for material. Begley, who appears to have been inexperienced in building matters, gave O'Connor money as he asked for it, until the total of his payments amounted to more than the contract-price of the houses. By this time the houses were finished, except hanging some of the doors, and connecting the house plumbing-pipes with the service-pipes from the street, but O'Connor, who

probably thought that nothing more could be extracted from Begley, coolly notified him that he could not proceed any further with the buildings, as he was insolvent; and that he had not applied the advances made to him to paying the sub-contractors, as he said he was going to, and that they had not been paid, nor had all the materials been paid for. Architects are familiar enough with this sort of contractor, and will probably not feel much commiseration for the woes of an owner who chose to be his own architect, but the sequel differs from that of most stories of the sort. No sooner had O'Connor thus gracefully withdrawn from the scene than Marrin, who seems to have had his plans laid beforehand, appeared, and demanded from Begley's agent four hundred and fifty dollars, which, as he said, was due him on his sub-contract for plumbing; adding a threat, that being a member of the Plumbers' Union, he would see that not a drop of water was turned on to any of the houses until his demand was paid. The agent declined to pay, for the obvious reason that Mr. Begley had already paid O'Connor more than the agreed price for the whole work, including the plumbing, and had never made any contract with Marrin, or asked him to do any work, or promised or intended to make payments to him, instead of the principal contractor.

MARRIN then reported to the Plumbers' Union, which sent a walking-delegate, named Todd, to see Begley's agent. Todd was accompanied by a walking-delegate from the Carpenters' Union, and the two worthies demanded that Marrin's claim should be paid. The agent refused, and applied to a dozen or more master-plumbers, to finish Marrin's work. To a man, they refused, saying that they would like to do it, but that they were members of the Union, and compliance with the request would subject them to a fine of a hundred dollars. Finally, a non-union plumber was found, who undertook to complete the plumbing for seventy-five dollars, and asked for an advance of fifty dollars on account, which was given him. Nothing further was heard from him until a note arrived, saying that "owing to the pressure that had been brought to bear on him," he could not do the work. He omitted, however, to return the fifty dollars advanced. Some weeks later, the agent received notice to attend a meeting of officials of the Plumbers' Union, and did so. Here he found Mr. Todd again, who, besides being the walking-delegate of the Union, turned out to be an inspector of plumbing for the Brooklyn Board of Health. Although Mr. Marrin was there, Mr. Todd spoke for him, and finally agreed that Marrin should finish his work for two hundred and twenty-five dollars. The agent, who had tenants waiting to move into the buildings, paid the money, and the plumbing was completed by Marrin. Mr. Begley thought that it was now his turn to make claims, and brought suit accordingly against Marrin for damages, for preventing the completion of the houses for nearly six months; and the jury awarded him four hundred and ten dollars damages, which Marrin will have to pay, besides the costs.

THE *Courrier de l'Art* mentions the death of an artist somewhat known in this country — Frank Buchser, of Soleure, in Switzerland. Besides being a good painter, Buchser was a man full of energy and resource. As a boy, he was destined by his parents to learn the carpenters' trade. He was already full of artistic fancies, and hated the monotonous life of a carpenter's apprentice, so, one day, he dropped his tools, and took the nearest road to Rome. At the time of his arrival, the Pope was still a temporal prince, and having nothing to live on, he enlisted in the Swiss Guard. This service required of him nothing more than an occasional drill, and an ornamental appearance on state occasions, and he had plenty of time for drawing and painting, which he improved diligently. Before long, he started out to seek his fortune. He went first to England, then to Holland, Spain, the Soudan and Morocco. In this last country he staid a long time, painting its picturesque scenes, and enjoying the warm friendship of its dreaded Sultan, Muley Edirs. Still another period, of several years, was spent in our own Southern States, where he painted many portraits and plantation scenes. He was forty-three years old when he arrived once more in his native land, where he soon took a prominent place. He made himself the principal advocate in Switzerland of the idea that the State ought to encourage the fine arts, and his persistent efforts led at last to

the establishment of a permanent Commission of Fine Arts, of which he was appointed a member, and to a regular appropriation for carrying out its work. His next work was to urge the regular exhibition of native art, and he was one of a committee which, last spring, organized the first "Salon Suisse." His zeal appears to have been greater than his strength, and he survived this success only a few months, dying at home at the age of sixty-three.

A CURIOUS difference is just now to be observed in methods of transmitting power, between the New and the Old World. In this country the installation of electric motors, driven by a current from a central station, has reached an enormous development. Not only are one-fifth of all our street-railway cars now propelled by motors, aggregating sixty thousand horse-power, but countless elevators, hoists, grindstones, printing-presses and other light machines are driven by electricity; and the number increases every day. On the other side of the water the transmission of force is accomplished by means of compressed air, and the multiplication of compressed-air motors and stations appears to be going on as fast in England, France and Germany, as that of electrical plants is in the United States. In Vienna, for example, seventeen thousand horse-power in compressed air is now regularly distributed to about fourteen hundred consumers, and the extension of the system is eagerly awaited by the small manufacturers outside of the present district. So great is the advantage which the system presents for such persons, that, on the occasion of the application of a new company, not long ago, for permission to lay its pipes, a petition, signed by two hundred and forty-five manufacturers, and strongly endorsed by the Manufacturer's Association of Lower Austria, was presented to the city council urging it to grant the desired permission without delay. Whether electricity or compressed air offers the greater advantages for transmission, we will not undertake to say, but it is to be noted that the compressed-air system appears to have been much improved of late. Not long ago some dissatisfaction was expressed with the working of the system in Paris, on account of the loss of power by the chilling, due to the expansion of the compressed air in the machines in which it was utilized, and the dripping of moisture from the surfaces of the machines, which often became so cold as to be covered with frost while in operation. Owing to this annoyance, a system was constructed and put in operation, which exhausted the air instead of compressing it, the motors being driven by the pressure of the exterior atmosphere. As only a very moderate pressure could be obtained in this way, the vacuum system appears to have met with slight success, while the compressed-air service has, of late, been rapidly extended in Paris, and perhaps even more rapidly in London. As a moral agency, the multiplication of small motors is looked upon with much favor by students of social science, who find that manufacturing carried on at home, or in a small shop, is far more likely to develop energy and intelligence in the workmen than employment in a huge factory, and it seems as if the promotion of this new movement would be advantageous in many ways.

IT will be remembered that, a year or two ago, a conference of jewellers was held in Paris, to consider the appearance in commerce of rubies, which were said to come from Geneva, and, although of the same color and composition as the precious natural ruby, showed under the microscope air-bubbles, as if they had been formed by melting, instead of by the slow processes of nature. Little has since been heard of these Geneva rubies; but the French chemists, MM. Frémy and Verneuil, have succeeded in making artificially not only rubies of good color, but beautiful sapphires. So far, the crystals have been small, but, by operating on six or seven pounds of material, instead of the minute quantities usually employed in chemical experiments, stones of one-third of a carat weight are readily obtained. This is a size quite available in jewelry, and the inventors of the process think that, by treating a hundred pounds or more of material, large and valuable crystals can be made. The process employed consists in heating to a very high temperature amorphous alumina, with fluoride of barium and carbonate of potash, and a minute quantity of bichromate of potash. The last ingredient gives the color to the stone, and whether the color will be red, blue or purple seems to depend upon conditions not yet clearly understood.

AUSTRIAN ARCHITECTURE.¹—XIII.

THE SEVENTEENTH AND EIGHTEENTH CENTURIES.—III.

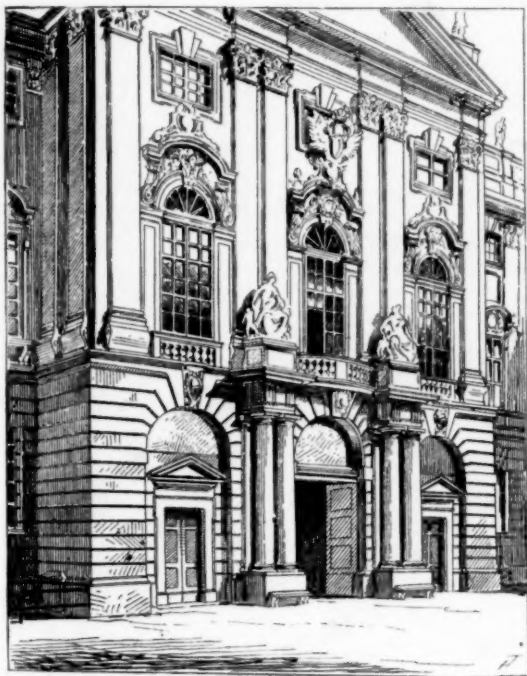


Fig. 16. Palace Trautson, Vienna.

THE palaces of Fischer von Erlach are as noted as his churches. He appropriated certain elements of French architecture, but inclined rather toward the Classic principles that were beginning to be revived in France by the side of the Louis Quinze style. A few of his palaces were designed to harmonize with extensive gardens laid out after the manner of

connoisseur in architecture. Fischer's first design was more imposing than the one which was finally adopted. It was originally intended to place the castle on the eminence now occupied by the Gloriette, a Classic colonnade executed later by Hohenberg of Hetzendorf. Broad sloping paths and capacious stairways were to lead to the summit of the ascent. The château was completed under Maria Theresa, in 1750; it shows an extension in the transverse axis, an accentuation of the main structure in the centre and, on the sides, a court in front of the façade flanked by the lateral projecting wings of the edifice and closed by grilles—all after the French manner, as



Fig. 17. Imperial Winter Stables, Vienna.

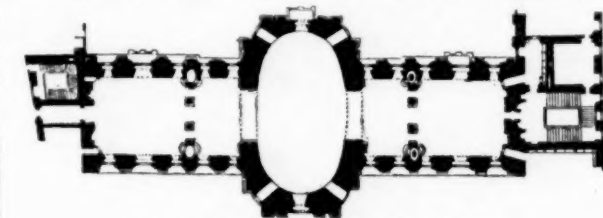


Fig. 18. Plan of the Imperial Library, Vienna.

fixed by Blondel. In the interior details the influence of the budding French Classicism is recognizable, while the apart-

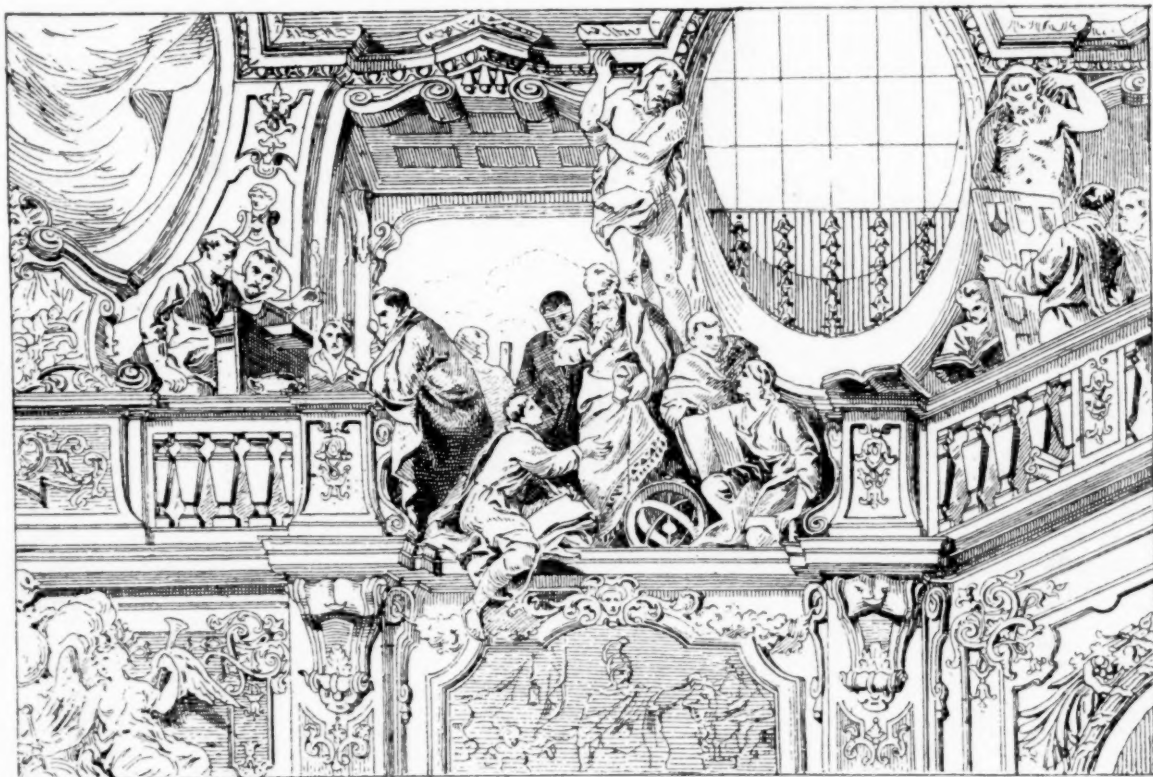


Fig. 19. Ceiling of the Imperial Library, Vienna.

Le Nôtre. His chief work of this kind is the castle of Schönbrunn, near Vienna; it was built in accordance with the general directions of the emperor Joseph I, who was himself a

ments are decorated with the most charming Rococo forms.

The palace of Prince Schwarzenberg at Vienna, by Fischer's son, has a court in front on the street, while the rear façade looks out on a large garden.

One of the noblest of the elder Fischer's works is the palace

¹ From the French of H. Semper, in Planat's "Encyclopédie de l'Architecture et de la Construction." Continued from page 192, No. 783.

of Prince Eugene in the Himmelpfortgasse, at Vienna. The interior decorations, in the Rococo style, are of wonderful richness, and the vestibule and stairway possess great beauty. Among the other palaces built by Fischer and his son Joseph

chung und Erhaltung der Baudenkmale," (Vienna, 1856-1873) — "Mittheilungen der K. K. Centralcommission zur Erforschung und Erhaltung der Kunst und Historischen Denkmale" (Vienna, 1875-1888). — "Berichte und Mittheilungen des Alterthumsvereines" (Vienna, 1858). — R. Dohme, "Geschichte der deutschen Baukunst. — Die Oestr. Ung. Monarchie in Wort



Fig. 20. Academy of Sciences (Formerly the University), Vienna.

Emanuel are the Auersperg, Bathiany, Stratmann, and Trautson (Figure 16), all at Vienna.

But Bernhardt Fischer's most notable civil constructions are the portions of the Hofburg (imperial castle) executed by him; namely, the Reichs-Kanzlei-Palast, the imperial winter stables (Figure 17), and the imperial library (Figures 18, 19). They compose the fragments of an imposing whole, projected but never completed by the architect.

We see in the imperial stables one of the finest monumental constructions of the period. The high, two-storied basement of ashlar-stones supports two other stories, the windows of which on the sides, are framed in by sirens; the rounded angles of the edifice are decorated with columns and pilasters, the effectiveness of which is heightened by double ressaults likewise embellished with columns and pilasters: above rises a cupola richly adorned with allegorical figures.

The Reichs-Kanzlei-Palast presents an imposing façade, which suggests motives of the Tursi-Doria palace at Genoa, as well as certain others of the Louvre façade, by Claude Perrault.

The imperial library, completed in 1735 by Fischer's sons, has a severely simple exterior, but the dispositions of the interior are such as to produce a very imposing effect. It comprises a suite of lofty halls, the central one of which is oval and covered with a magnificent cupola enriched with paintings. The marble and gold ornamentations are superb.

Toward the middle of last century the architect Munzer constructed the old University (now occupied by the Academy of Sciences) at Vienna, following the lead of the two Fischers and of contemporary French architects (Figure 20). It bears considerable resemblance to the imperial stables.

The Classicism of the close of that century is chiefly represented at Vienna in the works of Hohenberg of Hetzendorf, who (in 1775) erected the Gloriette on the eminence facing the Schönbrunn palace, and who was also the architect of the Pallavicini palace [1784].

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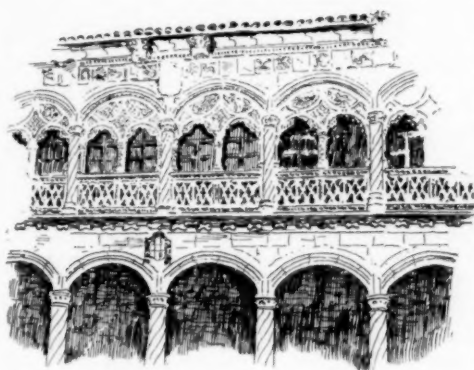
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(To be continued.)

BAMBOO FIBRE. — A memorandum, together with a sample of the plant, lately received from Sir Alfred Moloney, K. C. M. G., the Governor of Lagos, gives an account of the endeavor he is making to encourage the exportation of the fibre known as "African Bass," the fibre of the bamboo palm, or *raphia vinifera*. The "bamboo" palm, or *raphia vinifera*, is perhaps the commonest tree in the swamps and low lands which line the waterways of the colony. Dense thickets of these palms, traversed only by the palm-wine gatherer or the bamboo-cutter, push their way into the lagoons, and extend over the flood grounds, and even to a distance of from 15 to 20 miles up the river valleys into the interior. The area occupied by the *raphia* forests it would be impossible to calculate, but it may be accepted without doubt that they extend throughout the length of the colony, and to a distance of at least fifteen miles from the sea-coast, and that over this area of about 5,000 square miles they form a considerable proportion of the vegetation; next only in numbers to the oil palm, *clavis guineensis*, and the mangrove, *rhizophora mucronata*. The fibre itself is the one in most common employment on the coast, being used by the natives for all sorts of purposes — cloth, cordage, thatch, fishing-lines, etc. The cost is only that of collection and preparation, the latter being a very simple process of soaking and scraping. The price, delivered in England, is said to be £30 to £32 per ton for good fibre. The cost of production is estimated at £14 per ton, shipping and other expenses at £4.10s. The samples are now on view at the Society's House, and can be inspected by anybody desirous of doing so. — *Journal of the Society of Arts*.

A RUN THROUGH SPAIN.¹—III.

AN OLD WALLED CITY.



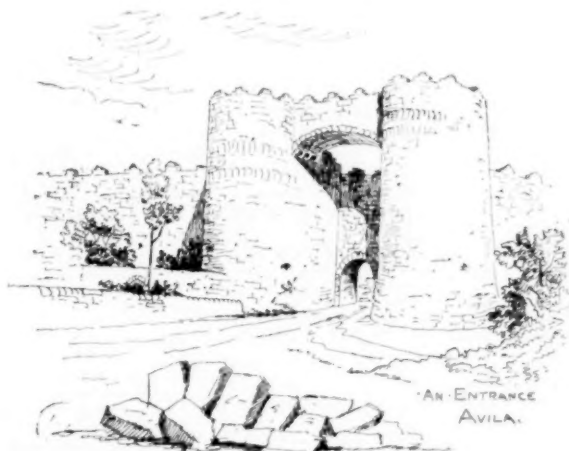
THE Northern part of Spain is not a beautiful country. The plains are vast in extent, rough and uninteresting in their nature, and the only item of interest to a voyager is, here and there, the sight of a long train of mules, laden with merchandise and driven

by brigand-like fellows, who, if their character is questionable, are like friends in this desert of stones and stubble. I know a friend who felt so disconsolate and wearied at the monotony, that he allowed himself to be slowly dragged along for two days without a stop, in order to get to such a totally uninteresting city as Madrid, when he was passing, meanwhile, some of the most interesting of Spanish villages. Had he stopped at the old walled town of Avila his wearied eye would have been refreshed by a picturesque old town, whose walls are nearly perfect, and which contains enough of interest to have occupied his attention for a week.

An old walled town! What an amount of interest is attached to such a place, and what a store of romance hangs about every old stone that goes to make up those grim walls frowning down on one. How they seem to tell of deeds of valor and clash of arms! It carries us back hundreds of years to sturdy old warriors, who, in building their houses, were obliged to hedge themselves in, and protect their belongings from the outside world.

"In days of old when knights were bold" it was no strange thing for the tocsin to ring out its wild notes of alarm, for the villagers to leave their work and seize their shields and pikes, and collect nature's weapons in the shape of stones, to crowd upon these very old walls, and hurl defiance upon their invaders. The portcullis must have fallen with deafening noise as the air became filled with arrows which bristled from the equi-distant towers, as if to give no chance for an approach to the walls.

And, on the other hand, we can easily imagine the excitement of the invaders, as they pushed on their engines of destruction, and swung back the heavy catapults that let fly a shower of stone cannon-balls destined to break down the old walls, or carry destruction to many reckless defenders. I could not help thinking of the sketches of Viollet-le-Duc as representing the nature of this old-



time warfare, and of Thackeray, too, in his jesting mood, as he recites the story of the Castle of Chalon, where, as he says, "The good king, having copiously partaken of breakfast, caused his trumpets to blow and advanced with his host upon the breach of the castle, many lords of note followed the king and bore the ladders; and as they were placed against the wall, the air was perfectly filled dark with the shower of arrows which the archers poured out at the besiegers, and the cataract of stones, kettles, boot-jacks, chests of drawers, crockery, bombs, bolts and arrows and other missiles which the desperate garrison flung out on the storming-party."

Aside from his joking mood, nevertheless, just such scenes in very earnest must have taken place about these old walls of Avila, and surrounded them with a very halo of romance.

When, therefore, we put down Avila as our next stopping-place, we knew that we should see one of those old cities, and were intensely interested in the outcome of the visit.

If I were to take a text concerning the first impressions of the old town it would be a single sentiment—garlic and beggars. Whew! Garlic, the perfume of Spain! Whew, also! Beggars springing up on all sides at the same moment, and that moment the well-chosen one of alighting from the train, and with a first view of Avila in the distance!



"Uno centimo, Señor, uno centimo, por Dios," cries a wretch with one leg sawed off below the knee, and the stump dangling, exposed to view.

"Por Dios, Hermano," cries another fellow, with a torn sombrero, a dirty shock of hair which had not seen a comb for years, and hardly a rag on his body.

Still another, and then another, and still they gather from Heaven knows where, and escort us up the road on a dead run, as the omnibus climbs the hill towards the little walled city. Our good friend, the priest, seeing the crowd of beggars increasing, turns around and flinging a perfect storm of invectives upon their heads, tells them to let the strangers alone, and then turning to us, laughingly

shrugs his shoulders, and apologizes for their rudeness.

The first thoroughly walled city of Spain is now before us, with its eighty-six huge circular towers and frowning battlements, and the grand old cathedral hanging on the edge of the wall as if stretching out its protecting wings over the town.

A marvellously picturesque town is Avila!

In, under the frowning archway, we drive, and turning presently into a square, the only part of the town indeed where a carriage can go, the hotel is reached, and we again drive under its sheltering archway to its picturesque patio. Out come all the people in the house, the noble landlord smiling and bowing; his assistant, likewise wreathed in smiles and with secondary bows; the cook peering from the kitchen door; the two little maids courtesying and all aglow with excitement; and, Heaven help us, up jumps an ogre with one leg broken and bent up under his arm; and a horrible hopeless expression on his face. "Perdone usted por Dios, Hermano!" Still the same cry and we know it will wait out at us till the centimo is forthcoming, be it a week or be it a month.

Garlic, garlic, garlic! The trees of the patio smell of it; the wood of the hall smells of it, the very air itself is compounded with it.

Up a grand staircase—the building was evidently once a palace of some kind—and into a chamber fully forty by fifty feet, we are ushered with the inevitable bow and smile.

"Only one room, Señor," I asked?

"Si Señor, but it is very large," he added.

"Yes, it is large, but we are four in number, and where are the ladies to sleep?"

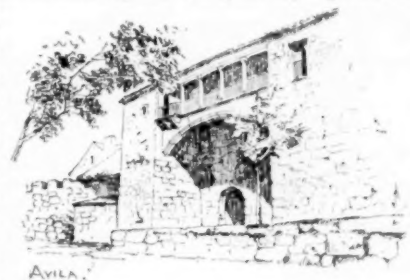
A shrug of the shoulders and a pointing to the four corners of the room where a little curtained-off space answers us, and I am assured that the number of little curtained spaces will quiet any slight shocks to my modesty which

were gradually springing into existence. Very much like Japanese houses, I think, but not altogether bad, after all.

"Si Señor," he replied, seeing that I had worked out the problem properly, and, with another shrug of the shoulders and a smile, he departed.

Ah, that shrug! Balm for all disappointments, ointment for all wounds, and oil to smooth over the little irregularities of Continental travel. But, after all, the room is very pleasant, notwithstanding its intense singleness, and so we retire, each to our little corner, lay aside the dusty robes of the day, and are soon deep in slumber and garlicy air.

Seven o'clock in the morning! The cracked, wheezy bell in the cathedral-tower awakes us, and sounds in strange contrast with the silver-toned cathedral chimes of old England. Clatter, clatter, go the wooden sabots over the pavement, as the devout worshippers hasten to early service, while we unworshipful foreigners turn over for another doze, and later sit in the window and eat our breakfast, watching, meanwhile, the throng as they come out. 'Tis only ten or fifteen minutes since they went in, and I imagine they must have said their prayers much as a New Yorker eats his lunch. Gay yellow



¹ Continued from No. 782, page 181.

petticoats and red handkerchiefs cover the women, while velvet jackets, scarlet vests, full trousers and rope sandals are the favorites with the men.

There are a couple of Dominican monks with black gowns and white cowls; they glide along, looking neither to the right nor left, while many of the children stoop down and kiss their garments as they pass. There, also, all around the door are the beggars, ever present, and always on the watch. They get but little, however, from the peasants, and are probably on the watch for strangers; we shall probably see them later.



What a beauty he is, to be sure! Tall and stalwart, with his big hat and voluminous scarlet sash, wound tightly around his waist, he would have made a model of which the immortal Fortuny would have been proud.

"Hi, caballero," we call out, making sign for him to stop for his picture, and, with a proud pose, he stands by his oxen and makes as good a picture as my album possesses.

"Gracias, caballero," we call out! He snaps his whip, and, with a wave of his hand is away, while a little boy accompanying him lingers behind to see if he cannot see the picture, yet unborn.

This picture is backed up by the magnificent walls of the town springing directly from the huge boulders of the hillside, and piling up sometimes to an enormous height. An artist goes wild at the picturesqueness, has his sketch-book always ready and plies his pencil with the speed of a penny-a-liner.

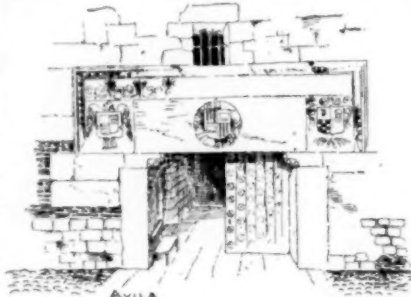
At an angle of the old walls is a curious church which was undergoing repairs, and is called San Vincente. It was guarded by an old family who are as jealous of its treasures as if veritable archaeologists. There was a small painting of the Virgin, which the head of the family had rescued from a hooded shrine on the outside of the western entrance. A modern painting on the stone had taken its place, and I was so much struck with the beauty of the old one that I tried my best to obtain possession of it. My persuasive powers were perfectly useless, however, for the old fellow revered its very memory. And no wonder, for all his life has been spent under its shadows, and he has knelt to it hundreds of times no doubt, although its author was unknown and forgotten. This picture of a poor old man refusing to part with his treasure at any price, awoke within me a feeling of great respect for his character, for it must be admitted that it was the first and last instance of the kind that we met with while in Spain.

The church was built near the end of the twelfth century and has a rich western entrance, where the space between the two towers is filled-in by a lofty arch with cannon-ball ornament, and a beautifully carved entrance. This ornament is strangely characteristic of much of the Spanish work and seems to harmonize with the simple and massive work of the exterior, but I do not know whether it has any significance or not. It is, at least, very effective at a distance.

Like most of the little Spanish towns the environs have many little churches scattered all around. Another of them is reached by a beautiful road lined with massive trees.

It is San Segundo, a specimen of Norman architecture. A monument shows the patron saint in recumbent position on his knees. Not always was he thus engaged, however, for his memory is held sacred by the peasants from the fact that when the little town was besieged by Moors in olden times, he rose in his might, and leading his people in the struggle, put off his gown, and hurled a gigantic Moor over the walls. "There were giants in those days," and they were often found foremost in carnal as well as spiritual warfare.

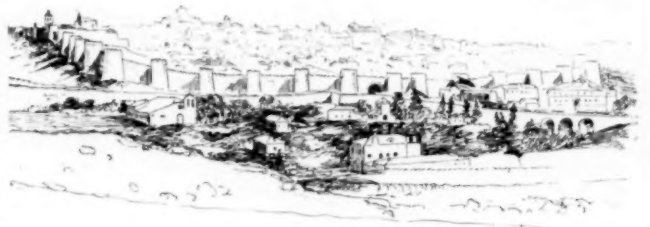
On the other side of Avila we found the famous church of San Tomas. Here Isabella was induced to sign her name to the famous document which allowed the Inquisition to become a thing of law, and it was here that she chose to bury her son, San Juan, and to give



to the world one of the most magnificent tombs in Spain, designed and cut by a Florentine sculptor named Domenico. The whole story of Prince Juan is touching in the extreme, as he was cared for by the queenly Isabella, who, although she had all the "dear old Spanish vices," was yet a mother whose life seemed bound up in that of the youthful prince.

In this old church the total disregard of all historical or beautiful relics was shown by the fact that for many years the church was deserted, and the gamins of the villages made it and its glorious tomb a place from which to take bits of carving, and delicate ornament, to sell to chance visitors. But a railing has now been placed around it, and it will in all probability be protected. A feature is the *coro*, which is a gallery over the entrance instead of in the centre of the nave, and the gallery is upheld by a beautiful elliptical arch. The cloister and stairways, rich in sculpture, are said to be most interesting, but about the time we were ready to inspect them a mild-mannered little monk, enveloped in a hood, approached, and with a shrug intimated that the señoras were a very dangerous class of people, and were not permitted to enter the sacred precincts set aside to the noble lords of the convent. He gently urged us to turn our faces and seek shelter under the sunlight outside, which we were obliged to do. I got permission, however, to sketch the beautiful old lock of wrought-iron on the outside door, it being six feet high and of effective design.

We were thus persuaded to abandon San Tomas, and thinking that perhaps Santa Teresa might be more mindful of her own sex, we sought her out. Now Teresa is universally liked by the artists. Her mother, Donna Beatrix, was a most pious individual, if history can be believed, but she used most of her spare time in "the devouring of romances" as the historian quaintly puts it. This love for romance evidently fell as a natural birthright to her daughter Teresa, who was also, naturally, slightly of a flighty turn of mind. But this disposition gradually turned to its very opposite, and making up her mind that the things of this world were too frivolous to be healthy to the spiritual mind, she formed the scheme of going to Africa, hoping there to bear the standard of her religion, and at last to be martyred by the Moors; but this pleasure being refused her, she relapsed into a state of melancholy painful to contemplate. Her good mother seeing her state of mind was sorely puzzled, but at last struck upon the very original scheme of working upon her mind by handing over to her her very questionable library of fiction; the scheme worked,



vanity and love of personal charms kindled a flame of unholy desire which bid fair to wreck her subsequent life. *Pater familias* became again alarmed at the weathercock antics of his child's mind, and decided to place her under the restraint of convent life. Avila was chosen as her home and the natural result followed—she became a nun, set herself apart from the world and gave herself up to deeds of charity and love. This was evidently the beginning of her earnest life, and when she passed away she had become a Saint in regular standing and one who certainly merited her saintship.

I should like much to have described her shrine, but just as we got inside the church up walked a tall monk in brown gown and politely showed us the door.

"Can't we look around, Señor?"

"Non, Señor!"

"Can't we see the shrine of Sta. Teresa?"

"Non, Señor, only ladies can enter!"

"But is not this the home of Saint Teresa and cannot ladies visit her shrine if your humble servant, a man, withdraws?"

"Non, Señor!"

"Well can I draw the ironwork on the entrance door, if we cannot see the saint?"

"Si, Señor," answered the keeper of this impenetrable shrine.

As we were wending our way homeward a strange sight meets our eyes. A funeral procession approaches, all on foot. Slowly they tramp along towards the little cemetery, and in the centre of the group is a wagon with the corpse in full view, and uncovered—a little girl about ten years of age, her pale face turned upward, her hands crossed, and around her head wild flowers and reeds from the plains. Dust to dust returns the little body in all countries alike; the mournful group pass on while we uncover our heads in the presence of these sorrowing peasants, and think of our own friends in a country far away.

But we are rudely awakened. "Uno centimo por Dios, Hermano!" Here he comes, a dirty, unkempt figure, which we remember as the hanger-on at the hotel of the night before. Thinking that one centimo is getting off very cheaply, we fling him a copper and pass on.

San Pedro, San Esteban and San Andres are all interesting little churches outside the walls, and it is as beautiful and interesting a

tramp as one could wish, to go out from the Segovia gateway and pass around the walled town examining these little structures.

As I write, the scene comes vividly to my mind, the beautiful clear morning, the sunlight throwing the castellated towers and walls into deep shadows: and when we consider that hundreds of years have passed since their stones were cut and set in place, they would seem to bid fair to remain hundreds of years to come. We stroll around them, and return by another road which enters at the lower end of the town under a noble gateway, and meanders up through the narrow and dirty streets, at last landing in front of the cathedral, which we enter between rows of beggars crying for coins.

A grand old church it is, this Spanish cathedral, an example of the end of the twelfth century, and very noticeable because of the cannon-ball ornamentation on all the buttresses, and its massive apse built over the sides of the city walls, with castellated machicolations. As we enter, the organ screeches away like a combat of files, and the priests are just now entering the choir, chanting away as if their lives depend on the amount of noise they can make, and the little white-robed boys shout out their responses in monotonous wails. At the base of one of the massive columns in the transept kneel a few men, women and children, and yet in the face of these devotions the old verger shuffles up with irreverent haste, and desires to "show us around" and thus reap his *peseta*. "Hold on, my good fellow," we answer, "although we are Americans we are not heathen, and have some respect for the attitude if not the spirit of these dumb worshippers, and we can wait in the cloister until the service is finished." But we have only a few minutes to wait, then out come priests and boys together, laughing and joking, and all hands light up the ever-present cigarette puffing away their leisure until the next service.

During these few minutes, however, it was exceedingly interesting to follow the lines of the church as they ran out over the city wall, the apse having castellated machicolations, and the whole forming one of the wall towers. The cloisters themselves are much dilapidated, the evident reason being the extreme poverty of the church and the small number of those who support it. How in the world these little towns maintain such an institution anyway, is more than one can understand. But it is a pity to see the beautiful traceried windows and screens blocked up, broken, or defaced.

The *coro* in this church is entirely separated from the church although directly in the centre, and its massive brass gates are models of hammered work, a point in which the Spanish churches are rich in fine examples. To a lover of Renaissance work the *coro* stalls also are marvels of work, too intricate for description, save to say that they represent scenes in the life of Christ. Furthermore, the missals, iron-bound, gray with age, and full of fine specimens of illuminated work are enough to turn the head of the antiquary and make his hands itch to possess every one of them. Sacrilegious wretch! I wanted to buy one, and carry it away to take the place of honor in a far-off library, but thinking that the very ghosts of the old cathedral would call out from their parchment pages, and being further staggered at the price of infamy which the old verger whispered into my ear, I withdrew with righteous indignation at the idea that I should have been tempted to sell my honor for even an iron-clasped, pig-skin bound, parchment-filled, illuminated-page missal. My empty pocket-book saved my reputation.

The streets of Avila are few in number, and represent a tangled skein of yarn. They are full of tumble-down picturesque houses, and not a few sedate, dignified old houses, evidently once the homes of nobles; these remain unchanged from mediæval times. Many of them are rich in iron grille-work, and nearly all possess the open balcony on the second story over the entrance, and the interior *patio*.

It will not be uninteresting for the architect to make a visit to one of the old houses which seem to claim attention, from the entrance to the exit. I have sketched one of these entrances and they are all much alike. The *voussiors* are very large, often as long as the width of the opening. Over the arch, in difficult form, is a heavy label-mould sometimes profusely ornamented. In the spandrels are the armorial shields which are always present. Still above, comes a window with a metal grille and sometimes a balcony across its face. The carving around this and elsewhere is in good order and often sharp in detail. When we consider that hundreds of years must have elapsed since these bits of carving were done, it is wonderful to find them in such perfect state of preservation and so strongly cut. Like the Pompeian houses, a description of one is that of all, and I remember that the first morning I took a stroll, I came to one of these huge arches and, entering, was interested to find out its whole plan. I entered a vast hall whose floor was tiled with marble, and whose ceiling was hung with honeycomb of plasterwork. The doorway was guarded by massive doors with solid iron grilles, and enriched by dozens of huge bronze nails of ornamental design. On each side of this entrance-hall, is a large room, used generally on state occasions only, and facing the entrance is another door opening into the main part of the house. From this room we step directly into the open *patio*, filled with trees and shrubs, and a cool retreat in summer. Through another doorway we come to the garden, or yard, off of which are all the working-rooms of the household. In the second story, reached by a huge staircase, and surrounded by a balcony are the chambers.

It will be seen that ground rent is no object, and as I issued from this house I could not help contrasting its spaciousness with that of our modern houses where inches must be computed instead of feet.

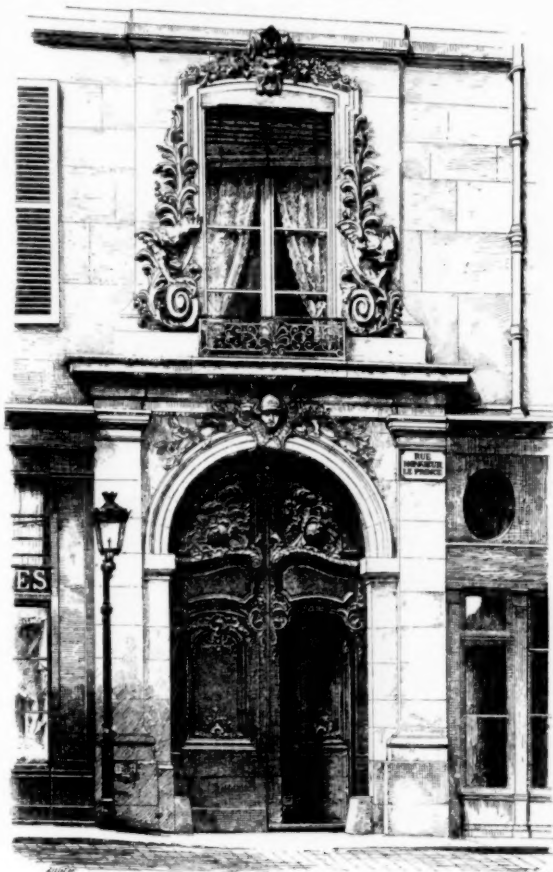
Certainly there are many advantages in this Spanish mode of planning, not the smallest of which is the grand effect of wall-surface that is obtained for an exterior. Many of the houses are monuments of grandeur, where the windows are few but extremely rich in detail, and where the huge wall-surfaces give a strength and dignity that can be obtained in no other way.

C. A. RICH.

[To be continued.]

ANCIENT ARCHITECTURE FOR STUDENTS.¹—VI.

CHAPTER II.—THE HITTITES.



NO work on archaeology at this time would be complete without some notice of this great race and empire of a hundred tribes. In the last two or three years this empire has been raised out of oblivion and has now a place assigned to it in history. Its name is well known to all, by its repeated occurrence in the Scriptures but its power and extent have only lately been ascertained through the remarkable discoveries of its own peculiar writings and hieroglyphics and of the clay tablets of Egypt and Assyria alluded to in the foregoing chapter.

We have already seen the connection of the Egyptians with the Hittites but there is a good deal more to be learned about them. The Hittite empire was not one consolidated dominion but was made up of numerous independent tribes, continually at war with each other but acknowledging themselves the subjects and tributaries of such princes who were able to subdue them, following them in their warlike expeditions and sharing the spoil that fell into the hands of the united forces.

The territory of the Hittites extended from the Euphrates to the western limits of Asia Minor, and over the whole of the intervening country their monuments are scattered, which when they have been properly deciphered will give us far fuller information than we have of them up to to-day.

Certain details that appear in all their carvings such as "mitts" or fingerless gloves, their shoes with turned-up toes, "snow-shoes" as they have been called, prove that they came from a cold country and their inscriptions tell how they had to fight their way from one part of the country to the other.

Continually at war with the Egyptians, when they were at the height of their prosperity we find them occupying the whole of Canaan or Syria and acknowledged by the Egyptians as a people of equal power with themselves. We have seen how Amenophis made a treaty with them and married a Hittite princess, a treaty that was ratified by Rameses II, who in like manner took to wife the daughter of the King of the Hittites. Then, we find them an object of hatred and envy to the Assyrians, but still powerful enough to keep in

¹ Continued from No. 789, page 147.

check the armies of Shalmanezar I, Tiglath-Nin and Tiglath-Pileser I. But under the determined and repeated attacks of Asshur-bani-pal and his successors we find them dwindling and their power waning until under Tiglath-Pileser II (744 B. C.) their doom is finally sealed. As separate tribes they continued to exist but they never regained any power and one hundred and forty years afterwards Carchemish their stronghold in the east, was destroyed by Nebuchadnezzar of Babylon. Friends and allies of the Israelites against the Assyrians, the Kingdom of David extending northward to their borders of Hamath and Kadesh, David marries Bath-sheba, herself a Hittite, who, as the mother of Solomon becomes the ancestor of Our Lord (1030 B. C.). Professor Sayce is the authority on this subject and in his interesting little book, "*The Hittites — The Story of a Forgotten Empire*," is summed up all the information we possess of these people: not that we yet know all that we can know, for the inscriptions that we possess have yet to be translated.

The site of Carchemish has been unknown, but by descriptions and actual views of it obtained from Assyrian sculptures and bronzes the place has now been found, and there stands a mound of artificial construction "under which ruins and sculptured blocks have been found from time to time."¹ This place is now known as Jerablûs. "The ancient city was defended on two sides by the Euphrates and was exposed only on the north and west. Here, however, an artificial canal had been cut, on either side of which was a fortified wall."²

The Hittites raised their cities above the plain on platforms like the Assyrians, but of less altitude.

At a place called "Eiguk" there are the remains of a vast palace, which stood on an artificial platform of earth. The walls of the palace formed of huge blocks of stone can still be traced in many places. It was approached by an avenue of sculptured slabs, on which lions were represented some of them in the act of devouring rams. "The head and attitude of one that is preserved remind us of the avenue of ram-headed sphinxes which led to the Temple of Karnak at Thebes. The entrance of the palace was planked on either side by two enormous monoliths of granite, on the external faces of which were carved in relief the image of a sphinx. But though the artist had clearly gone to Egypt for his model, it is also clear that he had modified the forms he imitated in accordance with national ideas." "On the right hand the same block of stone which bears the figure of the sphinx bears also on the inner side the figure of a double-headed eagle. The same double-headed eagle must be regarded as one of the peculiarities of Hittite symbolism and art. The symbol was adopted in later days by the Turkoman princes and the crusaders brought it to Europe with them in the fourteenth century, where it became the emblem of the German Emperors who have passed it on to the modern kingdoms of Russia and Austria."³

Sculptures abound in Asia Minor all belonging to the Hittites or to the people whom they subdued and to whom they taught the arts of civilization: warriors in full dress, religious processions, worship of the gods are all represented, but of their actual architecture it is necessary for us to wait with patience the time when the sites of cities already discovered are thoroughly explored.

CHALDEAN CHRONOLOGICAL TABLE.

Cushite Kingdom founded in Lower Babylonia. 2500 or 2400 B. C.
Chaldean History opens. 2286 B. C.

	B. C.
Nimroud	2286
Uruk	2093
Tiglath-Pileser I.	2070
Chedorlaomer	2052
Tamir Dagon	1850
Shamasbul	1700
Sar Sin	1630
Purmas Purmas	1600
Arab Conquerors	1500
Assyrian Conquest	1300

(Under Tiglath-Nin.)

R. W. GAMBIER-BOUSFIELD.

(To be continued.)

A HINT TO USERS OF COLLODION. — Collodion is not so much used by photographers at the present time as it formerly was, says the *British Journal of Photography*. Still, it is used pretty extensively for enamelling and for stripping gelatine films; so also is a solution of India-rubber in benzole for the latter purpose, and its vapor is equally as inflammable as that of ether. The dangerous nature of both these bodies is but little understood by many amateurs who use them. Quite recently we saw a gentleman coating tolerably large plates with each of these materials in close proximity to his dark-room lamp, being quite unaware that he was incurring any risk whatever. Whenever collodion has to be manipulated by artificial light, the electric light excepted, the operations should always be performed below the flame, as the vapor of ether is heavier than air. Ether may be decanted tolerably close under a flame, but at a much greater distance above it would instantly inflame. All who use either rubber-solution or collodion should be made aware of the highly inflammable nature of their vapors. — *Invention*.

¹ Sayce: "*The Hittites*," p. 98.

² Sayce: "*The Hittites*," p. 99.

³ Sayce, p. 85.

DANGERS IN CONNECTION WITH ELECTRICITY.⁴



A Louis XIII Doorway in the Hotel Boucicout, Paris. From *La Semaine des Constructeurs*.

WHEN electric currents, on a large scale and at comparatively small cost first became practicable after the discoveries of Faraday, Wilde, Gramme, Siemens, and others, the question as to the dangers of life and property attending their use was brought prominently before the public; just as the dangers attending the use of steam, of rapid locomotion on railroads, and of dynamite were brought under the notice of the world when these powerful agencies first left the experimental laboratory of the chemist or engineer to take their part in the ordinary labor and business of life. In each instance there was a class of people who took the narrow and partial view that if an agency were dangerous it should be excluded altogether from public use, or (what amounted to the same thing) be surrounded with such exclusions and limitations as would rob it of nearly all its capacity for usefulness, and restrict all possibility of

advance and development in its application.

Thus laws were actually passed in England on the first introduction of steam, limiting the pressure in boilers to 30 pounds on the square inch. The first railroad charter contained a clause limiting the speed of trains to twelve miles an hour, and when a speed of thirty miles was suggested it was ridiculed in a prominent journal of the day as an idea simply insane, and it was said that people would just as soon be persuaded to allow themselves to be fired out of a cannon as to be hurled along at such fearful velocities, which would without doubt have the most disastrous effects upon the circulation of the blood and other vital actions! Some of us can also recollect the excitement produced and echoed in the press on the introduction of dynamite and the stringent laws regarding its transportation, which in many cases only increased the danger to the public by occasioning its surreptitious conveyance in passenger and ordinary baggage cars. We must be very young indeed not to remember the great popular excitement brought about by a certain section of the daily press when electric lighting first appeared in the streets of New York, and when flashes of flame were described as proceeding from a horse that had run against an electric wire.

In all the older instances matters have settled themselves in accordance with the laws of human progress and the diffusion of intelligence, and we now have boilers running at pressures of 140 pounds and upwards, trains going more than a mile a minute, and gunpowder largely superseded by dynamite. What is more, the accidents and injuries actually produced by these several agencies have been vastly less than were caused by those which they replaced. A much smaller number of people are killed or injured by high-pressure boilers than were killed by low-pressure boilers. How rarely do we hear of the explosion of locomotive boilers which usually carry 140 pounds pressure? The accidents to express trains are as nothing compared to those occurring with freight trains, and the loss of life and injury to passengers by rail is insignificant in its percentage to the number carried when compared to similar loss and injury incurred in the days of stage coaches. The same relation has been found between dynamite and gunpowder, the former having largely reduced the proportion of accidents and injuries compared with the work done.

Two lessons are very plainly taught by these facts. First, the world is not going to be frightened away from a new and valuable source of power by the circumstance, inseparable from the very nature of all powerful agencies, that it is dangerous if not adequately controlled, but, on the contrary, will develop the new power to an ever-increasing, and therefore more (possibly) dangerous, intensity. Secondly, intelligently managed and controlled, the most powerful and therefore, in a sense, dangerous agencies become the most efficient protectors and servants of man, and not only aid him in his mission of subduing and utilizing nature, but actually protect him in his work. Without these "dangerous" agencies, man would be reduced to the lowest condition of savagery, when he would be at all times helplessly at the mercy of the "elements," or the blind forces of nature. With them he not only defies and subdues the beasts which might otherwise be his superiors, but even conquers and renders tributary to his comfort and advancement those vast forces which control the entire matter of the universe.

⁴ Part of a paper read before the American Electric Lighting Association.

Applying these lessons taught by the past history of the world in parallel cases to the problem of the distribution and use of electricity, we see, in the first place, that the way to deal with its dangers ought not to be the timid, obsolete way of prohibition or of unintelligent restriction, such as that which proposed the exclusion of locomotives from railroads, or the limiting of their speed to twelve miles an hour, but the sensible way of providing adequate safe-guards to the new power, and with these allowing it to follow its natural line of development and growth into higher and higher ranges of intensity and consequent efficiency. It is too well known to all to need statement with emphasis that the methods thus pointed out by history and taught by experience have not been by any means universally advocated or followed, and that while many have loudly demanded the exclusion of powerful electric currents—the limitation of their intensity to what they suppose to be necessarily harmless ranges—the users of such electric currents have in too many cases neglected the most obvious precautions. It is only fair to say, in explanation of this latter statement, that this neglect has in many cases been brought about by obstruction thrown in the way of good work by those who were exerting themselves for the total abolition of dangerous currents, and who objected to every mitigation of the evil they attacked because any such improvement weakened their case against it.

As regards danger to property from fires, the matter fortunately fell at an early period in America into the hands of the Board of Fire Underwriters, who, in a judicious and business-like way, investigated the subject, and formulated such rules as have proved eminently satisfactory, and have shown that, under proper regulations as to good work and means of protection, electricity is by far the safest means known to us for the distributing and development of light so far as "fire risks" are concerned. The other part of the problem—namely, that relating to dangers to human life—has recently been taken in hand by an organization known as the "Employers' Liability Assurance Corporation" in America. This association, after collecting a mass of material from a great variety of sources, some time since formulated a series of rules for the protection of those employed in erecting and operating electric apparatus involving the use of powerful and therefore dangerous currents. These rules have been examined and approved by several of the managers of prominent electric companies, and so far it would appear as if no accidents have resulted from the use of electric currents when these rules have been followed, and that most, if not all, the accidents which have occurred would have been prevented had these rules been followed and obeyed. They are as follow:

1. Do not touch or handle any electric wire or apparatus of any sort while standing on the ground, or while in contact with any iron work, gas or water pipe, stone or brick work, unless your hands are covered with rubber gloves and you are provided with such properly insulated tools as have been declared to be safe and in good order by the electrician or other competent officer of this company. If it is at any time necessary to stand on the ground, or any surface not insulated from the ground, while handling electric wires and apparatus, rubber boots or an insulated stool should be used. In moving wires hanging on or lying over electric-light wires, lamps, or fixtures, use a dry hand line.
2. Never handle any electric wire or apparatus with both hands at once when this can be avoided, and if it is necessary to do so be sure that no current is present, or that one or both hands are protected by rubber gloves or other efficient insulation.
3. When handling line wires treat each and every wire as if it carried a dangerous current, and under no circumstances allow yourself to make contact between two or more wires at the same time.
4. Never open a circuit that has been in use without giving notice to the superintendent, or whoever is in charge, of your intention to do so, and at the same time request that the same line be opened at the main station and kept open until you have given notice that your work on that line is complete.
5. In the dynamo-room never go near the belts or dynamos, nor touch any apparatus unless you are fully informed and instructed how to do so. Tools used by line-men should be provided with insulating handles of hard rubber or other equally good insulator. It is the duty of each line-man to look after his own tools and see that they are in good order, especially as to their insulation.
6. Lamp-trimmers and others engaged in the care of lamps must see that the switch putting the lamp in circuit is turned off before they handle the lamp in any way.
7. In construction-work a space of at least twenty inches must be left between the holes for pins on the cross arms, so that a line-man may get to the top of the pole and work without danger.

The same insurance association has collected the authentic records of a number of so-called "electric accidents," or accidents happening to the employés of electric companies. Professor Morton has investigated the abstracts of 91 such cases. He finds that only about 16½ per cent have any direct relation to electricity, and that most of them would have occurred in any factory where power was being used, or any place where heavy objects were being moved. All of them might have been avoided by a strict observance in form and spirit of the seven rules laid down by the Employers' Liability Assurance Corporation. It must not be assumed that such rules are perfect or complete, but only that they seem to be in the right direction, and to furnish a starting-point from which further developments may proceed.

No one having even an elementary knowledge of electricity as it existed ten years ago needed or needs to be convinced of its power to do harm when all safeguards are removed, and the occasional declarations of its harmless character which have been uttered can only be accounted for by reference to that combative disposition which impels some minds always to take a view in opposition to any which may be expressed, and gives birth now and then to a book or pamphlet disproving the law of gravitation or the solar origin of light and heat. To say this is, however, far from implying agreement with the other extremists who would banish electricity from our daily walks and occupations, or place it under restrictions which might render it harmless, but which certainly would make it relatively useless for the countless purposes in which its efficiency demands its full development. The true opinion is that which is supported by past experience, and which advocates the fullest developments of power to which this agency can attain, combined with the use of all the means of protection by which human intelligence can protect itself while using to the utmost this potent and therefore dangerous weapon in our victorious contest with the destructive forces of nature.—Professor Henry Morton in the *Building World*.

MANUFACTURE OF TIN-PLATE.¹—I.



Staircase in the Hotel Cluny, Paris, France.

THE process of manufacturing tin-plate, and indeed the character of the product appear to be something of a popular mystery which the public, in this country at least, is very slow in comprehending. Anything, from a roof to a cup which happens to be made of tin-plate is called tin. It was gravely stated in a Western paper, some months ago, that tin-plates were being extensively mined in the Black Hills, Dakota. Such ignorance is truly startling, and it would seem about time the public was informed that what is usually called tin, is simply sheet-iron coated with from two to five per cent of that metal, and that few or no articles of commerce are made of the pure metallic tin itself.²

When the iron sheets are coated with an alloy of tin, and from twenty-five to sixty per cent lead, they are known asterne-plates, and have a dull, leady appearance as compared with bright, lustrous tin-plate. Terne-plates are usually used for roofing purposes, and are not infrequently sold as tin-plate, pure and simple. When used for purposes other than the preservation or preparation of foods, terne-plate usually fulfils its requirements quite as well as tin-plate, and has the great advantage of cheapness.

History.—The manufacture of tin-plates seems to have originated in Northern Germany, but the particular place and year in which it was commenced are unknown.

Flower³ states that it has been very clearly ascertained that in 1620 the trade had already existed for many years in Bohemia. "In that year a knowledge of the manufacture was sought and obtained from Bohemia by the then Duke of Saxony, who immediately commenced the manufacture in his own territories, and it was from Saxony that the secret came to England in the year 1670." Works were first established at Pontypool, but in consequence of certain difficulties were subsequently abandoned and neglected for a period of fifty years, and it was not until 1720, that the manufacture of tin-plate can be said to have been carried on to any extent.

Flower states that there appears to be no mention of the invention in any of the old French, German, or English works on metallurgy,

¹ A paper by F. Linwood Garrison, Philadelphia, Pa., read at the Stated Meeting of the Franklin Institute, held Wednesday, November 19, 1890, and published in the *Journal of the Society*.

² There seems to be a similar misconception as regards galvanized-iron, which is simply iron coated with metallic zinc by being immersed in a molten bath of that metal. There does not seem to be any galvanic action whatsoever taking place during the operation, it is an alloying of the iron and zinc, pure and simple.

³ *History of Tin and Tin-plates*, P. W. Flower. London: George Bell & Sons, 1889.

and it seems to be probable that all information relating to this trade was kept very secret with a view to a quiet enjoyment of the monopoly by those who possessed a knowledge of its details. M. de Reaumur, writing in 1725, confirms this idea by saying that the art of making tin-plates was considered Germany's own trade.

The French iron-masters were not behind the English in introducing this industry into their country, the first successful works having been started in Mansvaux, in Alsace, in 1714, several years before the industry was thoroughly established at Pontypool. Two previous unsuccessful attempts were made to establish the industry in France, one at Chenessy, in Franche Comté; and the other at Beaumont-la-Ferrière, in Nivernois. The successful works started at Mansvaux, in Alsace, were followed by those of Buins, in Lorraine, in 1733; Imphy, near Nevers, in 1745, and Moranbeau, in Franche Comté, in 1751.

Works were established near Forsmark, in Sweden, in the year 1739, English tin being imported for the purpose.

After the successful start, at Pontypool, in 1720, the manufacture began to extend itself through Wales, particularly in those places where water-power was available, and where forges already existed for the manufacture of charcoal iron.

From Pontypool it spread to Caerleon and Ponthir, in Monmouthshire, to Ynisgerwn near Neath, and Melin Griffith near Cardiff, in Glamorganshire, and to Kidwelly and Carmarthen Town, in Carmarthenshire.¹

For the past hundred years the manufacture of tin-plate in Great Britain has gradually increased until now she probably makes ninety per cent of the world's entire production, the rest coming from a few works in Germany and France.

In 1887, Germany produced 16,720 metric tons of tin-plate, basic steel being used almost exclusively for the purpose.²

It is an interesting fact that while the output of metallic tin from the Cornish mines has gradually decreased within the past twenty years (10,200 tons, in 1870, and 9,183 tons, in 1888), the production of tin-plate in Great Britain has increased at an enormous ratio. In 1889, Great Britain exported 430,623 tons, of which 331,312 tons went to the United States; the entire production in 1889, was about 450,000 tons. The great bulk of the metallic tin consumed in Great Britain in the manufacture of tin-plate is imported — mostly from Malacca Straits and Australia. The same may be said for Germany and France, although some small amounts are still mined in the Zinnwald district in Bohemia.

A brief sketch in this connection of the history of the futile attempts to establish a tin-plate industry in the United States may not be without some melancholy interest to the patriotic American.

The very high prices of tin-plate which prevailed in our markets between 1873 and 1878 induced some enterprising persons to establish a small tin-plate works at Wellsville, O., in 1873. The quality of the plates made at these works was said to be excellent.³ Between 1873 and 1875, tin-plates were also made to a limited extent at Leechburgh, Pa. Owing to the fall in prices, in 1875, both of these works were obliged to shut down. In the meantime somewhat more extensive works were built at Demmler, near Pittsburgh, Pa., and put in operation early in 1875. The career of these works as such was, however, short-lived, and since they were shut down there does not appear to have been a single pound of tin-plate made in the United States for commercial purposes.

For commercial purposes, tin-plates are divided into two classes, what are termed charcoal-plates and coke-plates, according as charcoal or coke is used as fuel in the manufacture of the iron bars from which the plates are rolled. At the present time, however, by far the greater part of the plates are made of mild steel, usually open-hearth, either acid or basic. It seems, moreover, that these tinned steel sheets are not sold as such, but as tinned iron.

The iron sheets made with charcoal as fuel, are, as a rule, of much finer quality, and bring a better price than the coke iron or steel sheets.

As the methods used for the conversion of the raw ore or pig into these iron or steel bars belongs more particularly to the metallurgy of iron and steel, they need not be mentioned in this connection.

Rolling the Sheets. — The finished bars used in the manufacture of tin-plates vary in dimensions, according to the size and weight of the sheets required, or the manner of rolling.

After the finished bar has been sheared to the required size, it is heated to redness in a reverberatory furnace, and rolled; again heated, rolled, and doubled; heated a third time, rolled, and again doubled; then heated and rolled a fourth time. Sometimes the heating and rolling is continued six times. The length of the bar should be about an inch more than the width of the sheet to be made, so as to allow margin for shearing; the bar is therefore rolled with its axis parallel to the axis of the rolls.

When the plates leave the rolls they are called "finished," and are known as "black plate;" when cool are trimmed and sheared as required.

Percy⁴ states that the yield of black plate varies from eighty to ninety per cent of the iron used, the minimum yield being obtained from narrow plates rolled in one length and doubled three times,

thus making eight sheets 10 x 14 inches, or doubled three times and rolled in two lengths, making sixteen sheets of 10 x 14 inches. The maximum yield is from wide plates doubled only once, and rolled into two lengths, thus making four sheets.

The more frequently a plate is doubled the greater will be the waste, owing to the larger amount of shearings cut off the extremities.

The weight of the ordinary sheets (1x and 1xx, 10 x 14 inches, or 14 x 20 inches), is calculated in the following manner:⁵

Bars are selected of sufficient weight to produce sixteen sheets of 10 x 14, or eight sheets of 14 x 20 inches. Taking for example, 14 x 20 inch sheets, running 112 sheets per box, we have —

Weight when tinned.....	150 pounds. ⁶
Shear-house weight.....	135 pounds.

The yield of black plate in this variety is eighty-seven per cent. Then $\frac{1}{2} \times \frac{3}{4}$ pounds = 155 pounds, the weight of iron required to produce one box of these plates. As each bar of iron will make eight sheets, fourteen bars would be required for 112 sheets, hence $\frac{1}{2} \times \frac{3}{4} \times 14 = 11$ pounds, the weight of one bar necessary to produce eight sheets of two lengths doubled twice. This formula will apply to a box of any weight of the same dimensions, rolled in the same manner.

Black Pickling. — The plates are now pickled by being immersed in hot dilute sulphuric acid (one part acid to sixteen water), contained in lead-lined tanks. The sheets are placed on edge in a wooden rack made for the purpose, and the whole immersed in the acid. By means of a suitable mechanical arrangement, the rack holding the sheets is given a regular up-and-down motion, thus maintaining a circulation in the acid bath.

When all the scale or oxide has been dissolved off, the rack holding the sheets is immersed, and the whole thoroughly washed several times in fresh water. The pickling and washing are carried on at the same time, and spare cradles are provided for filling and emptying, so that no delay occurs.

First Annealing. — The sheets are then dried, packed in tight annealing-boxes or pots and annealed from twelve to twenty-four hours in a reverberatory furnace.

The temperature to which the plates are thus subjected is kept just high enough to prevent their softening to such a degree as to cause them to stick together when cold, i. e., just below a good welding heat. The door of the annealing-furnace is made level with the floor, so the annealing-boxes can be readily wheeled in on a truck. The object of this annealing is to so soften the sheets that they will readily take a polish when cold-rolled in the next operation. If the annealing has been properly done, the sheets come out nearly as soft as lead.

Cold Rolling. — In order to receive a proper coating of tin and possess a fine finish, it is necessary to pass the sheets singly through a series of highly-polished cold rolls. These rolls should be as hard as possible, have a high polish, be heavy, and set in strong solid frames. A well-polished surface saves tin, and is very essential to the good appearance of the finished plate. It might be stated in this connection that mild-steel plates always require less tin to coat them than iron, as the former is denser, and the tin has less opportunity to penetrate into the pores of the metal.

Second Annealing. — After the cold rolling the sheets become more or less harsh, and to remove this they are again annealed in the same way, but at a somewhat lower temperature than the first annealing. Ten hours is usually found sufficient for this purpose.

White Pickling. — The surface of the sheets having become somewhat oxidized by the cold rolling and second annealing, it is necessary to pickle them a second time. In this operation, which is known as the white pickling, a much weaker solution of sulphuric acid is used, or sometimes hydrochloric acid is used instead. The slight coating of oxide or scale is thus quickly removed, and after being thoroughly washed with water, the sheets are supposed to be ready for the coating of tin. As a matter-of-fact, however, it is always necessary to examine them very carefully after removal from the annealing pots, and if they are rough and contain small specks or patches of undissolved oxide or scale, they will have to be scoured with sand and perhaps re-pickled.

The careful inspection and selection of the sheets is a most important part of the operation, requiring a considerable degree of skill and experience on the part of the workman. It is always better if the sheets can be inspected and the defective ones picked out at the end of each of the several operations.

As the workmen are usually paid by the amount of work done, there is naturally a constant tendency for defective sheets to reach the "tin-man's" hands.

The hands required for each set of pots consists of a tin-man, a wash-man, a grease-boy and three girls, who rub, dust and polish the sheets.

The tin-man (foreman of the set that does the tinning) receives the sheets from the scourer and places them in a trough of water near at hand until he is ready to remove them to the grease-pot.

Grease-pot. — As the sheets are removed from the water-trough, they are immediately plunged, sheet by sheet, into what is known as the grease-pot, which is filled with hot palm-oil or tallow.

The object of the oil bath is to remove the moisture and to warm the sheet so as to prepare it for tinning.

(To be continued.)

¹ Flower's "History of Tin and Tin-plates," London, 1889.

² "Annual Report of American Iron and Steel Association," 1890, p. 96.

³ "A Treatise upon Tin-plate Manufacture in the United States," by John Jar, p. 5.

⁴ "Metallurgy of Iron and Steel," p. 726.

⁵ Percy's "Metallurgy of Iron and Steel," p. 725, et seq.

⁶ Taking 2,340 pounds to a ton.

AN ENGLISH POMPEII.



Wardour over the origin of the Picts. It is said on the one hand that Silchester is derived from "Sul" or "Sol" the enchorial god after whom "Aquæ Solis" or Bath was named; and this opinion is supported by the frequent occurrence of the word "Sul," as in Sulhamstead, in the neighborhood. But one would suppose the worship of Baal, or the Sun God, had died out when the modern title-name was given, and that its source is to be sought rather in Saxon than in Roman times. This would make the etymology of Silchester "Sel Cæstre," or the camp in the woods. And whosoever has visited the place, hemmed in on one side by the dark pine forests of Tadley, and on the other by the broad oaks and noble elms of Strathfieldsaye, now glorious in their autumnal dress, will acknowledge the appropriateness of the name bestowed by our Teutonic forefathers.

The visitor to the buried city will find that it is intersected by two principal streets, at the junction of which stood the Forum, with its noble basilica. This Forum was, of course, the chief building of every Roman town, being court-house and market-place in one, the centre of government, business, and traffic. From the foundations which have been laid bare of the Forum at Silchester, it must have been a large and stately building—a parallelogram, surrounded by an ambulatory. At one end it was adjoined by the basilica, or hall of judgment, with its apsidal termination. This judgment hall had evidently been lined with precious Italian marbles, and must have been a noble edifice. In it all cases of common and criminal law were heard. In it, probably, Christian martyrs have pleaded for their lives during one or other of the imperial persecutions. We know that Claudia, the daughter of a British King, Cogidunus, in the neighboring city of Chichester, was a Christian, and probably others were to be found in every rank of life in a Romano-British city. Outside the walls—there is a street leading directly from the Forum—lies the Roman amphitheatre, where those who pleaded in vain and refused to sacrifice to Cæsar were sent to glut the wild beasts or fight the gladiators—"butchered to make a Roman holiday."

Around the Forum are the remains of various shops, a taberna, a wine-shop—for the Roman was not satisfied to drink the metheglin or native beer of the country—a fishmonger's, where are found plentiful shells of the precious bivalve of Britain, always dear to the Roman epicure; a butcher's stall, in whose foundations were discovered iron hooks and a steelyard. But if we would realize the life of the period we must betake ourselves to a little museum close by, erected by the late Duke of Wellington, who took a great interest in the discovery made under his direction. Here are gathered together many small objects—"for trifles make the sum of human things"—fragments of red Samian ware, quarries of glass for windows, finger-rings, and keys for locks, some of them resembling Mr. Chubb's ingenious inventions; the legs of game-cocks, still bearing their steel spurs; children's toys; a tile on which some love-lorn potter, who made rhymes to his mistress's eyebrow, has scratched, while the clay was still moist, the last dactyl and spondee of his Latin hexameter, "*Puellam,*" my lass! All these small objects enable us to realize the kind of life which was led in a Romano-British city 1,600 years ago; that life which then, as now, contained the elements of tragedy and comedy—the comedy to those who think, the tragedy to those who feel.

On the whole, it must have been a singularly peaceful and un-

BUT with regard to Silchester, we have every reason to believe that it became a Roman fortified camp at a very early period, perhaps in the reign of Claudius, and that by degrees it grew into a town of some importance, lying as it did on the great highway from south to north. Its name under Roman occupation was Calleva; it is so called in the Antonine itineraries. It was a city of the Atrebatæ, a Gaulish tribe of Celts who had gradually dispossessed the earlier British inhabitants, the Sægontii, driving them into the fastnesses of the forests and hills, and perhaps to the far distant "West Wales" or Cornwall. The Atrebatian chief or king, was Commius, Cæsar's friend, specimens of whose coinage are still in existence, as well as that of his sons Eppillus, Tincommius, and Verica. So Cæsar Sægont became Calleva, and Calleva in due time became Silchester. With regard to the origin of the latter name, antiquarian opinion is greatly at variance; and, indeed, the controversy waxes as hot as did that of Monkbarns and Sir Edward

ventful time, the last 200 years of the Roman occupation of Britain. We judge so simply from the fact that, scattered all over the country—that is to say, along the lines of the great Roman highways—are the remains of numerous villas, many of them rich with marbles and mosaics, and with silken stuffs from Eastern looms; the habitation of the old Romano-British country gentleman, who only wished to live his life in peace, and to be left alone with his dogs and horses, and with slaves enough to till his farm and keep the hypocaust, or stove-flue, in full blast during the winter. These villas, scattered up and down the country, were apparently quite unprotected, and had not even the defences of an English country-house in the Middle Ages. Doubtless the iron rule of Rome was protection enough while it lasted, but the time came when that protection had to be withdrawn, and the country gentleman woke up to the reality that the old peaceful life was a thing of the past, and that he must be prepared to hold with a strong hand the possessions of his fathers; for in the fifth century (about 411) the last of the Roman legions was withdrawn from Britain. Rome, in fact, needed all her soldiers at home. The Goth was upon her track, and as an empire she was even hard at death's door. The departure of the legions left the Briton defenceless. The Britons knew nothing of self-government. All authority had been centralized at Rome, and all local vigor had been repressed and crushed out. No doubt a kind of militia was organized for the defence of the cities in Britain, but these forces were undisciplined and useless. Then came the end. Ælla with his savage horde of Saxons, marked his way from the coast through Venta Belgarum, or Winchester, to Silchester, by smoking homesteads and desecrated hearths and altars, and by a long line of miserable captives chained together. He was probably joined by the native British races, who were altogether a different people from the Romano-British inhabitants of the towns, and with them the slaves would make common cause. A careless garrison, a vigorous assault of multitudes, and Silchester was taken and sacked, and its goodly buildings given to the flames. The Roman eagle, still kept as a symbol of victory, was no longer terrible in the eyes of these fierce invaders, but was thrown aside and buried among the smoking ruins of the city, to be recovered again in the nineteenth century, cherished as an interesting antiquarian relic. Other relics of no less interest may yet be disinterred as the excavations go on; for to-day the laborers are busy at their task, while the curlews scream overhead, and the pleasant sunshine of autumn floods the buried city with light.—*London Times.*

THE ILLICIT-COMMISSION EVIL.



Clock on the Hotel de Ville, Neuilly, France. From *La Semaine des Constructeurs*.

WE give below a few of the letters which have been drawn out by our suggestions as to one manner of overcoming the illicit-commission evil, as an indication of the way in which architects in different parts of the country look at the matter.

First, as to the objection which Mr. Osborne hints at, as it is one which has doubtless occurred to many others. As we said, it is a "disagreeable matter" to stir up, and, when one undertakes to handle disagreeable things, it is usually not possible to avoid doing things which are physically, morally or socially repulsive to the finer feelings.

We have suggested that architects should declare that they are honest, decent and honorable men, a declaration which the architect who is conscious of his own probity is naturally unwilling to make in his individual behalf. But, unless this declaration is made, how is it possible to offset the declaration that is continually made by material-men and contractors, that architects are prone to take the commissions that are offered by them—a declaration which is not only made known to the public indirectly through the issue and circulation of the objectionable circular-letter, which easily strays into

hands for which it was not intended, but is also positively and specifically made by word of mouth, as we have abundant evidence to prove?

It is incomprehensible that material-men, who derive so much benefit from architects, should in so many cases do all in their power to undermine the influence which architects naturally have upon the plans and operations of their clients. Because an architect may have reasons for not using a material or an apparatus in a given case, there is no proof that he may not find it desirable to use them in another, but it is an every-day matter for the dealer in the rejected material to at once approach the owner and try to induce him to disallow the architect's selection, and, in doing so, to do all in his power to disparage the intelligence the ability and the probity of the individual architect, and to say an ill-word for all architects.

All material-men do not do this any more than they all offer commissions, and it is probable that the malicious statements are made by clerks, agents and drummers without the knowledge or consent of the responsible head of the establishment. Still such statements are made, listened to and believed, and, in the face of the existence of this belief, which may be widespread or it may not, we ask whether it is right and fair for any architect to abstain from helping the profession at large to a better standing in the minds of the public—their actual or prospective employers—from a finical feeling that in joining his fellow architects in making the declaration we suggest he is doing something unworthy of his personal and professional honor?

We must point out, also, that if we send out an incomplete list of signatories, it will at once lend support to the assertions made by material-men that "many architects in high standing," that many "leading architects," that "many prominent architects" are consenting (and profiting) parties to the existence of an evil which a large portion of their fellows publicly declare is intolerable.

The use of the word "crusade" by some of our correspondents makes it desirable to point out that we are not crusading against the material-men as a class, but merely against a reprehensible practice which some of them adopt, as we are firmly persuaded, merely through ignorance of what is the true relation between the architect and his client.

We trust that this recurrence to the matter will bring us at once from all architects who have not already expressed themselves the necessary authorization to append their names to the following declaration:

The undersigned architects desire to state that they are absolutely and only the agents of their several clients, and that, consequently, they cannot accept from any dealer or manufacturer a commission upon any goods or apparatus that they may cause to be used in their clients' buildings. They respectfully request dealers in such materials to spare them the annoyance of receiving circular-letters offering such commissions.

ITHACA, N. Y., December 16, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I hesitate to ask you to add my name to the signatures to your proposed "illicit-commission" declaration, for the reason that I am unable to regard it otherwise than a declaration to the effect that "we, the undersigned, hereby certify that we are honest architects and that we will not betray the trust placed in us by our clients."

Yours very truly, C. FRANCIS OSBORNE.

PHILADELPHIA, December 15, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—We read with much interest your admirable article upon the "illicit-commission evil" and we endorse most heartily the declaration you propose publishing.

There are undoubtedly frauds and dishonest practitioners in every profession, and it is most unjust that the honorable members should be associated with these by the public. The line should be drawn at once, and sharply drawn, that those who wish to employ such tricksters may do so with their eyes open. The profession will never attain the position it merits till such men are eradicated from its acknowledged ranks.

We would respectfully suggest that action in this matter might be taken most effectively by the individual Chapters, when all members unwilling to avow themselves as opposed to such methods, should be stricken from the rolls of both Chapter and Institute.

Very truly yours, W. C., JR. & J. B. PRICHETT.

NEW YORK, December 13, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I note with pleasure and satisfaction your remarks in to-day's issue, under the heading "The Illicit-Commission Evil." You express my sentiments exactly, and, I authorize you to subscribe my name to the declaration published, and, I will gladly do all in my power to right this wrong and protect the honorable names of others, and my own, who have never stooped to such dishonorable dealings.

Yours truly, GEORGE KEISTER.

ROCHESTER, N. Y., December 17, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The crusade began by you, against the "illicit-commission evil" ought to continue until the system is abolished, it being practised by a few architects makes the blackest spot upon the profession at large as all are hurt by the evil committed by a few. The

evils of "free for all" competition have been vigorously and thoroughly discussed, and if this bribing of architects can be put down, it will be a long step taken towards the better recognition of architecture as a profession and command more respect from the public, and if architects would rise up against the evil, putting the question before the material-men as proposed by you, they would soon see wherein they were wrong, and lend their aid to put down the practice, for nine cases out of ten they do not think but what it is right to fee architects for fancied favors, and I, for one, wish my name to be put upon your list declaring in most positive terms against architects' receiving remuneration from any one but their clients who employ them to look after their interests.

Very respectfully yours,

H. L. LANZELERE, Architect.

NEWARK, N. J., December 17, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—I wish to enroll my name among those who oppose the illicit-commission question. I also trust the immense amount of good your journal can do toward rooting out this evil, will not be limited to the extent named, i. e., distributing a list of names of those architects opposed to the nefarious practice. This would undoubtedly do a great deal of good, but the evil will exist till there is a more general knowledge of the fiduciary position of the architect in relation to his clients.

In my experience I have found a most woeful ignorance among contractors, material-men and even some clients, on this subject.

What would be but common honesty to a person having a clear perception of the architect's true relation with his client, would be but "Sunday-School" ethics to another.

Let the great influence your magazine can exert in this matter, be in part spent in disseminating light on the subject. It is true you have frequently referred to the matter in vigorous English, but all you have ever said on the subject can be well said again, and much more besides.

Most respectfully,

CHARLES P. BALDWIN.

[HOW THIS MATTER IS REGARDED IN AUSTRALIA.]

THE following letter published in the Sydney Builder and Contractors' News has a bearing on this matter and distinctly suggests the question: "Will the American Institute of Architects make the same announcement and live up to it?"

ROYAL VICTORIAN INSTITUTE OF ARCHITECTS, LUDSTONE CHAMBERS, COLLINS STREET,

MELBOURNE, October 23, 1890.

Dear Sirs,—It has been reported to my Council that you have mentioned that certain architects (not named) are in the habit of taking commissions from you, or of requiring it, on orders for goods supplied by you to their clients or to the contractor for their clients. I am directed to inform you that such conduct on the part of any member of this Institute lays him open for expulsion from its ranks, and if you put in writing the names of any of our members who so act the Council will at once deal with the matter. Further, they strongly urge your cooperation in their endeavor to stamp out this most improper practice. In order to assist you to deal with it, a copy of the members' roll is forwarded herewith.

Yours, etc., W. U. BILLING, Hon. Sec.

[HOW THIS MATTER IS REGARDED BY THE MATERIAL-MEN.]

GRAND RAPIDS, MICH., December 23, 1890.

MR. E. A. KENT, WHITE BUILDING, BUFFALO, N. Y.:—

Dear Sir,—We are just in receipt of our letter returned and note your comments. Are surprised that you do not catch on when we plainly say that we ship to any responsible party subject to our claims, fully guaranteeing and offering to refund the money for any which does not fulfil them. For the life of us we cannot see how you for an instant understand that we propose to bribe architects, when we state that we make architects a price which only covers cost of production and fully guarantee our goods, recommending at the same time that the consumers be given the benefit of the regular trade discount, securing to the architect, or to his client through him as he may see fit, all profit between cost of construction and our wholesale price. Some architects are in the habit of receiving a commission on such goods; others are not. Some give their clients the benefit of our entire offer securing to them the ——— at bare cost of manufacture. It is only the practical demonstration which we covet for our part of the profit, preferring [as stated in letter] to give the architects and the consumers the benefit of all monies which would otherwise go to publishers.

Trusting that on reinvestigating you will feel that our method of introduction is not only thoroughly honorable but a very liberal one, we are,

Very respectfully,

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—The foregoing is in reply to my answer to their first (stock) letter, in which, you know, I wrote them that goods were not specified in this office, that instead of resting on their merits required bribing architects.

Yours,

E. A. KENT.

NEW YORK'S PUBLIC LIBRARY.—Boston is a very intelligent town in her own little way, but she has not yet learned to look upon New York as a model. Perfection will not be attained until this is done, says Life. In the nature of public libraries, for instance, Boston shows every promise of soon completing the finest building for that purpose in the world. It is not only an exceptional specimen of architectural beauty, but is enormous in its dimensions, well lighted throughout, and most skilfully adapted to the requirements of a library. This building will hold over 2,000,000 volumes. That is, over 2,000,000 volumes more than the New York public library contains. But books, after all, are unimportant. We may have no public library at present, but we are far ahead of Boston in the beauty of our bar-rooms; and, besides, we are not big enough yet to need such an institution. Why should a city of only 1,700,000 inhabitants have a public library?



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

HOUSES OF A. B. WEIDENER, ESQ. AND G. W. ELKINS, ESQ.,
BROAD STREET AND GIRARD AVE., PHILADELPHIA, PA. MR.
WILLIS G. HALE, ARCHITECT, PHILADELPHIA, PA.

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

COMPETITIVE DESIGNS FOR FIRE-ENGINE HOUSE, BY MESSRS.
W. A. PITKIN, W. H. BARNES, R. A. GREENFIELD OF THE
ROCHESTER ARCHITECTURAL SKETCH-CLUB.

"THE CLOISTERS"—MEETING-HOUSE OF THE SEVENTH-DAY
BAPTISTS, EPHRATA, PA. SKETCHED BY MR. FRANK A. HAYES.

COMPETITIVE DESIGN FOR ST. MICHAEL'S CHURCH, NEW YORK,
N. Y. MR. R. H. ROBERTSON, ARCHITECT, NEW YORK, N. Y.

DESIGN FOR A \$25,000 CHURCH. MESSRS. LORING & PHIPPS,
ARCHITECTS, BOSTON, MASS.

BARBERTON INN, BARBERTON, O. MR. GEORGE T. PEARSON,
ARCHITECT, PHILADELPHIA, PA.

OREGON NATIONAL BANK, PORTLAND, OREGON. MR. A. H. STEM,
ARCHITECT, ST. PAUL, MINN.

[Additional Illustrations in the International Edition]

TWO PLANS OF THE NATIONAL POSTAL SAVINGS BANK, PARIS,
FRANCE. M. J. BOUSSARD, ARCHITECT.

[Copper-plate Engravings.]

M. J. BOUSSARD, who for many years has conducted with great ability the *Moniteur des Architectes*, has just been made a chevalier of the Legion of Honor, on the occasion of the inauguration of the building for the National Postal Savings Bank designed by him. Entering the Ecole des Beaux-Arts second on the list, M. Boussard, after graduating from the School, published a series of works which bear witness to the breadth of his views, the extent of his studies and the versatility of his mind. We will mention "*L'Architecture Funéraire Moderne*," "*Recueil de Tombeaux*," "*Décoration Architecturale des Parcs et Jardins*," "*Fontaines Publiques de l'Europe*," "*La Maison Française*"; besides this he has designed many houses of merit, private hôtels and tombs. It was he who brought about the amalgamation of the postal and telegraph service in Paris. He also built the post-office at Angers, and besides he is an architect of the Department of Posts and Telegraphs, for which he has just completed the Postal Telephone Building at Paris. His earlier successes gained for him the position of Officer of Public Instruction. The work which, after those we have just mentioned, will draw attention to this architect is the building which has been partially illustrated in our recent issues. This building for the National Postal Savings Bank was conceived in conformity with the following official programme:

"The property in question is composed of a hôtel and court-yard on the Rue St. Romain, together with sundry attached buildings on the Rue de la Barouillière, and between these a garden having about forty-five by fifty metres area, fronting on the Rue St. Romain. The total area is about 3,450 square metres. It may be enlarged hereafter by acquiring neighboring property. The scheme of installation which is demanded must be studied with a view to the best use of the area actually in hand, and for the construction, at present, of the portion necessary to accommodate the force, with its probable increase up to 1895. The directory of the treasury and the administrative services, properly so-called, namely, the cabinet of the Director of the Bureau of General Correspondence, may be provided for in the hôtel. The buildings to be built are intended to receive the executive branches, which are: (1) A post-office, with private apartment for the receiver; (2) The section for the payments, with a special room for the payment of sight-drafts; (3) The section of control; (4) The auditor, with his staff of assistants and commissioners; (5) The running accounts, kept in duplicate by women, one for the auditor and the other for the administration; (6) The archives of the auditor; (7) The chief of the internal administration, with his stores of printed blanks and material and his private apartments; (8) A concierge, at each exit, two or three according to the arrangement of the building. It is proper that the two series of current accounts, and each series will require about

270 female clerks in 1895, should be placed in well-lighted and well-ventilated galleries, so that they may be easily overlooked, and not be subjected to any risk from fire. The building, therefore, must consist of a central portion destined to general administrative purposes and independent galleries. The division of the service between the several floors is to be made in accordance with the following instructions:

"Ground-floor: Post-office, with façade on the Rue St. Romain; size as common with the branch post-offices of Paris, except that the public hall must be large enough to receive at least fifty persons at the same time. Persons who await payment of sight-drafts, very numerous at the end of the quarter, may have to wait there for an hour.

"Payment of sight-drafts; five or six clerks, six or eight guardians; in direct communication with the post-office, public hall, and the women's galleries which have been mentioned.

"Female clerks charged with receiving the bank-books. These clerks, who will number about sixty, must have about them a vast array of pigeon-holes. For this, an area of eight square metres is not too much.

"Ordinary payments; a chief, an assistant clerk, twenty commissioners and the guardian of the office.

"Chief of the interior control and storekeeper, with one or two assistants and guardian.

"Basement: The stores of material and printed forms, as well as the archives, can be placed in the basement. Nevertheless, it must be remarked that the archives of the auditor, consisting of elementary evidences of receipts, and expenses, must be protected from all chance of fire as much as possible. If the arrangement in the basement does not offer apartments of sufficient security in this respect, it will be necessary to prepare a special building isolated from all neighboring constructions, and connected with the principal buildings by a gallery. The archives of the auditor occupy about sixty square metres of vertical pigeon-holing per year, and they must be kept for thirty years; but the contemplated construction being intended to provide only for the service until 1895, provision need only be made for fourteen years' storage. Near the archives there must be a hall in which the classifying clerks, six or eight in number, can work all day. Likewise, near the store-rooms of printed blanks, and so on, there must be a room where the guardians of the bureau can verify the receipt of such material or prepare for its shipment. In the basement, also, must be placed the heaters and the store-rooms for wood and coal.

"First, second and third floors: In the central portion will be placed the chief, his assistant, about ten clerks and four guardians; the auditor and all his staff, namely, five or six assistants, fifty clerks, ten guardians; the private apartment of the receiver of the post-office and the head of the interior administration. In each gallery must be about 270 female clerks divided between the three stories. Experience has proved that galleries intended for women must be in bays three metres wide, so that they may be placed back to back with a passage between them. On each story of the galleries must be provided toilet-rooms, cloak-closets, a kitchen, a room where invalids may rest themselves, and a dining-room, so that the ladies need not go out during the time of their attendance.

"Leaving out the basement and the post-office, the buildings must accommodate twelve superior officers, eighty clerks, six hundred female clerks and thirty guardians. Superfluous space may be computed as fifteen square metres each for the upper officers, ten for the clerks, four for the female clerks employed on the accounts, eight for those employed as paying-tellers, and five for the under-agents. The total area demanded, will be about 380 square metres, omitting the corridors, stairs and openings of all kinds. It appears then, to be necessary to build on an area of 1,200 square metres, with a basement, first floor and three stories above. The whole building must be lighted with gas or with electric light and heated by heaters."

Paris, December 17, 1886.

(Signed) Administrator of the National Postal Savings Bank.

For the sake of condensing these general requirements and removing their official dryness we develop below the architectural side of the programme for the sake of giving it more professional clothing. In brief, the building must contain a large basement, fully lighted, and four stories, namely, a ground-floor, where will be the apartment for ordinary payments and the branch post-office, with a large waiting-hall for the public, which will form the decorative feature of this story; second, an entresol story, intended for the masculine portion of the clerks; third, two lofty stories where the female clerks will do their work. Finally, a special building to contain the archives, which will be placed in the centre of everything.

The administration of the National Postal Savings Bank is a financial service where all accounts are kept in duplicate by two special branches, the control and the auditor—services which have to be kept absolutely distinct, without other point of connection than iron galleries, if possible, so that in case of fire the security of one of the two sets of accounts may be always assured, as the loss of both would be an incalculable injury to the financial interests of the State.

The building for the archives must be arranged in such a way that, like each of the two services mentioned, it may be isolated by iron galleries, while yet being connected with each of them. Finally, the rooms of the lower story and those of the two stories above devoted to the auditor's use, must be lofty and well-lighted rooms, with a system of heating and ventilation particularly arranged so that the

female clerks who here work ten consecutive hours may have truly hygienic surroundings. There must also be taken into consideration in the study of the plans this important necessity, namely, that of the possible successive enlargements owing to the probable development of the Postal Saving-bank service. Consequently, the buildings must be arranged in such a way that neighboring properties can be made to give place to new portions added to the original building without affecting the harmony or the architectural character of the building, designed in the style of the French Renaissance, in brick and stone. The buildings must afford a superficial area of about 5,000 metres.

The building which to-day bears the name of the National Postal Savings Bank, has been built after these general conditions, and it will be enough for our readers to examine the plans to then discover the general lines of the arrangement. On the Rue de Sevres will be found, later, the principal façade of the building, with the offices of the head of the administration established in the centre of the façade. On the right and left, great staircases of stone serve for the masculine portion of the working force, who must be divided between the two chief divisions of current accounts, while still kept in contact with the central administration. At the rear of this service stretch the great galleries intended for the female clerks, whose dining-rooms, kitchens and waiting-rooms are at the other end, as well as the toilet-rooms and water-closets. The circulation of this female portion is provided for by the great gallery which opens on the Rue St. Romain and the Rue de la Barouillière. A spur gallery at right angles leads to the great staircase flanked on either hand by cloak-rooms, where clerks leave their cloaks and bonnets before entering the work-rooms after having crossed the iron galleries intended to isolate the whole corps of buildings, one from the other, in case of fire. The grand staircase, built entirely of masonry, with steps of concrete, decorated on the soffit, is itself incombustible. Finally, in the centre of the group is found the building devoted to the archives, connected by fireproof galleries with the other portions of the building. Between the pavilion of the archives and the staircase for the women is found the public waiting-room, of which the glass roof is placed above the entresol stage. On the plan the portion tinted gray shows the part of the building actually erected. It must be understood that it was necessary to provide temporary accommodations for the service in this restricted area, but the situation is only temporary, and the interest of the plan lies wholly in the total scheme.

The heating and ventilation of all these rooms is assured by the arrangements indicated in the following programme:

Heating and ventilation.—Calculations and losses: The conditions of the programme are as follows: To obtain in winter in all the inhabited rooms a temperature from sixteen to eighteen degrees Centigrade in the coldest weather; to arrange hot-water radiating heating-surfaces under the feet of the people seated; to provide in all seasons a renewing of the air sufficient to remove in a continuous manner the carbonic acid produced by respiration. (It is recognized that if one wishes to keep the amount of carbonic acid in the air below the amount at which it becomes troublesome to respiration, there must be produced in that room a renewing of the air corresponding to sixty cubic metres of fresh air per individual per hour, at least.) To provide this amount of ventilation by a system independent of heating apparatus and permitting the removal of air from rooms at will, through openings situated at the top or the bottom of the room according to the season; to introduce into the rooms fresh air taken at a proper point and purified in a special chamber, if necessary.

Number of heaters to be provided: Let us first establish the calculations for a half-bay of one of the large rooms. There must be furnished per hour for this half-bay the necessary air for the well-being of eight persons; that is to say $8 \times 60 = 480$ cubic metres of air. It is necessary to give these 480 cubic metres of air a warmth sufficient to overcome the loss which chilling on the surfaces of the walls and windows occasions, and to maintain the room at the indicated temperature of eighteen degrees, which it must preserve even when ventilation withdraws a portion from the room and ejects it outside.

Losses. The losses occasioned by wall-surfaces and windows corresponding to our half-bay are:

Total surface	$4.50 \times 4.50 = 20.25$
Glass surface	$2.00 \times 3.00 = 6.00$
Total,	14.25

Taking for coefficient for transmissibility of stone two and for glass four, we have under an exterior temperature of minus ten degrees and inside temperature of plus eighteen degrees a loss of:

Mural surface	$14.25 \times 2 \times 28 = 798$
Glass surface	$6.00 \times 4 \times 28 = 672$

Total, 1,470 units of heat.

Ventilation. The air is taken from the outside at minus ten degrees. It leaves the room at plus eighteen degrees. Ventilation, therefore, consumes the quantity of heat represented by a temperature of twenty-eight degrees, multiplied by the quantity of air discharged or

$$4.80 \times 0.3 \times 28 = 4,032 \text{ units of heat.}$$

We see at once from these calculations that ventilation consumes an amount of heat almost three times that which is caused by loss.

It is interesting to take note of the temperature at which air should enter a room to satisfy the conditions which we have just announced, and to discover the necessary amount of heat. The 480 cubic metres of air must contain $4,032 \div 1,470 = 5,502$ units of heat. These 5,502 units of heat represent for the 480 cubic metres which contain them an elevation of temperature represented by

$$X = \frac{5,502}{480 \times 0.3} = 41 \text{ degrees.}$$

That is to say, air, having been taken from the outside at ten degrees below must enter the room at a temperature of thirty-one degrees above. This relatively little-increased temperature of the air entering the room presents the great advantage of diminishing the currents of heat in the neighborhood of the heat-registers.

Heating Service. The system of heating adopted in this building consists of cast-iron pipes arranged in vertical chases in the brick-work. These chases are divided into superposed compartments by partitions made at the height of the floors and arranged in such a way that the fresh air brought to the bottom of the compartment is heated while rubbing along the length of the conduits in the height of one story, and escapes through a register in the upper portion. The conduits used are of two kinds, one .060 in internal diameter, furnished with six longitudinal ribs of four centimetres' projection. The others of the same interior diameter, but with smooth exterior surfaces. Finally, the system is completed by a system of smooth and rectangular pipes which have an area and equivalent diameter of 0.040 on the inside, arranged horizontally under the desks in the thickness of the floor to serve as foot-warmers at a low temperature.

The half-bay which we have considered in the foregoing calculations is thus found to be heated by two pipes 0.060, with a length of four metres and a half, representing a plain heating-surface of four metres and a half. Two smooth pipes of the length of four metres and a half representing a surface of 2.42 metres, making a total of 6.92 metres of heating-surface, which radiates $6.92 \times 700 = 4,844$ units of heat. Finally, twelve metres of smooth pipe 0.040, having a surface of 1.80 metres, which radiate $1.80 \times 400 = 720$ units or $4,844 + 720$, equalling 5,564 units of heat. That is, there is produced 5,564 units of heat per half-bay to satisfy the demand for 5,502 units of heat indicated by the former calculations.

Ventilation Surfaces:—There has been adopted in this scheme ventilation by suction, as it presents the following advantages: simplicity of apparatus, which, so far as concerns operation and maintenance, is of easy regulation, according to the requirements of the temperature. The installation comprises heating-surfaces arranged under the roofs in suction-chambers, to which lead the ventilating conduits, which draw the air from the different rooms. In this case the heating-surfaces in the suction-chambers must have sufficient power to give the air an ascensional force, in proportion with the cubic space to be emptied. The scheme contemplates four suction-chambers. Each of them serves for the discharge of 20,000 cubic metres of air per hour. The surfaces have to be calculated for the most unfavorable conditions; that is to say, for the summer-time, when the external temperature is likely to be much higher than the interior temperature, and, for instance, reaches as high as thirty degrees. We will establish the calculations by taking a difference of three degrees as the proper ascensional force. It will be necessary, therefore, to have an apparatus capable of raising the interior air having a temperature of twenty degrees only to thirty-three degrees, which corresponds with a production of heat-units $20,000 \times 0.3 \times 13 = 78,000$ units. We obtain this result by disengaging the heat of nine water-heaters, each having a surface of 6.68 metres, or, say, sixty metres, to which must be added a surface of 150 metres of pipe 0.100 interior diameter and 0.120 exterior, which connect the heaters with the suction-chamber, or a surface of fifty-six metres; that is to say, $60 \text{ metres} + 56 = 116$ metres, disengaging per hour $116 \times 700 = 81,200$ units of heat. It is easy to conceive, by what has gone before, the cost of the installation which the importance of the ventilation demanded by the programme necessitates.

The quantity of warm air which ventilation casts into the outer atmosphere in winter, which rises as high as 80,000 cubic metres per hour, makes it necessary to double the power which one would give to the heating apparatus in an ordinary installation. Besides, the surface of the suction-apparatus necessary to produce the movement of such an enormous volume of air leads to an important expenditure, amounting to about 30,000 francs. These expenditures are largely compensated by the good which is derived from it: Hygienic heating through air drawn from the outside from a thoroughly healthful part of the atmosphere; the purification of this air in its passage through a special chamber where doctors can, if necessary, place antiseptics in time of need; distribution to the different parts of the rooms and the pure warm air at low temperature spreading through the rooms through numberless openings without annoying rapidity; extraction in a continuous manner from the top, or the bottom, of the rooms, of the carbonic acid produced by respiration; complete separation of the heating and ventilating apparatus, which allows of maintaining, at all times, an equal renewing of the air while regulating the heat according to the demands of the season. This arrangement, giving to the work-rooms very desirable hygienic conditions, allows the persons employed there to work assiduously without their healths suffering the ordinary inconveniences of such crowding.

In its present state, this building has cost a sum of about 800,000 francs.

PORTICO OF THE RATHHAUS, COLOGNE, GERMANY.

(Gelatine Print.)

This marble addendum to the old Gothic town-hall fronts on the little Stadthaus platz and conducts to the chambers of justice, while the main front of the building is found on the Alten Markt, nearer the river. The portico dates from 1571, the lower story of the building from the thirteenth century and the great Gothic tower, which would be imposing if one could get a fair view of it, from 1414.

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

(Gelatine Print.)

GARDENER'S COTTAGE, CROOKSBURY, AND STABLES, LITTLE TANGLEY.

ADDITIONS TO "THE CORNER," THURSLEY, AND GARDENER'S COTTAGE, LITTLEWORTH. MR. EDWIN L. LUTYENS, ARCHITECT.

CATHEDRAL OF THE BLACK VIRGIN, LE PUY, FRANCE. DRAWN BY MR. J. A. SLATER, ARCHITECT.

DESIGN FOR BOARD SCHOOL.



[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.]

PERRECY-LES-FORGES.

CEDAR RAPIDS, IOWA, December 26, 1890.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Referring to the illustration given of Perrecy-les-Forges in your issue of December 20, would say that we think a mistake was made in location, hence the reason nothing definite was found regarding it. The village and church of that name are in the Department of Saône-et-Loire, just east of Allier, being in the north part of the Arrondissement-de-Charrolles, and some eighteen or twenty kilometres north of Paray-le-Monial. The church is recorded as an "historical monument" of the twelfth century. The work over the door very closely resembles that over the main entrance-door to the church at Senuer-en-Brionnais, located about the same number of kilometres south of Paray-le-Monial; and erected, perhaps a little later, in the same century. Respectfully yours,

H. S. JOSSELYN.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs:—Perrecy-les-Forges is a mite of a village (about 190 inhabitants) about 70 kilometres from Macon and 20 north of Charolles. I am quite sure that it is over the line in Saône-et-Loire, but, at any rate, the church-tower and the doorway which you give are among the finest Romanesque remains in France. The nave belongs to the same period, but the choir dates from the sixteenth century.

The Sisters of St. Joseph have an establishment there. How beautiful your cut is, and what a charming *Giraldia*! Yours truly,

M. A. HOWE.



WORKMEN'S ACCIDENT INSURANCE IN SWEDEN.—The new law of State insurance for Swedish workmen against accidents and sickness covers all workmen engaged in the building and kindred trades, saw-mills, deal-yards, quarries, all industrial concerns, etc. A State insurance institute is to be established, the employers paying the premiums. Insurance with the State institute is not, however, compulsory, provided the employer has his hands similarly insured elsewhere; but, nevertheless, the State guarantees the compensation in all such cases. The amount of compensation is the same in all cases, viz., for total disablement for life, an annuity of £20; for disablement reducing working capacity for life an annuity of £17; for temporary disablement or sickness, 14d a day. Hands under eighteen years of age receive only three-fourths of the above sums. In addition to the two former cases, where the assured has children, he receives 24s. a year for each one under fifteen years of age, the total compensation, however, not to exceed £24. 10s. In case of death through accident the payments are:—For funeral expenses, £1. 13s.; annuity to widow, £6. 13s. 6d.; annuity to every child under the age of fifteen £3. 7s., total, however, not to exceed £17 a year. The employer has to report the accidents

to the nearest police authorities, who, after investigating the case, report it to the institute. Any one dissatisfied with the decisions of the latter may appeal before the Stockholm municipal court within one year. The payments for sickness are made weekly and others quarterly, the premiums of the employers being payable half-yearly, and in case of non-payment they may be enforced as Crown debts. When insured with the State the workman enjoys the great advantage of being insured from the moment he enters upon his work, whether notice thereof be given or not by the employer or himself. As to the rates of premium, the Minister of Public Works will divide them into classes, according to the risk of occupation, at first for three years, and afterwards every fifth year. Should experience prove any trade less risky it may be reduced in class. The State insurance also covers foremen and overseers of work. Should any person injured receive compensation from other persons, according to general law the institute has the right of indemnification for any compensation. Moreover, employers as well as men may effect voluntary insurance with the State, but in no case must the sums assured be more than double those stated above. The State will establish and maintain the institute, the officials being one chief administrator, three directors, a secretary, a registrar, and a treasurer, and neither of the first four named must hold any other public office or position. — *The Builder*.

A PROFITABLE PUBLIC FOREST NEAR ZURICH.—The Sihl-Wald has been owned by Zurich ever since 1300, at least, and has been carefully administered for centuries. It is now managed on the most approved scientific principles by a corps of trained foresters and a permanent working-force so well organized that important work is successfully executed by common laborers under the supervision of a forester of the lowest grade. Economy as strict and watchful as that of any private enterprise prevails, together with a wise and open-handed liberality in providing for the welfare of the property. Last year the net profits were something over \$8 an acre, or a total of about \$20,000 for the city treasury. The city does the entire work—lumbering, manufacturing, and administration. It employs the best modern labor-saving devices, such as lumber-slides, portable railways, and a railway to the mills. In the sawmill the principal machinery is American, and in its factories the forest management works up the product into a great variety of marketable material, and also manufactures nearly everything it uses. An elaborate and costly apparatus has been successfully introduced for injecting wood with a solution of copper sulphate under hydrostatic pressure, making its product last twice or three times as long as ordinary wood, so that there is a wide demand for the telegraph-poles, railway ties, wooden pavement shingles and other articles treated in this way. The net profits of the forest will be largely increased by a new railway building into the valley. Almost half the annual yield of wood is from thinnings alone. The proportion of firewood is generally seventy-four per cent, yielding sixty-four per cent of the total revenue. In this economic treatment of the forest its value as a pleasure-ground is not forgotten. The management maintains throughout the domain a network of well-kept roads and paths, with occasional benches along them, while it aims to preserve the landscape unharmed and make the place thoroughly and pleasantly accessible. All this shows what is possible in the public management of forest property. Knowledge of examples like this should be a great encouragement to our Massachusetts cities to follow the wise lead of Lynn in taking advantage of the public park or public forest acts. Lynn, for instance, ought to be able gradually to introduce similar methods in the management of its beautiful public forest, so that, besides its invaluable service as a pleasure-ground and in preserving the purity of the water-supply, it would also become an important source of revenue. — *Boston Herald*.

AN EXCITING RIDE IN A LIFT.—"London may not be provided with elevators on anything like the scale that New York is," said a man recently who spent his vacation abroad, "but I saw a 'lift' there, the like of which I do not believe exists in this country. I entered an office building in London, which was not far from the Bank of England, to see a friend, who was on the top floor. In the corridor I saw a number of boxes following one another up one shaft and down another. They were attached to an endless chain, and were large enough to hold several persons. I looked at the machine in some doubt when suddenly a man stepped out of one of the boxes or cars, which was coming down. The car, which was going at what seemed to me a rather rapid rate of speed, did not stop, the man jumping off it while it was in motion. Pretty soon I saw other men jumping in and out of the cars, which were about as far apart on the endless chain as the distance from floor to floor. I at first hesitated about risking my limbs and life on the contrivance, but finally stepped into an ascending car, just before its bottom was on a level with the floor. No sooner had I done this than I began to get afraid that I might be crushed to death between the car and the floor or ceiling when I tried to step off. Of a sudden it struck me that if I did not get off at the top floor I would be carried to the roof, and then be stood on my head in the car as it turned over. I was in a perfect fever of anxiety, and could hardly screw up my courage to the point of alighting, but I managed to do this when the top floor was reached. I found that it was much easier to get out than I had supposed, and when I finished my call I boldly rode down on the machine. I afterwards learned that a man who did not get out of an ascending car at the top floor would be in no danger of being turned upside down at the top of the shaft, because the car always maintains its upright position. This is due to the fact that only the roof of the car is fastened to the cable, so the car always remains bottom downward by its own weight. A 'lift' like this may be economical, as it does away with the need of men to run it, but I myself much prefer the safe American machine." — *N. Y. Tribune*.

BRICKMAKING IN BAGDAD.—The British Consul General at Bagdad in his latest report has some interesting observations on brickmaking

in that town. All Bagdad, with a population of about one hundred and sixteen thousand souls, may be said to be built of kiln-dried bricks. Stone is little used there, as it is in Mosul, in house building, and, although the tenacious clay of Irâh gives good material, its use is confined chiefly to huts and agricultural squattings along the Tigris banks. There is thus an enormous demand for bricks. These are all hand-made and kiln-dried. There are about twenty-five large and small kilns at work, in the hands chiefly of Jews and Christians, but the turnout is far behind the demand. Half-built houses sometimes remain so for long periods for want of bricks. The kilns are dotted over the desert outside the city. Often in spring, when the Tigris or Euphrates lays acres of ground under water, these stand like islands in the inundation, and brick making is suspended. The usual prices of bricks at the kiln side is £1. 16s. per 1,000 of twelve inches square, and 18s. per 1,000 of seven inches square. The bricks are carried from the kiln on small donkeys, each taking not more than ten large or twenty-five small bricks. In the course of transit they get much broken, as the best, though good to look at and of a chrome yellow color, are very brittle. Another great promoter of the demand for bricks is the absorption of water every winter, bricks suffering equally with the mortar in which they are laid, owing to their porousness. Thus there is hardly a house or wall or brick pathway in Bagdad which does not constantly call for patching or rebuilding with new bricks. The old city walls, thrown down about 1870 by Midhat Pasha when Governor-General, remain still, in spite of years of burrowing and abstraction, a mine of broken bricks. Under a late regime it was said that the right of taking these away and selling them, was conferred as a substitute for pay on the soldiery; but at present all classes seem to help themselves to them. These remarks serve to show what a good opening there is in Bagdad for brickmaking after some simple but scientific method.—*London Times*.

MANGALORE TILES.—The manufacture of Mangalore tiles is advancing by rapid strides. This industry was initiated by the industrial branches of the Basel Mission, and is now in such a state of development that, if unchecked by competition in other parts of India, there is every probability of its assuming large dimensions and benefiting the district in various ways. In its present state, it finds employment for a large number of working people of the district for a considerable portion of the year. In the year 1889-90, 9,066,961 tiles and bricks, valued at Rs. 3,94,293, were exported by sea, against 6,812,607, valued at Rs. 3,13,449, in the preceding year. But to obtain an accurate idea of the large quantity manufactured, the number exported by land to Mysore and Coorg as well as those taken for local consumption have to be added. It is unfortunate that Mangalore is not on the line of railway communication with the interior, for otherwise the industry would probably expand still more rapidly than it is now doing.—*Indian Engineering*.

"REMEMBER THE BAKER."—In the courts of Venice, when a prisoner is about to be condemned to death, a tall and ghostly-looking individual, dressed in a long black gown walks majestically to the centre of the court-room, bows solemnly to the judges, and in a cavernous voice pronounces the following not over-startling words: "Remember the baker!" Then he bows again and stalks away. Just 300 years ago a baker was executed in Venice for a crime of which he was not guilty. When his innocence was fully established, the judges who condemned him gave a sum of money to the city, the interest of which was to be devoted to the setting up and perpetual burning of a lamp known as the "lamp of expiation," in the palace of doges. It is still burning here. So runs the story.—*Invention*.

BURNING OFF OLD PAINT.—That is making it soft with a spirit-lamp of gas-jet so it can be more easily scraped off for a fresh coat—is dangerous. It occasioned a \$100,000 fire at Rockland, Mass., recently. The Glens Falls paid for a valuable dwelling on Staten Island a few years ago, the fire originating from the flame of a spirit-lamp used in softening the paint on the clapping outside. By a draft upwards through the studding the flame was drawn in between the clappingboards, started a fire which after burning some time unnoticed, broke out through the roof and destroyed the dwelling. It is a common practice with painters and a bad one.—*Now and Then*.

DISCOVERY OF A NEW "LAST SUPPER."—A discovery of considerable artistic importance has just been made at Milan. In the process of scraping some walls at the hospital, there has been brought to light a copy of the famous "Last Supper" of Leonardo da Vinci. The interest of the discovery is that the newly-found fresco seems to be an exact replica of the composition as originally painted by da Vinci, and contains details which have disappeared from the original in the course of much maltreatment and partial restorations, notably some partly legible names and inscriptions traced on the borders of the draperies.—*N. Y. Commercial Advertiser*.

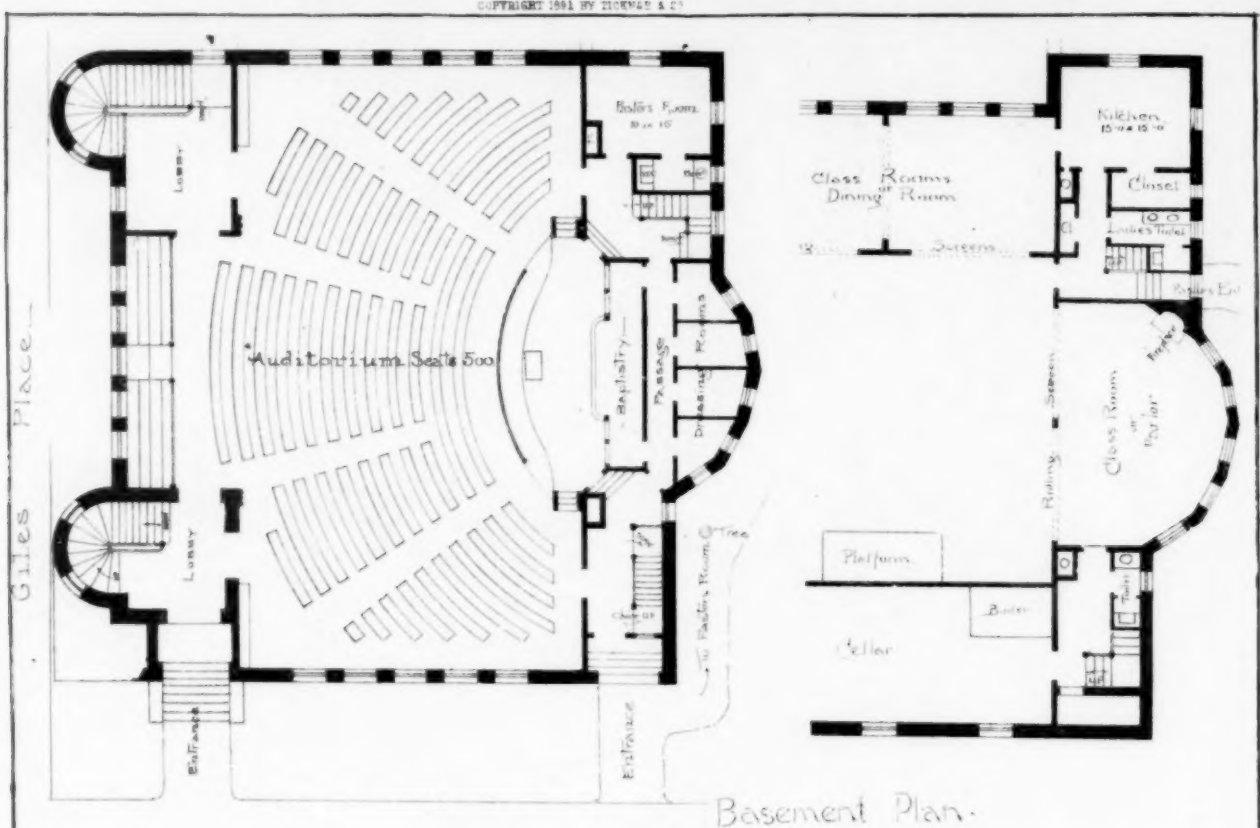


The manufacturers of the United States enter upon the new year under favorable conditions and surroundings. The recent financial flurry, with good management at Washington, will soon be a thing of the past. With poor or bad management, the country is destined to encounter another depression in the near future. Such a statement is not made in the spirit of prophecy or prediction, but is made simply because facts and conditions unerringly point to further trouble unless the evident causes are removed. The holiday business disbursements and the banking disbursements in the way of dividends and the like will foot up not less than two hundred millions of dollars. The dividend disbursements alone amount, it is

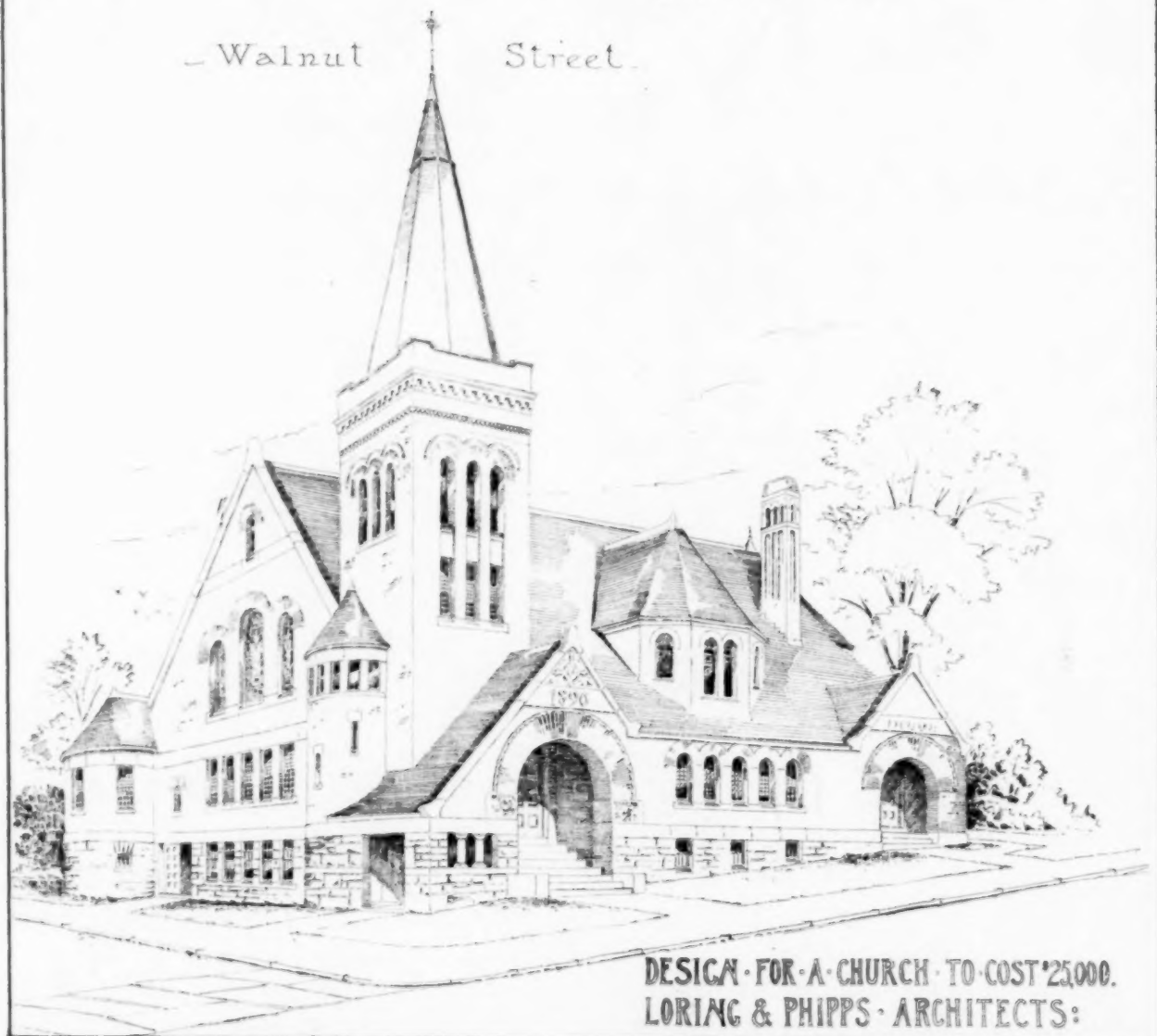
estimated, to one hundred and thirty million dollars. The next fright which banking interests are industriously seeking to create is that the efforts to utilize silver to the extent that is being attempted in contemplated legislation will scare gold out of the country and into bank-vaults. There is more danger in appearance than in fact in this. Silver money is not, theoretically, a safe money, but the American people have learned a great deal within the past thirty years, and they are prepared to accept it as money, and their willingness to do so will go a far way to make it a good money, in spite of the financial doctrinaires. Congress is slow to act, and is evidently seeking a compromise measure. The West will accept a compromise measure for the time being, but the whole monetary policy of the Government will be settled eventually in a political issue. It is destined to come up because the money-lending interests will never surrender a principle, and the money-borrowing West and South will never be content to let things go on as they have been going. There is a great deal more involved in the formation of the Western Railway Association of Trunk Lines than is apparent on the surface. It must of necessity lead to the construction of a good deal of additional mileage of a non-competitive character. This construction in 1891 will develop a good deal of activity in a multitude of smaller industries furnishing equipments, from rails and locomotives down to the innumerable smaller productions that go into railway construction. Reports from roads are also very gratifying; there is an abundance of traffic. It is estimated by a very recent authority that eight thousand miles of road will be built in 1891. The rush of traffic will probably continue all through the winter months. Railroad bridge-builders will have an unusual amount of work. There is an extraordinary demand for bituminous coal in both Eastern and Western markets; the anthracite production will be upwards of a million tons in excess of last year. The output of coke is also far ahead of all past years. The lumber interests are preparing for the heaviest logging season. Supplies have run very low in the South and Southwest, as well as in the Northwest, and for some kinds of lumber prices have already been advanced in Western wholesale markets. Throughout the South all business interests seem to be prospering; the heavy cotton crop is being disposed of at good prices. Southern bankers report demands for more money than usual, but the demands will rest upon legitimate requirements. Farmers and planters are calling for assistance to extend operations and to equip their properties more thoroughly. Storekeepers are multiplying in the South and Southwest, and credits are being shortened; in other words, more business is being done on a cash basis throughout these regions than formerly. The farming interests have been fearful of the outcome of the recent combinations of the manufacturers of agricultural implements. These combinations extend all through nearly every article or product used on farms. An inquiry made recently at authoritative sources developed a response that no advance on equipments for farming uses was contemplated; that only a control of production was at present intended. This, it may be said, is simply an indirect way of accomplishing the same purpose. The manufacturers claim that their interests are in as much need of protection as farmers' or railroads' interests, and that their customers will not suffer from their legitimate efforts at self-protection. The large stocks of implements made during the past year have been reduced through purchasing to a low ebb. The same observation applies to the manufacturers of wagons and carriages. The reports of new enterprises for the past three months in the States south of the Ohio show that there has been an increase in projected work. The peculiarity of most of these enterprises is the small amount of capital invested, but it is individual capital, and represents actual savings. This sort of enterprise is safer than that which is based upon borrowed capital. Eastern jobbers who have been travelling through the newer States of the Union speak of the solid foundation upon which business rests. Of course, a great deal of assistance is being received from Eastern private money-lenders, and, although there are thousands upon thousands of instances where it is out of the power of the borrowers to restore the money according to agreement, there are scarcely any foreclosures, and no disposition shown to take advantage of borrowers. The distribution of loanable funds will doubtless continue, because of the ability of borrowers to pay, and the rapid and general growth of values in land and manufacturing plants. Eastern money-lenders have for years watched the wonderful development of the West, but each year's progress strengthens their confidence, and there is now more confidence felt in all manner of Western loans and securities than there has been for many years. Justice is being meted out to agricultural interests more fully, and the pending solution of the railway question will place them upon a still better footing. There is also a rapid growth of wealth in the Rocky-Mountain and the Pacific-coast regions. Reports from various mining localities all the way from British America into Central Mexico show that there is a steady growth in the output of mines, and a corresponding increase in the numerous little industries dependent upon mines. There are a few discouraging features to be noted, and the commercial agencies think that there will be, perhaps, an increase in the number of commercial failures during the first quarter of the new year, but that they will be confined for the most part to small traders who have been enticed into trade with too limited capital. Iron and steel makers enter the new year with very trifling stocks. Textile manufacturers of all kinds have disposed of the usual stock of goods during the past quarter. Importers have done a heavy business. Southern textile interests are prospering, with very few exceptions. The dividends paid by the larger Southern corporations show heavy sales and excellent financial and shop management. Northern manufactures are profiting by the opportunities for Southern investments in textile mills, and it is quite probable that, under their supervision, mills will be built for the production of a finer class of goods. The only serious labor difficulty threatened or contemplated is a strike among the miners of the United States. Such a strike is being worked up, but the promoters of it and agitators for it are leaving out of account, because of their inexperience, a few factors which will likely result in the defeat of a general strike. If a general suspension of mine laborers could be brought about it would certainly be a very disastrous thing, but it is as impossible as it is chimerical. The members of the building trades have discovered the cost of and results of strikes, and there will be no general effort made by them next spring to better their condition. The labor problem is settling itself in a different way; laborers are now directing their attention to possible political action, to the slower but ultimately wiser method of individual improvement, and to the development of habits of economy. There is a wonderful growth of building and loan associations, and of societies for cooperative effort in the direction of life and health insurance. State reports exhibit a wonderful growth of effort of this kind. There is a very wide and deep spirit of reform in this direction among the wage-working classes in all sections; this is one of the outgrowths of the labor agitations of past years. Every year makes strikes more difficult to originate, as the workers are studying more closely, and with an aroused intelligence, the real nature of the economic problem in which they are such a mighty factor.

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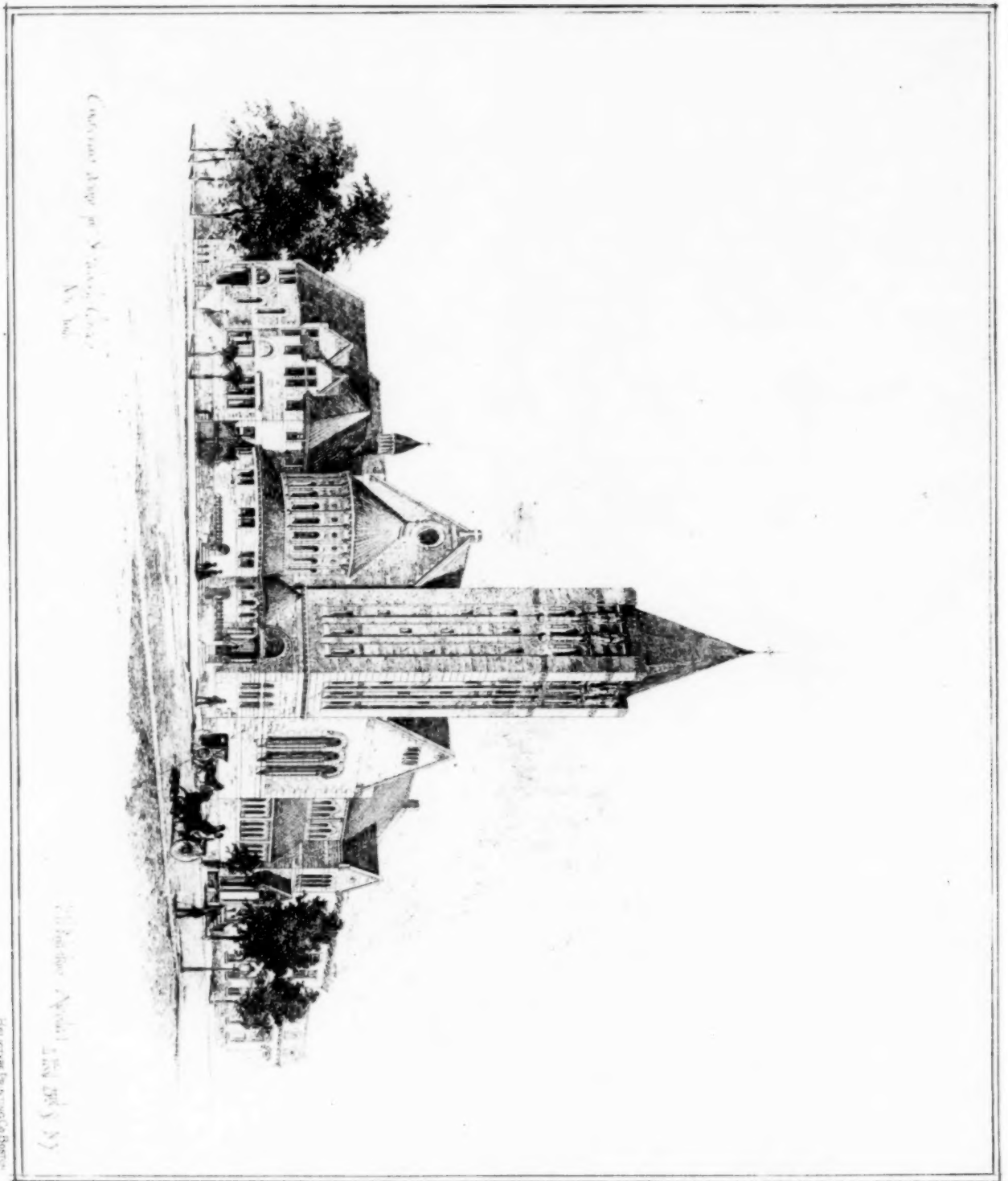
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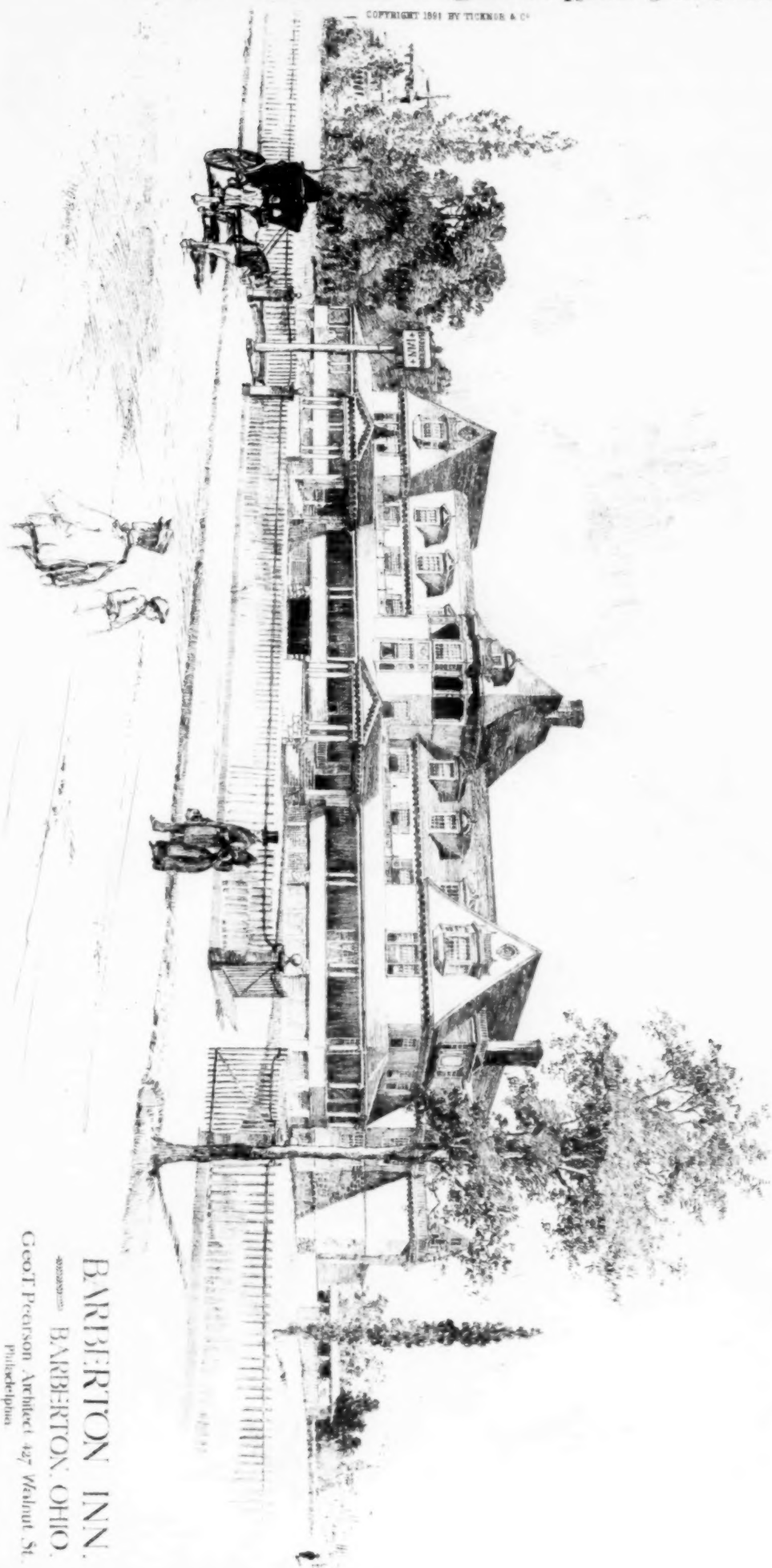
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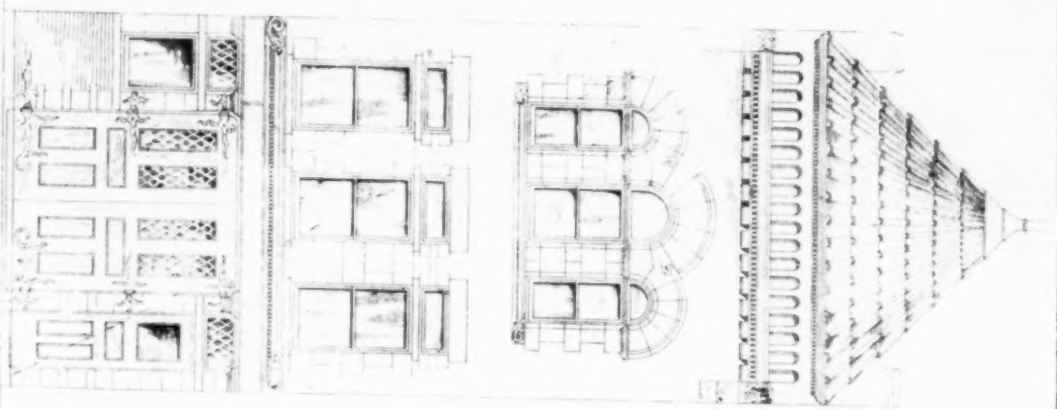


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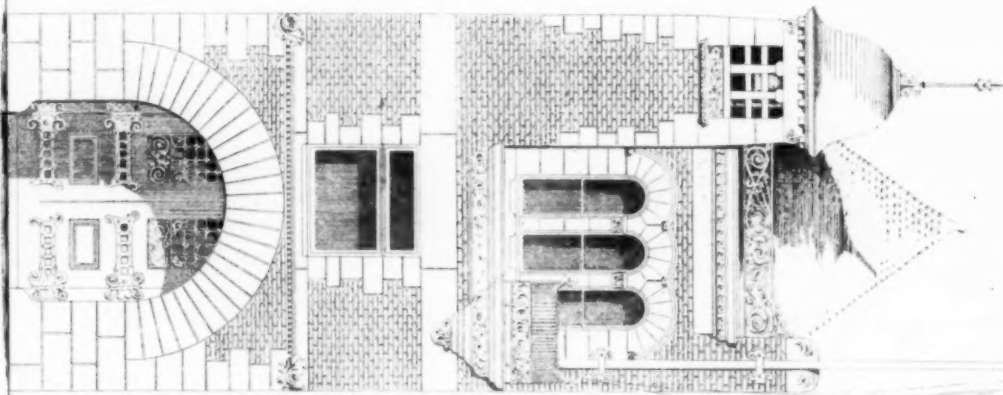
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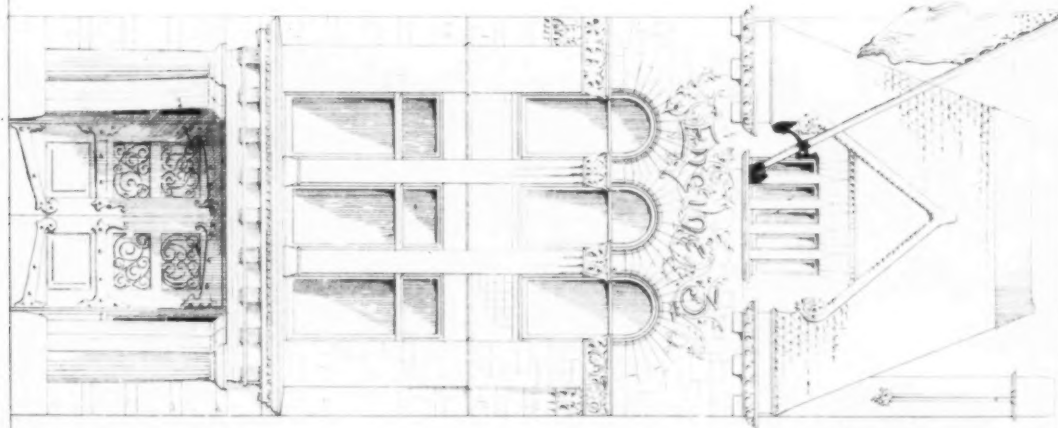


FIRST-PLACE - W-A-PITIN-

STILL ALARM.



SECOND-PLACE - R-A-GREENFIELD-



Plan of Entrance



R-A-S-C-COMPETITION

First Entrance House, Fifth
Floor, 10th to 11th floors

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