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A FIRM of architects in London recently sued for a commission of seven-and-one-half per cent on the cost of certain alterations carried out under their charge. Their case seems to have been well managed, their counsel, instead of merely quoting the Royal Institute schedule, and staking the result on the reception that this might meet with from the judge or jury, having brought forward independent evidence that the charge was proper and just; and they won their suit without difficulty. The total cost of the work was less than five hundred pounds. Two witnesses testified that, for work costing less than five hundred pounds, the customary fee paid to the architect was seven-and-one-half per cent, which was increased to ten per cent when the cost was not more than one hundred pounds; and they testified further that, where alterations are to be made in buildings while business is being carried on in them, the work and responsibility of the architect and builder are much increased. They thought that, in the present instance, the commission claimed was very moderate. It was further shown that the plaintiffs had prepared several extra plans, and had measured the old buildings, without any extra charge; and the jury, convinced that the plaintiffs had earned what they asked, gave them a verdict for the full amount, with interest and costs.

SIMPLE as this case seems, it is worth studying as an example of how architects' claims should be presented. There is no doubt that architects earn all the pay that the custom of the profession allows them, but, if they have to sue for it, they often lose a large part of it, through their own or, occasionally, their attorney's, inexperience in such matters. Most architects have a blind faith in the Institute schedule, and imagine that it is only necessary to exhibit a copy of this document in court to have judgment entered forthwith for compensation according to its terms; and some lawyers, little versed in building matters, share this delusion. For people who cherish such notions it is a rude shock to learn, as many of them do, that very few judges admit the Institute schedule at all as evidence in cases tried in their courts. If it is claimed that the plaintiff read the schedule to his client, before the latter concluded his agreement with him, or that the plaintiff sent him a copy of it, or had an abstract of it printed at the top of his letter-sheets, or if it is claimed that, in some other way the client had read and understood the schedule, before

he contracted with the architect, and knew that his transactions with the latter would, in the absence of special stipulations, be governed by it, then the schedule can be read in court, as a part of the agreement between the parties; but that the client should, as a matter of common knowledge, be familiar with the Institute schedule, or that he ought to be bound by a tariff which he had never heard of, drawn up among themselves by members of a profession to which he did not belong, judges, as a rule, refuse to admit, and often exclude the evidence of the schedule altogether, as being irrelevant to the question of what was the real contract between the parties. For this reason, advocates experienced in building cases never try to force the schedule upon a court, unless it is claimed that both parties understood that it formed a part of their agreement. If the jury finds that this claim is substantiated, the schedule will be enforced, just as any other terms would be enforced to which it could be ascertained that the parties had bound themselves; but the schedule would in the case be enforced simply as a part of an agreement, and not as a code having any innate authority.

ALTHOUGH the schedule has no authority in law, as the rule adopted among themselves by a certain set of professional men, it may have, and does have, a certain authority, not as a schedule, or code, but as furnishing evidence of what are fair and reasonable charges for architects to make under various circumstances; and in this light it may be consulted by a court, or certain of its clauses admitted as evidence; but, it must be remembered, as evidence which may be contradicted by the testimony of other witnesses, or confirmed in the same way. Thus, the statement of the schedule, that five per cent is the proper and usual architect's fee for services on new buildings, is so constantly confirmed by people who have had business with architects, and by architects themselves, that it is generally accepted without question by courts, as well as by the public; but the rule which was once included in it, that one per cent on the proposed cost was a proper compensation for preliminary sketches, has been almost always rejected, for the reason that plenty of architects and other witnesses could be found to testify that small pencil studies, dignified by the rather elastic name of preliminary sketches, were not worth, in many cases, the one-per-cent fee. The essential element of the evidence which should be brought forward in an architect's behalf is, therefore, not authority, or official character, but reasonableness. He cannot expect to collect a certain fee simply because the schedule says that he ought to have it; and he should not, in his own interest, try to do so; for the jury are quite aware of the fact that they alone are entitled to say what compensation he should recover, and an attempt to impose schedules on them is more likely to arouse their resentment than their favor. It is otherwise if the schedule is so used as to appear simply as a confirmation of the testimony of witnesses whom the jury respect. If half a dozen well-known and respected architects and builders testify, for example, that ten per cent is a proper charge for designing and supervising the execution of a monument, the jury will be disposed to believe them, notwithstanding the evidence of people who are willing to do the work for less; and, at the end, the schedule may, perhaps, be quoted, with good effect, to show that all respectable architects expect to be paid on this scale; while a simple demand for ten per cent for doing what the average juryman supposes to be a particularly simple and easy piece of work, fortified only by the exhibition of a printed document, which neither defendant, judge nor jury have ever seen before, purporting to emanate from a body of which none of them have ever heard, will be tolerably sure of rejection.

WE have much pleasure in welcoming to the field of technical journalism a handsome periodical, published, at intervals of twenty to twenty-four days, so as to include twenty numbers in the year's series, by E. Grossman, in Stuttgart, Germany, at the very moderate price of three marks, or seventy-two cents, per quarter-year, for foreign subscribers. Our readers should remember the name of this journal, which is called *Der Kunst-Gewerbe-Gehilfe*, and, besides being the established organ of the Association of German Art-Workers, is intended to be devoted to the higher interests of the

professions to which it appeals. That its purposes in this respect will be ably and earnestly fulfilled, the introductory number certainly indicates. The first important article is an interesting study of the fundamental ideas of form; and this is followed by one on the importance to art-workers of a comparative knowledge of artistic forms, by Professor von Feldegg, of Vienna, who introduces his essay by quoting an expression of Liebig, who once said that "A person who knows nothing of chemistry does not even know that"; and continues by showing the value of the resources with which a wide knowledge of the arts supplies the artisan, and the effect of general study in forming the taste. In Professor Feldegg's opinion, all the arts spring from a common root, and he promises to show the stock from which they have all proceeded, and to analyze the relations of the different branches, in what promises to be a valuable series of papers.

TURNING to the more practical part of the new journal, we find, under the heading of Furniture and Wood-Carving, some good drawings of an extremely pretty selection of articles of furniture, in various styles; and the Department of Decorative Painting is likewise furnished with a half-tone reproduction of a fine piece of glass-painting from Bologna. Under this heading, Professor Sepp, of Munich, begins a curious account of early glass-painting. According to him, the earliest known undoubted reference to painted-glass windows is to be found in a letter written by Gozbert, abbot of the convent of Tegernsee, in Bavaria, to his Highness, or Sua Celsitudo, as the abbot calls him, Count A—. The rest of the name is lost, but the letter was probably written to a certain Count Arnold von Vohburg, or Vogaburg, whose ancestral estates joined those of the abbot, who was himself born Count of Kehlheim and Essing. The latter speaks further of the death of "the noble Adelheid;" and as Arnold's wife was Adelheid von Ammerthal, daughter of the Margrave of Nordgau, it seems tolerably certain that this friend and neighbor was the "Count A—" to whom the letter was addressed. It seems that, perhaps in memory of the deceased Adelheid, the Count A— had presented to the convent church a painted-glass window; and a considerable part of the letter is devoted to praising the window, and thanking the donor for it. "You have," says the reverend abbot, "brought our place into such honor as was never known before, and such as we never dreamed of attaining. The windows of our church were until now closed with old cloths. Now, for the first time, the golden-haired sun throws its rays through many-colored glass-paintings upon the pavement of our basilica." "Where," he goes on to inquire, "in all the world is there a place so beautifully ornamented?" "The hearts of all beholders tremble with a thousand delights, when they gaze upon the novel work."

IT is known that Count Gozbert was elected Abbot of Tegernsee in the year 983, and died in 1001. Arnold von Vohburg is known to have lived at the same time; so that the window spoken of in the letter must have been set in the church about a thousand years ago. It was not the first work of its kind, for Gozbert himself speaks elsewhere of having learned the art of glass-painting from the monks of St. Emeram, in Ratisbon; but it seems to have been the first of which a detailed account has come down to us. Gozbert put the admiration and curiosity of the people of Tegernsee to good account, and soon had a little shop established, where the white quartz sand brought down by the torrent of the Weissach, near by, was converted into glass of different colors. The reputation of the place soon spread, so that the Bishop of Freisingen, and the Abbess of Chiemsee, are recorded as having given orders for windows about the beginning of the eleventh century; and even to this day, bits of green and blue and red glass are picked up in the ash-heaps, which mark the site of Abbot Gozbert's shop. The original window, to which the new manufacture owed its inspiration, was destroyed by fire, with a large part of the convent, in the year 1036; and the monks were so distressed at their loss that they deposed their abbot, Ellinger, for not being able to prevent the catastrophe.

MR. DANIEL WOOD writes to the *Builder* an interesting letter on the way in which the Ionic volute was drawn. It has been the fashion to suppose that all Greek curves were drawn freehand, by a sort of superhuman

inspiration; but Mr. Wood says that nearly all Ionic capitals in Greece have a small hole in the centre of the eye of the volute, in which, as he thinks, was set the point of a cone. Around this cone was wound a string, to the end of which was tied a pencil, either directly or through the medium of a flat stick, through a hole in which the pencil was thrust; and, as the string unwound from the cone, the pencil described a volute. He says that with this arrangement he has followed exactly the curve of the volute of existing capitals, and that, as the hole for the point of the cone is found at Mycenæ, at Priene, and in the temple of Niké Apteros, at Athens, he thinks such an instrument was generally used. At Ephesus, the Ionic capitals do not show any arrangement for holding the cone, and he thinks it was probably held in a separate frame.

THE Paris Exposition of 1900 has to develop under considerable difficulties. There has always been a strong party in the Chamber of Deputies, formed particularly from the Provincial members, not only opposed to the present project, but opposed to any sort of exposition in Paris. This party has probably a majority of the house, and, while it would hardly venture now to suppress the scheme entirely, it can, and does, occasionally avail itself of opportunities for throwing obstacles in its way. Its last proceeding in this direction is to forbid the use of any part of the Champs Elysées for the exhibition, to interdict the removal or rebuilding of the Palais de l'Industrie, and to direct that all the exhibition buildings shall be confined to the left bank of the Seine. This decree upsets completely the fine plans for a monumental bridge, extending from one grand cluster of palaces on the right bank, to another on the left, and restricts the exhibition within a smaller space than was occupied by that of 1889. The Municipal Council of Paris is said to be also disaffected toward the Exposition, and, in its plans for a Metropolitan Railway, carefully avoids arranging for any accommodation for visitors to it.

IT is a matter of some interest to know that the Section of Fine Arts of the Institute of France has elected, as Foreign Associate, in the place of the late Richard Morris Hunt, the distinguished German painter, Adolph Menzel. This leaves only one foreign architect-member of the Institute, the venerable da Silva, of Lisbon, who, although he is eighty-nine years old, still retains his interest in his profession and the arts, and has already signified his intention of being present at the meeting to be held next October, to commemorate the one-hundredth anniversary of the foundation of the Institute.

THE District of Columbia is to have a fine Episcopal Cathedral, designed by Mr. Ernest Flagg, of New York. By desire of the Trustees, two designs were prepared, one in Gothic and the other in Renaissance style, and the Renaissance design was chosen. The building, as planned, is to be two hundred and seventy-two feet long, and two hundred feet wide, and is to have a dome two hundred and eighty feet high, and four towers, each three hundred and twelve feet high. It is expected that the church will cost nearly three million dollars, and about a million more is to be expended upon a Bishop's palace, a deanery, a boys' and girls' school, a chapter-house and other buildings, which will form a part of the group. Mr. Flagg certainly has a fine opportunity, and the whole profession will be interested in his success.

THE second year of the *Oesterreichische Monatschrift für den öffentlichen Baudienst* (Austrian Monthly Record of Public Building-Service) begins under new auspices, the publication having been transferred to the house of R. von Waldheim, Taborstrasse 52, Vienna. Although this is an official journal, prepared, to a certain extent, in the Imperial Ministry of the Interior, it contains a good deal of technical matter of interest, and it is curious that a large part of this refers to American work. One of the New York "skyscrapers" is illustrated and described, Mr. von Emperger's paper, read before the American Society of Civil Engineers, at Nantasket Beach, is translated, with illustrations, and several items are quoted, with due credit, from the *Electrical World*, the *Iron Age*, and other American journals; and Carson's well-known excavating apparatus is shown in a page of plates.

EVERY-DAY ITALY.—I.

TURIN, GENOA, SIENA.



In Via della Sperandie, Siena.

were nearly all of them women, of different ages and degrees of comeliness—or homeliness, to be less flattering and more exact—members of one spiritual household, from some obscure Illinois town. They were accompanied by their “pastor” and another younger man, who, for the sake of dramatic unity, I choose to believe was the superintendent of the Sunday-school; and they were “conducted” by a polyglot guide, from whom every sort of treatment drew only the same unvarying politeness expressed in labored but courtly English.

The minister was really the shepherd of his flock, and toward him all the others manifested a lamb-like trust and devotion. They accepted his pompous commonplaces as so much distilled wisdom, and laughed at his pleasantries as we have all laughed at our teachers’ thread-bare jokes at school. He was a man of forty or thereabout, well and sturdily built, like a farmer, but with the “soldier’s eye,” and the high, whining now-my-little-children voice, so common among American ministers in rural communities. He wore ill-fitting black clothes of a clerical cut, and a soft, broad-brimmed hat, in which a Sherlock Holmes would, perhaps, have recognized his prairie origin. His thick, black beard had enabled

MY first impressions of Italy proved to be rather impressions of America, for at Modane, the frontier station, I was aroused out of a sort of waking sleep, which had continued fitfully ever since we quitted Paris, by the entrance of a party of American tourists, members of some educational excursion on their way from Switzerland to Rome—“The Eternal City,” as the small but enthusiastic guide-book, with which each was provided, was happily inspired to call it. They

a shock of carrot hair, which tumbled in fine disarray from under a rakish and beribboned straw hat. He had shifting gray eyes fringed with white lashes, and a complexion of that freckled whiteness peculiar to red-headed people. His clothes were also



A Hot Day, Bologna.

black, but their sobriety was greatly tempered by a gaily-colored garment—a happy compromise between a bath-robe and an outing-shirt—which was confined at the waist by a broad sash, and at the neck by a red cord terminating in fluffy balls of green, which dangled coquettishly about under his chin. He was very nervous, eager and excitable, and rushed often from one compartment to another to ask the ladies, individually and by name, how they were getting on, or to point out to them some feature of the passing landscape.

It was curious and even pathetic to observe how closely these people clutched their own individualities, and clung to the facts of their common home life amid strange scenes and alien peoples. It was the morning after the Fourth of July, and they had all been up late the night before “celebrating”—telling the Alps their patriotism with guns and fireworks. This they did, it appeared, not for the pleasure they found in it, but as their duty as loyal Americans.



Palace in Bologna.

him to forego the necessity of a collar, and for further comfort and protection he had tucked a black silk handkerchief about his neck. So attired, he presented an altogether funereal aspect in great contrast to his more youthful companion. Him Nature had provided with



In the Piazza San Martino, Bologna.

They relieved the monotony of the early morning hours by singing Gospel Hymns and discussing mooted points in the Old Testament, which had been raised, perhaps, in some past prayer-meeting. They gossiped about their friends and neighbors as interestedly and

familiarly as though they still sat about one another's tea-tables, and in all ways renewed and treasured up the memory of their far-off prairie home. They were by no means indifferent to their surroundings, notwithstanding, nor to the wonderful scenery through



Palazzo Zatti, Ferrara.

again into their journals, or to embody in letters to their friends at home. After the first hour or so of this exercise I fancied it was pursued with a more and more flagging interest, somewhat in the spirit of a man who continues to eat after he has satisfied his hunger, solely because the meal has been paid for. They had paid for their "culture" in advance, and seemed resolved to get the worth of their money.

Thus it happens that my early memories of Italy are so mixed with others alien to them. The pictorial Alps, the world-old cities clinging to their sides and resting in their valleys, the brown beauty of the people with their passionate eyes, their gay costumes and the soft accents of their speech are mingled in my mind with visions of the far, bleak prairie, where houses, like lost things, huddle together into villages for warmth and comfort; of gaunt meeting-houses and grim black-coated elders with high, nasal voices; of pale, patient women's faces and meekly folded hands.

I do not know how Turin seems to others, or how it would appear to me to go back to it again, but the impression I retain is of a toy city—a Noah's-ark sort of a place, where the buildings seem cut out of cardboard with the windows painted on, and one is afraid of leaning against a tree for fear of knocking it over. The people, somehow, only intensified the notion. They seemed like *marionettes*, uncommonly supple in the joints. The palace gates would open amid a blare of trumpets, and a band of red and blue soldiers march out with a clock-work regularity of movement, and disappear under some archway, just as they used to in the mechanical toy village I once saw exhibited when a boy; and in the band which played at evening in the palace yard I heard again, in imagination, the squeaking hand-organ which accompanied the performance.

Turin is really a very pompous, formal, architecturally correct little town, situated in the midst of a great plain, with wide wind-swept streets and squares in which there never seem enough people. The only thing that impressed me with a sense of something living was that which had been dead the longest—the old Castello, in the very heart of the city, with its red brick mediæval towers rising out of the dark-green foliage at their base, and hundreds of birds circling about their summits.

In Genoa, first, I found the Italy of my dreams—the sumptuous churches, the marble palaces, the houses climbing one above another in picturesque confusion; the thronged streets and squares, gay with color and alive with movement and, all about, the vine-clad hills, villa-crowned. No other city in Italy, not even Venice, rivals Genoa

in picturesqueness, for she has the double charm of the hills and of the sea, and it is difficult to declare which is finer, the view from the heights looking seaward, or of the city and mountains from the harbor. Fresh from New York and Chicago, I was not prepared to



A Hill-top in Genoa.

find in old Italy anything that would add to my sense of the merely precipitous in architecture, but in Genoa the buildings, though not really so, appear higher than our own skyscrapers. This is partly owing to the fact that the streets are so narrow (defiles, at the bottom of which one wanders in semi-darkness with only a ribbon of blue sky far above), but more because so many of the houses start from eminences whose presence is concealed by the other buildings about their bases.

Thus they mount upward in great steps like some colossal staircase. The vertical dimension is everywhere enormously exaggerated, like those maps surveyors sometimes make, in which the horizontal measurements are drawn to one scale and the vertical to a greater.

I used to wander for hours among the narrow, crooked streets, where the sunshine never penetrates and the air is never pure. It did not seem as though human beings could live in them, but I found them always fairly swarming with life. Merely to traverse some of these streets requires a good strong stomach, and is as perilous a business, in a certain way, as crossing the Channel in stormy weather, they are so reeking with the sickening smell peculiar to the Italian poor. The very worst are those adjoining the quays. The only scenes of drunkenness and violence I saw in Italy I witnessed there, where sailors of all nations, fresh from the confinement of long voyages, come to let their devils loose with drink.

The churches of Genoa are very numerous and beautiful. They especially abound in the poorer quarter of the city, where they form

a grateful refuge from all the filth and sordidness without. I remember one Sunday morning I found myself in a little square, one side of which was bounded by an ancient church, into which people were passing. I entered with them, for a "Baedekerite" in Italy would no more think of letting a church go unvisited than an Irishman would pass a horse-shoe on the road. The moment the heavy curtain fell behind me I was in another world. The garish daylight was supplemented by a rich, religious gloom. Columns of noble proportions rose at intervals to support the painted and vaulted ceiling; a multitude of candles caught the light on golden altars, and



Palazzo Spinola, Genoa.

held the vision captive in an hypnotic thrall; robed priests moved stealthily about among the hushed and humble worshippers; the odor of incense hung heavily in the air, and from some unseen recesses there trembled forth the music of organ and violin, and well-trained human voices blended together in some grand, suave, world-old measure of praise to the Most High.

The palaces of Genoa are distinct in type from those of other

Italian cities, though this statement is perhaps no less true of any other of the larger towns, for in each of them the buildings have features peculiar to that place alone. In Siena, for example, nearly every palace is crowned with a lovely arcaded open loggia (or was, for most of them have been bricked up). Bologna and Ferrara are remarkable for their ample and exquisite arcaded courts, and in Venice the feature most insisted upon is, of course, the balcony overlooking the canal. Perhaps the most characteristic thing about the Genoese palaces is the stairway, which there assumes such a size and importance as to constrict the court and dictate the whole interior arrangement. Another peculiarity is found in the loggias which flank each end of the façade of some of the larger palaces. They not only impart to the front a charm and distinction, but they must have been delightful as places of resort as well.

One of the most curious things about the buildings of Genoa is their painted and decorated exteriors. In no city is it more universal, though in Vicenza, Verona, and elsewhere I have seen it carried to greater lengths. The idea seems to be "Architecture or bust," and if the sculptured article is too expensive, paint is made to take its place, and columns and entablatures, door and window casings are painted on with as great a simulation of reality as is possible—which is not much. It is needless to say that the deception never deceives, yet the artist, with sublime confidence in his powers and myopia in the beholder, hesitates at nothing. He paints false windows just beside real ones, balconies where none could possibly be, and sometimes figures, in sentimental attitudes, upon them. In Verona the entrance arches to many of the palaces are so many theatrical prosceniums, framing just such chalky and ochreous landscapes, endless colonnades and impossible stairways as still adorn our drop curtains in America.

In summer half Genoa goes bathing in the sea, while the other half looks on from the Mura del Malo far above them. There I saw how the Genoese babies are washed: Pater, in a bathing-suit, enters

the water with the naked child, and swashes it up and down there, unmindful of its frantic cries until it is soaked as a sponge. Mater, standing on the beach with a clean, dry sheet, receives it, and the nurse disappears with the agitated bundle.

The policemen in Genoa, as in some other of the north Italian towns, are costumed so as to present very much the appearance of the polished villain of conventional melodrama, who so ruthlessly pursues white-robed and long-haired virtue in the person of the village beauty, until foiled in the fifth act by the noble rustic lover. Their uniform consists of a long black frock coat, black trousers, a "stove-pipe" hat and white gloves. They carry in place of a club or side-arm a long silver-topped cane or baton, and the only thing that betrays their office is a numbered badge and some too-brilliant buttons. I often wondered what had become of all those old stage scoundrels in these days of Ibsenism, the New Woman, and Frohman's Chocolate Caramel Comedy Company. Now I know, and my artistic sense is satisfied. What fitter end than that these former breakers-of-the-law should now uphold it. They seemed to have lost little of their ancient elegance and romantic charm, and if they continue to engage in the chase of the festive village maiden, I am sure that the rustic lover is not as uniformly successful as we have been taught to believe.

It took me a long time to become accustomed to the dramatic vehemence of the Italians. For the first few days especially, I seemed always to be witnessing some quarrel which might even lead to a tragic close. I would see two men talking and gesticulating wildly, ready at any moment, it seemed to me, to spring at one another's throat. Then suddenly they would enter a carriage and drive off together, leaving me to surmise the simple truth, that one had merely asked the other if there was room for him in the carriage and had received an affirmative reply. My first experiences in the restaurants were little short of exciting. I very soon learned that when I was told to "seize an oar" I was not to take it literally, as it was only their way of saying "Yes, sir," but I never got very much farther than that towards understanding what was said to me. I soon learned the names of things, and would order the dish I wanted in bad Italian or American-bill-of-fare French. The waiter would shrug his shoulders, make a few passes with his hands, such as a conjurer does before he takes a rabbit out of your hat, and at the

same time pour forth a flood of Italian of which I could understand but little, but from which I gathered, in a general sort of a way, that the particular dish I wanted it was impossible to procure, because the cook had cut his throat and was that moment being transported to the hospital, or that he was sorry to inform me that the macaroni crop had been ruined the night before by the frost. Then he would disappear as suddenly as though shot through a trap-door, and in the course of half an hour or so (they take their time in Italy) would return with the very dish I had ordered, and deposit it before me with "Behold me; it is here!"

The Italians love these battles in the air. Their trade is always a kind of warfare. I have seen a man and woman altercation for half an hour about the price to be paid for one shrivelled little eel, chopped up into fragments, bringing into play in so doing enough of eloquent gesture and dramatic diction to have equipped the whole Lyceum School of Acting for a year.

In Pisa, I had only time for the "four-fabrics" and a glass of beer afterwards at Pietromani's, beside the yellow Arno, with all youthful Pisa parading up and down the Lungarno before me, making love in the warm summer twilight.

Of the matchless group of buildings on the Piazza del Duomo, much as I admire them, I can say nothing that is not trite, but I may permit myself a word about the echo in the Baptistery. It is the most beautiful echo in the world. When a note is sung, the whole building seems to vibrate with it like some vast instrument. It comes back enforced with all the harmonics necessary to make a perfect chord, and as the fundamental dies away these mount upward, higher and higher, liquid, clear, like bubbles in a spring. One never tires of evoking this rich, strange voice from nowhere. It made me realize, as nothing else has done, the close parallel which exists between music and architecture. I remember seeing somewhere—perhaps in Gwilt's "Encyclopædia of Architecture," a drawing showing the simple yet elaborate system of circles and tri-

angles which are said to have determined the proportions of this Baptistery, and I believe that the echo is so beautiful because the building itself is everywhere of musical proportions, and its intervals of space are somehow converted into corresponding intervals of tone.

Siena was to me the most fascinating of all the Italian cities I visited, and if my ready money had not

run so low, and I had not had an unused "circular ticket," I believe I would have remained all summer and, perhaps, been there yet.

Seen from my window in the Palazzo Bandini, the town spread out in two directions like the arms of a fan, with the church of San Francesco at one apex and San Spirito at the other. The wide interval between was green with orchards and gardens, planted where once were busy streets, ploughed under after the great plague of 1348. In the middle distance the old city wall with its ruined towers climbed up and down the gentle slopes, just as so many of the pictures show it. Beyond, stretched fifty miles of Tuscan hills, a playground for the flying shadows of clouds. In the early morning the whole was enveloped in pearl-gray mist, out of which the sun rose grandly, tossing aside the vapors like the curtains of a bed, and leaving revealed the landscape, fresh as a still damp water-color. The morning merged into a burning noon, in which the brown roofs and salmon-colored walls shimmered with intense heat, and the foliage where the sunshine struck it took on hues of molten bronze. The evening was the Indian summer of each day-long year—still, pensive, yet serene. Far distant windows on the hills blazed like jewels with light caught from the horizontal sun, and then went out, one by one, as the valleys drew veil after veil of darkness over them. The church bells throbbed out their two sweet notes of joyful invitation; the blare of a bugle from the garrison mellowed and sweetened by distance and robbed of its warlike quality, mingled with the fresh laughter and shrill cries of romping children.

Nor was there any lack of "human interest" in the prospect, seen at any hour of the day. In the cool morning the gardeners came and watered their green beds and trimmed their plants. As day advanced, troops of naked boys disported themselves in and out of an embowered pool of water which may once have formed part of the system of fountains of the palace garden. Sunlight and the shadows of leaves dancing together on their brown young bodies made an Arcadia of the place, and it would not much have surprised me to



Via Carlo Alberti, Genoa.

have seen goat-footed Pan piping beside the stream, or fleet and shy Diana and her nymphs hastening to cover. At evening, when the shadows stretched half way to the city wall, men, women and young girls came out upon the noble palace terrace and talked and laughed, and made love, no doubt, till long into the night. I used to watch and listen at my window till nothing more was visible but the glowing points of the gentlemen's cigars, then I would go to bed and be lulled to sleep by their sweet, vehement Italian speech and gentle, liquid laughter.

This was very fine, but it was not, after all, Siena. Siena lay on the other side of my palace. Here there were no green fields, nor spacious terraces, but constricted, tortuous, stone-paved streets, plunging up hill and down, and lined on both sides with old buildings so high and narrow, and so crowded close together that it seemed as though their horizontal development must have been arrested by such close proximity, and that they had climbed upward from sheer necessity of expansion.

Rome, for all her antiquity, seems a modern city; Florence, also, in a less degree; Venice lies in mid-stream of sensation-seeking travellers, but Siena, when her day had past, was allowed to sleep in peace. Tourists, except the more adventurous, do not visit her, for she is away from the main arteries of travel and out of the course of circular tickets. Her shops are not vulgarized by displays of cheap jewelry and articles *de voyage*, nor her inhabitants corrupted by the lust for unearned and suddenly acquired wealth which travel inspires and ministers to. There is hardly a building that does not look at least three hundred years old, and one may wander forth at evening when the clamorous voice of trade is hushed and gloom conceals obtrusive details, and forget the insistent present, and live again in the glorious *cinquecento* past.

Siena is rich in treasures of art. Her cathedral is one jewel-casket—itsself a jewel. The unfinished Opera del Duomo, beautiful in itself, possesses the still added interest which ruin and a sad, true story impart. In the Library, Time has held its hand, and the frescoed walls are hardly less fresh than when Pinturicchio laid aside his brushes. I might go on and enumerate all the fine churches, palaces and pictures, of which the city is full, but my knowledge is not yet great enough nor my pen adequate for such a task. I will present, instead, two images, oddly dissimilar, of some people who meet for the first time in the strange company I carry in my head. One was a little brown-frocked, barefooted monk, who resembled Francis Wilson even to his gay manner and cracked voice, and the other a troupe of acrobats who performed each evening in the marketplace; two sorry clowns, a man with a cornet and another with a drum, and a painted woman dressed in tights, who performed with great caution on a tight-wire near the ground, and afterward collected pennies from the audience, moving about among the people with a swift and panther-like tread.

For some reason the memory of these people always rises first whenever I think of Siena, and so I have put them on this page, where, robbed of their background and detached from the mood in which I saw them, they must seem singularly out of place.

CLAUDE FAYETTE BRAGDON.

[To be continued.]

THE SUPPLY OF SEA-WATER TO LONDON.¹

THE scheme I am about to lay before you is, in one sense, not a new one, inasmuch as an Act of Parliament was passed a few years ago, incorporating a Company for the Supply of Sea-water to London. Satisfactory arrangements having been made with all the local authorities and other bodies affected, the Act was passed as an unopposed measure, the scheme being viewed with favor by the said bodies. The powers granted by that Act were, however, allowed to lapse, in consequence of the great demands which were made by parishes, hotels, householders, and others for the supply of sea-water for public and private purposes, convincing the directors that their plans had been laid on too small a scale, the authorized capital being insufficient to meet the requirements certain to arise. That Act contemplated the supply of about one million and a quarter gallons per day, whereas the present intention is to supply nine or ten million gallons per day; and the area in London to be dealt with now is much larger than that originally contemplated. In the sense that no inland town has yet been furnished with a supply of sea-water, this is an entirely new scheme; and I propose showing that it is thoroughly feasible, at a reasonable cost, and that it will confer a great benefit on London as a town, and on Londoners as individuals.

General Description.—On reference to the diagram, it will be seen that the intake from the sea is opposite Lancing, between Brighton and Worthing; it is placed at a considerable distance to the seaward of high-water mark—almost at low-water level—and can, therefore, admit the sea at nearly all states of the tide, which has there, at spring tides, a range of about 20 feet. That spot has been selected for the position of the intake, as the sea there is remarkably free from contamination of sewage or other pollution.

The sea-water will first be pumped into the reservoir or settling-tank at Lancing, the bottom of which is about 10 feet below high water; this reservoir will have a capacity of 10,000,000 gallons. The water is thence forced to a reservoir situated near the summit of Steyning Round-hill. The pumps and machinery are all situated

alongside the reservoir at Lancing. This is, therefore, the only pumping-station in the whole system; it adjoins the railway, and is provided with its own sidings for coal, etc. The Steyning reservoir will be situated nearly 500 feet above high-water level, and will have a capacity of 10,000,000 gallons. The sea-water will flow thence, by gravitation, to a third reservoir, at Epsom, over 200 feet above high-water level; this, also, will have a capacity of 10,000,000 gallons. From this reservoir the sea-water will flow, by gravitation, to London, where it can be delivered under the pressure due to this head, which is greater than that which most of the water-companies command. The sea-water will be conveyed in mains the whole distance, and as there will be two days' supply in the Steyning and Epsom reservoirs together, the mains will be always full. It is a practical impossibility that they should ever be frozen.

It will be seen that the route of the mains is through Lancing, Bramber, Steyning, West Grinstead, Horsham, Capel, Dorking, Mickleham, Leatherhead and Ashstead, to the reservoir at Epsom; thence through Ewell, Cheam, Morden, Sutton, Merton, Wimbledon, Mitcham, Tooting-Graveney, Streatham and Clapham, to Battersea, where a branch main runs off for supplying that locality. Crossing the Thames at Battersea, the mains pass through Chelsea, Kensington, Paddington, Belgravia, etc., and ultimately to Victoria Park. Any of the places *en route* can be supplied.

On reference to the plan showing the position of the mains in London, it will be seen that the mains form two complete circuits. The westerly circuit traverses Kensington, Paddington and Belgravia; the mains passing along Cromwell Road, Warwick Gardens, Addison Road, Uxbridge Road, Ladbroke Road, Pembridge Square, Bayswater Road, Stanhope Street, Connaught Street, Park Lane, Grosvenor Crescent, Belgrave Square, Port Street and Brompton Road. There will be a branch main up Queen's Gate to Kensington Gore. The easterly circuit comprises Mayfair, Oxford Street and the Strand districts; the mains passing along Park Street, Wigmore Street, Mortimer Street, Charlotte Street, Bedford Square, Russell Square, Southampton Row, Theobald's Road, King's Road, Farringdon Road and Street, Victoria Embankment, Northumberland Avenue, Pall Mall, St. James's Street, Piccadilly, Berkeley Street and Square, Mount Street and Park Lane. From the eastern side of this circuit, starting from Farringdon Street, there will be a main passing along the Barbican, Curtain Road, etc., to Bethnal-green Road, terminating near the gates of Victoria Park. And from the southern line of this circuit, starting from Charing Cross, there will be a main passing along Whitehall and Parliament Street to Abingdon Street, terminating at the end of Great College Street.

From these various mains, service-pipes will be laid to the adjacent houses and other buildings as required, and hydrants will be provided in the streets for the supply of water-carts, etc.

Municipal Purposes.—The first place to make habitual use of sea-water was Ryde, more than forty years ago. Tynemouth was the next in 1872. Barrow-in-Furness, Birkenhead, Blackpool, Bootle, Bournemouth, Falmouth, Great Yarmouth, Grimsby, Gosport, Harwich, Littlehampton, Plymouth, Portsmouth, Shoreham, South Shields, Torquay, Weymouth and other places, have since followed those examples. It is found that once watering with sea-water is equal in efficiency to twice or even thrice watering with fresh water. Evidence of this fact would have been given to the Parliamentary Committees on the former Bill by the surveyors of some of the places named, had the Bill not passed unopposed through both Houses. Sea-water keeps the road-surface moist for a long time, but without slush. It hardens and binds macadam roads, and forms a preservative crust which prevents dust from rising. It is the one thing needed to make wood-paving perfect, as, by retarding decomposition of the street refuse, it will effectually prevent the annoyance of any smell arising therefrom, of which annoyance public complaint has occasionally been made; as wood-paving is fast displacing granite and macadam, this is a feature of considerable practical importance. The proportion of salts in sea-water is about 3½ per cent, or, more exactly, 36½ parts per 1,000. Of these, nearly 30 parts are chloride of sodium, or common salt, and about 3½ parts are chloride of magnesium; it is owing chiefly to the deliquescence of these salts that the roads remain sufficiently moist for so long. A ton of sea-water contains about 220 gallons, from which are deposited 80 pounds' weight of salts. A water-cart will spread a ton of water over a surface of from 1,900 to 2,000 square yards.

The cost of sea-water for street-watering in London will be, most probably, less than that of fresh water; but were it even the same, the advantage and economy of sea-water would still be great, because—(1) the quantity used would not exceed half; (2) the cost of distribution, horse wear, etc., would be correspondingly reduced; and (3) the roads would last longer in sound condition, and cost less to repair. This is the recorded experience of the places already named. In the hottest weather, when water is most required, there is now too often a difficulty in getting sufficient water for the streets, whereas the sea could never run short.

The use of sea-water for flushing sewers is found to be decidedly beneficial; decomposition is retarded, and the sewers are kept cleaner and become more wholesome when sea-salt is present in them. The borough surveyor of Great Yarmouth, for instance, stated that from his experience the advantage of being able to flush the sewers with sea-water was alone worth the whole cost of the works for the supply of sea-water for all purposes. His experience is that the effect of flushing with salt water has been to thoroughly

¹ A paper read by Frank W. Grierson at the Society of Arts and published in the *Journal* of that Society.

cleanse the sewers, and that no nuisance from its use has been created, whilst owing to its greater specific gravity he considers it more valuable as a flushing agent. Its effect in the Yarmouth sewers has been to reduce, and, in fact, almost entirely to prevent the generation and accumulation of sewer-gas. Sewers which could not be entered by the sewer-men until the man-hole covers had been opened several hours can now be entered by them, and have been entered, without any inconvenience, immediately on the removal of the man-hole cover.

As nearly as can be ascertained, about 40,000,000 gallons of fresh water are now daily consumed in London for non-domestic purposes. This water has been filtered for drinking, but it is nearly all consumed in requirements which might be better satisfied by the use of sea-water.

Sea-water will be available for use in extinguishing fires. It will be on constant service under good pressure, and can be obtained from the hydrants at any time in abundant quantity. There will be no hunting for turncocks, or having idly to watch a fire progress, owing to insufficient supply or absence of necessary pressure.

Public parks, such as Battersea and Victoria, could be supplied with salt-water bathing lakes, and swimming therein would offer a greater attraction than swimming in fresh water.

Public baths, which are fast increasing in number, will also be supplied with sea-water. The fact that it is considerably easier to learn to swim in salt water than in fresh will, no doubt, make these institutions still more popular.

Within the last fortnight over 300 members of those London Vestries through whose jurisdiction the mains will pass have communicated to me their assent—in many cases a very emphatic assent—to the opinion that a supply of sea-water to London would be of beneficial use for municipal purposes.

Hospitals, Schools, etc.—There is a general consensus of medical opinion as to the value of sea-water to health. Medical evidence of the highest importance was laid before a Parliamentary Committee on a previous occasion as to the great benefit a large supply of sea-water would be in connection with hygienic work, and as to the desire of the hospitals for the establishment of sea-water baths in connection with their practice. More than a hundred physicians and medical officers of health testified their approval of that project, as being of the first importance from a medical point-of-view. "It is impossible, as a matter of fact, ever to imitate the composition of sea-water by putting into the water any salts; we may know its composition exactly, but we cannot make it." Although the residue of sea-water may be collected and dissolved in water, the resulting liquid is not sea-water, but only salt water, for the reason that a great many of those substances which are held in solution in the sea never become soluble again after they have once been precipitated. It will be easy to supply most of the hospitals of London with sea-water—always available and abundant in quantity—at the same cost as fresh water, or even less. Every Board or other school in the neighborhood of the sea-water mains will be able to have its own swimming bath, and many thousands of London school-children thus greatly benefited in health, and even taught to swim.

From many leading members of the medical profession, I have quite recently received the expression of their assent to the opinion that a supply of sea-water to London would be of beneficial use for both public and private purposes.

Hotels and Residences.—During the passage of the former Bill through Parliament, the demands of hotel proprietors and householders for sea-water were so numerous, that it is pretty certain it will not be long after sea-water is obtainable before a good house not so supplied will be an exception.

Saving of Fresh Water.—It will be remembered that a Royal Commission has recently reported on the present supply of fresh water to London, in view of its probable inadequacy in a comparatively short time. The present consumption is 200,000,000 gallons a day, of which, as nearly as can be ascertained, about 160,000,000 gallons are used for domestic purposes, and 40,000,000 gallons for municipal and other purposes; that is, 20 per cent of the total supply is consumed for non-domestic requirements. Nearly the whole of this 20 per cent might, with great advantage both as to economy and efficiency, be satisfied by the use of sea-water, thus releasing or providing 40,000,000 gallons of fresh water a day for household purposes, and so practically increasing the present supply to that extent. This is equal to an increase of 25 per cent, without any extension of fresh water-works or further drawing on the present sources. This fact, apart from other considerations, affords a weighty reason for the speedy realization of the present project, and its extension to the whole of London.

The Royal Commissioners reported that by extensions of the present works, and by further drawing on the Thames and Lea, the existing sources might be made to supply 420,000,000 gallons a day, and so be adequate for the wants of London for another thirty-six years; taking the then population at 11,250,000, and the consumption at thirty-five gallons per head, London would then require not less than 385,000,000 gallons a day. From the foregoing considerations, it follows that if sea-water were used for all municipal and public purposes, and fresh water only for household requirements other than baths, the existing sources of supply would remain adequate for a population of 15,000,000, which London cannot reach till 1950, supposing the rate of increase to remain the same as from 1881 to 1891.

Fresh water is now supplied for public purposes at an average price of about 9d. per 1,000 gallons. Sea-water could well be supplied at a less price for such purposes; but taking into consideration the greater efficiency of sea-water for street-watering, etc., as before pointed out, the saving, even at the same price, would most probably amount to one-quarter or even one-third of the present cost to the ratepayers.

Cost and Time.—The cost of the complete carrying out of this project will be £450,000. Sea-water will be supplied by metre for public purposes, hospitals, schools, etc., at a price not exceeding the present charge for fresh water, and it is intended to supply householders also by metre at a price which will be only a fraction of the present cost of fresh water.

The construction of the works could be completed in about two years, so that if the Bill which has been deposited is allowed to pass with only those moderate protective clauses which the promoters will willingly accord, thereby averting the necessity of going before a committee on opposed Bills, the Royal assent will in all probability be obtained in June, or possibly before that month, in which case large numbers of Londoners will, in the summer of 1898, be able to enjoy the luxury of a daily bath of real sea-water in their own homes.

Experience.—It only remains for me to lay before you the experience gained as to the effect of the use of sea-water for public purposes in the chief places where it has been so used. The following information, compiled from authoritative statements, sums up the experience of several years. It will be seen therefrom that the testimony in favor of the use of sea-water for street-watering is practically unanimous, Hastings being the only case not absolutely and strongly favorable, and also that there is a vast preponderance of experience in favor of its use for flushing sewers, etc. The information given with the date 1887 was obtained by the Borough Surveyor, of Ipswich, from the surveyors of the towns named, with a view to the installation of a sea-water supply in that town, but owing to the existence of an exclusive clause in the Act of the Water-works Company which supplies Ipswich, it was found impossible to carry out the scheme. The surveyor has, however, kindly given me permission to make the information public. The information given with the date 1891 was obtained by the Borough Engineer, of South Shields, from the medical officers and surveyors of the places named, and a sea-water supply has since been established in that town. The information given with the date 1895 was communicated to me last month by the engineers and surveyors of the towns named, and I desire to take this opportunity of thanking the municipal officers who have so kindly favored me.

EFFECT OF THE USE OF SEA-WATER FOR PUBLIC PURPOSES.

Barrow-in-Furness (Used for street-watering).—I am greatly in favor of a sea-water supply. It occurred to me when I first began to use sea-water for street-watering that it might have in time a prejudicial effect on the macadam. I, therefore, selected two lengths of the same street, and had one watered with sea-water and the other with fresh water, and found after an extended trial that the sea-water had no such effect, while for keeping down dust it is immensely superior to fresh water. Sea-water cakes the surface of the road, which remains damp much longer; it binds the top layer of stone, and improves the condition of the road in summer to a marked extent. One thousand gallons of salt water equal in efficiency for street-watering 2,000 to 3,000 gallons of fresh. The scheme will be much extended. (1895.)

Berwick, Places near (Used for street-watering).—Salt water is very effective on roads made or repaired with flint or granite. It has a binding tendency, and causes a skin of adhesive matter to form on the roadway. One-third the quantity of salt water on wood will keep it in a more moist state than fresh water will, with no injurious effects. No complaints of salt water affecting the stock of any shopkeepers, and no offensive decay of street refuse caused. All parties having control of street-watering should use salt water where it can be had, from an entirely economical point-of-view, as well as for the comfort of the inhabitants. One cart of salt water is, in my opinion, equal to two carts of fresh water, giving a more lasting and beneficial result. Our macadamized roads that are watered with salt water are a pleasure to drive upon in the summer season, in comparison to those watered with fresh water, as we never seem to have a loose stone upon them. (1887.)

Birkenhead (Used for street-watering).—Salt water does not injure granite roads. No offensive decay of street refuse is caused. Its use is economical, inasmuch as one spread of salt water is equal to, at least, three spreads of fresh water. (1887.) It is found that sea-water is effective for a longer period than fresh water. (1895.)

Blackpool (Used for street-watering and sewer-flushing).—We use salt water for street-watering and flushing sewers, in fact, for a great many purposes. (1887.) Streets watered with salt water do not require to be watered as frequently as with fresh water. (1895.)

Boole (Used for street-watering, sewer-flushing and public baths).—Find it more economical as to cost than fresh water, and for several purposes it is decidedly better. (1895.)

Bournemouth (Used for street-watering and sewer-flushing).—No objections arise to the use of sea-water, no nuisance is caused by the admixture of sea-water with sewage. For flushing sewers it is quite as good as fresh water, if used in sufficient quantity. It is much more

effectual than fresh water for watering roads, one application of salt water being equivalent to three of fresh. The use of sea-water on a hard road exposed to the sun or wind causes a sort of glazed condition of the surface. It is in favor with the shopkeepers and public generally; no disagreeable smell is caused, and no complaints are received. (1891.) There is no doubt that considerable economy is effected in its use for road-watering; no injurious effect. It leaves a partially glazed surface on the roads, which is a great advantage in summer, because it binds and prevents the dust from blowing about; humidity is also maintained. The cost of road-watering is reduced at least 50 per cent. All our streets are watered with salt water. Every dead end of the sewers is connected with the salt-water mains, so arranged that any sewer can be flushed by simply turning a sluice valve. All our public urinals are supplied with salt water. (1895.)

Coatham (Used for street-watering and sewer-flushing). — We have had our salt-water works in use since 1877 for street-watering, flushing sewers and urinals. With regard to street-watering we find it far superior to fresh water, but in respect to urinals and sewer-flushing we cannot say it is superior to fresh water, and it is used for this purpose on the score of economy. (1895.)

Falmouth (Used for street-watering). — Our streets are all macadamized; I have observed that the salt water hardens the surface of the roads, and keeps the stones from rising. There is economy in the use of salt water, it will keep damp much longer, the roads will not require watering the third day, after being watered two days in succession. No objection to its use for flushing purposes. (1887.) Pure sea-water has many advantages over fresh water, and is much to be preferred. It has the effect of causing an incrustation of the road surface, thus preventing wear and tear, and also reducing the quantity of dust. It also keeps damp for a much longer period than fresh water, therefore a less quantity will do, thereby effecting a considerable saving in team labor. Carts are filled from hydrants from point to point. (1895.)

Fleetwood (Used for street-watering and public slaughter-houses). — The water we use is raised out of a well into a large tank, which contains a large quantity of salt; the well is in close proximity to the bed of the river or sea, and I consider it very effectual. (1887.) Salt water, such as ours, is much better for street-watering than fresh water, for various reasons; at times when dust is most troublesome in the streets — it is shortly before the rain begins to fall — the salt on the surface of streets becomes quite damp, and so prevents a large amount of dust being blown into the shops where doors cannot be closed against customers. (1895.)

Gosport and Alverstoke (Used for street-watering and flushing purposes). — Sea-water has been used here in an irregular kind of manner for years past. Last season salt water was used exclusively for road-watering and flushing purposes, with the very best possible results. It gave satisfaction to the inhabitants generally. When fresh water is used, our roads require watering nothing less than twice and sometimes three times each day, but with salt water once each day is sufficient. No complaints from tradespeople as to the tarnishing of metal goods, or of its being a destructive agent to boot leather or goods exposed for sale outside shops. Horse-keepers have great faith in salt water for keeping the legs of their cattle in good condition. In consequence of its antiseptic properties I much prefer it. (1895.)

Great Yarmouth (Used for street-watering and sewer-flushing). — For seven years a flint and gravel road was watered with salt water. The road was about two miles in length, and, when watered with salt water, cost £70 a year less than it did with fresh water, and the road has never been in so good a state of repair. For three years five miles of gravel and flint road have, as an experiment, been watered with salt water, and the expenses of keeping this class of road are found to be quite 30 per cent less than with fresh water. Thirty miles of these roads and five miles of granite roads are now watered with salt water. If salt water does a granite road no good, it certainly does it no harm. The sea-water appears to gum the dust down on the road, and this must be got off in the early autumn. No bad result has been observed on a wood-paved street. The supposition that delicate articles exposed for sale are injuriously affected is a piece of "bosh" and a scarecrow. The town is now much more free from dust, and that has pleased the shopkeepers, who, one and all, would vote for salt water in preference to fresh. Street refuse does not become so offensive with sea-water as with fresh water. The saving in road material and repairs, and in the cost of water distribution is very great, in consequence of the less quantity required, and the roads are much better watered. By flushing, the sewers can be kept quite clean, which is worth the cost of the whole job. (1887.) I know of no objection to the use of sea-water for flushing sewers, watering streets or for the supply of private houses. The admixture of sea-water with sewage certainly does not cause any nuisance. The generosity with which the water is used jams more sewer-gas out of the sewers, but does not create it. Sea-water is quite as efficient as fresh water, and is, sanitarially, superior; its chlorine and ozone purify the sewers. The Water Company are the only people who do not like it. (1891.) On light gravel roads sea-water does good, and saves 25 per cent in repairs; on granite macadam roads with heavy traffic it does no harm. In watering, one load of sea-water goes as far as three loads of fresh water. (1895.)

Grimsby (Used for street-watering and sanitary purposes). — The

use of salt water for watering roads repaired with granite has not in any way deteriorated them. During the last three seasons salt water has been used on the roads. I have not had a single complaint from any shopkeeper of damage caused to any goods exposed in shops; on the contrary, I have on several occasions heard tradesmen say that since salt water was adopted they have saved greatly through the absence of dust. I have never noticed that its use occasions any offensive decay of refuse, but I believe that the salt in the water would more tend to preserve refuse. Its use is decidedly most economical, as one load of salt water will last twice as long as one of fresh, and when it has dried, it leaves a thin crust of salt on the surface, which binds the dust and prevents its rising. (1887.) We have recently had a salt-water supply laid down for sanitary purposes. (1895.)

Harwich (Used for street-watering and sewer-flushing). — After a short time a crust is formed on the surface, which effectually prevents dust from rising, even when the road is apparently dry, but when rain comes after a long spell of dry weather, this crust is turned into a viscid mud which is not very desirable. No complaints from tradesmen or others as to bad effect on delicate articles exposed for sale. It does not occasion any offensive decay of street refuse. It is both economical and efficient, one load of sea-water doing as much good as two loads of fresh. (1887.) I have used sea-water for these purposes for some fifteen years, and certainly prefer it to fresh water; particularly for street-watering. (1895.)

Hastings (Used for street-watering and sewer-flushing). — No injurious effects on roads repaired with flint, gravel or broken granite. Have never heard complaints as to effect of salt water on delicate articles exposed in shops. Its use does not occasion any offensive decay of street refuse; is economical and efficient. Salt water has been supplied to private and public baths, schools, hotels, etc., for some time here, and is very satisfactory, both as regards efficiency and economy. (1887.) Sea-water is quite as efficient as fresh for removing sewage matter. The objections to flushing sewers and urinals with salt water are considerable. I consider the use of salt water for any of the above purposes is, from a sanitary point-of-view, undesirable. The use of salt water for street-watering and supplying private houses is decidedly objected to by the public. The outcome of the experiments was that in the long run 200 gallons of sea-water were proved to keep down as much dust as it would require 300 gallons of fresh water to do, but the drawbacks in every other respect are so great that if a town has plenty of fresh water, I should say decidedly not to use sea-water. I am decidedly of opinion that there is no saving, and a very considerable number of objections to it. (1891.) In practice it has been found that sea-water is more efficacious in laying the dust than fresh water, but that the damage done to macadam roads by salt is very considerable. The general opinion expressed was decidedly adverse to the use of salt water for street-watering. For sewer-flushing sea-water is equally good as, and perhaps, where the gradients are good, better than, fresh water. The Corporation decided a few months ago to entirely discontinue the use of sea-water, in consequence of having thrown on their hands surface-water reservoirs of the capacity of 41,000,000 gallons, and they are now using the water in these reservoirs for watering and flushing purposes. (Note. — This is the only unfavorable opinion.) (1895.)

Ilfracombe (Used for street-watering and sewer-flushing). — There is not the least doubt that it greatly assists to keep the surface of the street free from dust when used for the purpose of street-watering; it is especially useful on level roads, or those with slight gradients; it is inclined to make steep gradients slippery when used on them. It is also most efficient for sewer-flushing. The only place we can get it without laying down special plant is at the baths; the terms and difficulty of being able to get it when required led to its being abandoned. (1895.)

Littlehampton (Used for street-watering). — The scheme was carried out here eight years ago, and has, up to the present, answered its purpose very well. The advantages of employing sea-water instead of fresh water for road-watering purposes are two-fold; one load of the former equals nearly two of the latter, and there comes a great saving of the public water-supply, generally at a time when there is the greatest demand for it. I have, however, experienced this one disadvantage: late in the autumn, when thoroughfares are generally damp, the latent saline properties of the sea-water on the macadamized road surfaces show themselves in the form of a slime on the road surfaces, but a few good scouring rains, as a rule, remove it in time. (1895.)

Londonderry (Used for street-watering). — In my opinion it is preferable to using the city water-supply. I have never heard of any complaints of damage to goods, nor carriage owners, nor in any other form through use of salt water. (1888.) Find it much superior, both for street-watering effect and as regards economy. (1896.)

Plymouth (Used for street-watering). — We use salt water indiscriminately on all macadam roads. Every one likes it. It forms an incrustation on the road, which preserves the face and retains the moisture. One load of salt water goes farther than two of fresh. Never heard any complaint as to effect on delicate articles exposed in shops. It does not occasion any offensive decay of street refuse, as it is a disinfectant. (1887.) It is used very considerably during the very dry and hot part of the summer. It is superior to ordinary fresh water, from the fact that the roads do not require watering so

frequently when salt water is used. This remark applies both to macadam and wood-paved roads. (1895.)

Portsmouth (Used for street-watering and public baths).—It has a very good effect on flint or gravel roads; it binds them; not so good on roads repaired with broken granite. Has no effect on delicate articles exposed in shops, and does not occasion any offensive decay of street refuse. Its use is both economical and efficient; one load of salt water equals three loads of fresh in efficiency. (1887.) I believe salt water to be far more efficient than fresh; more particularly this is seen in the flushing of urinals and the watering of streets; but the good effect in the flushing of sewers may not be any less because it is not so easily seen. Salt water appears more efficient than fresh water; being of greater specific gravity, it, so to speak, carries the sewage on its back. The public and shopkeepers favor the street-watering with salt water. (1891.) I am most favorable to the use of sea-water for road-watering; it is no doubt more economical than fresh. It is well known that sea-water contains a large amount of salts of a highly deliquescent nature, takes longer to evaporate than fresh water, and the streets will keep moist for a longer period than when watered with an equal quantity of fresh water. It was at first thought by tradespeople that their goods would be injured by the use of salt water, but I have not received one single complaint since the adoption of the scheme. As watering the roads with sea-water is so economical, I have strongly recommended my committee to extend the scheme to the whole of South-sea. (1895.)

Redcar (Used for street-watering and sewer-flushing).—Sea-water is found as efficient as fresh water; no objections arise from its use, and its admixture with sewage in the sewers does not cause any nuisance. Is in favor with the shopkeepers and public generally; the ratepayers consider the salt-water scheme a great boon. (1891.) We find it to be more effective for laying dust; it lasts twice as long as fresh water. (1895.)

Ryde (Used for street-watering).—On roads repaired with flint or gravel it causes a crust to form, and keeps damp longer than fresh. We have used salt water for street-watering about thirty-five years; its use is economical and efficient; no complaints from shopkeepers. (1887.) We find it superior to fresh; but on our steep roads we are obliged to use fresh water for the second coat, otherwise the road would become too slippery. (1895.)

Shoreman (New) (Used for street-watering and sewer-flushing).—It binds the road and causes a hard incrustation to come on the surface, which is very beneficial to vehicular traffic. Never had any complaint as to its being injurious to delicate articles exposed in shops. Its use is very economical; once watering with salt water is equal to twice with fresh water. (1887.) It is, no doubt, superior to fresh water for watering roads, as it does not evaporate so quickly, and also, I think, improves their surface. For flushing purposes it is also well adapted, from its disinfecting properties. (1895.)

South Shields (Used for street-watering).—A beneficial effect on the road, binding it together. Its use effects a great saving in horse hire and time. (1887.) The roads certainly keep moist for a very much longer time than when watered by fresh water, and also the sea-water has a binding effect on the surface of the road which is not so prone to disintegrate. The roads do not give off a disagreeable odor; sea-water tends to prevent decomposition rather than to increase it. (1891.) Sea-water is very superior to fresh water for watering streets and roads, the moisture lasts so very much longer. I have known our roads to be dusty an hour after watering with fresh water, while roads watered on the Saturday with sea-water retained moisture till the Monday, and did not need watering till the next day; thus the saving in horse hire is immense. (1895.)

Stockton-on-Tees (Used for street-watering).—No prejudicial effect on roads. Salt water produces a freshness quite unknown in fresh water, and keeps moist for a longer period. It is quite adapted for macadamized roads, and can be used with advantage on wood. As regards causing offensive decay of street refuse, sea-water is preferable to fresh water. As the Corporation commands a very large interest in the supply of water for domestic purposes, it has not been worth while for them to carry out the scheme for the supply of sea-water. (1887.)

Torquay (Used for street-watering).—We use sea-water to some extent; the effect is not very marked in any way. (1887.) We use sea-water upon our roads very largely during the summer. I have found the use of sea-water much more economical than fresh water, and more efficient. It has been in use for nearly fifteen years. We get no complaints as to its being used. (1895.)

Tynemouth (Used for street-watering, sewer-flushing and public baths).—Watering macadam roads with salt water cakes the surface and binds the top metal, improving the condition of the roads to a marked extent. No particular effect on wood paving noticed. A jeweller states that its use causes no noticeable effect on his goods. Have not noticed any offensive result from the use of salt water in streets. Its use is both economical and efficient; one watering with salt water is worth three with fresh water. (1887.) No objections arise from the use of sea-water. It is as efficient as fresh water for flushing sewers and carrying sewage matter. With regard to watering the streets, we consider the moisture is retained longer than when fresh water is used. (1891.) As regards economy, we find the sea-water to be superior to fresh. With respect to effi-

ciency, I cannot say the sea-water is in any way superior to fresh water for the flushing of sewers, but for street-watering it certainly is superior. A thin crust of salt is formed upon the roadways, which binds the dust, and the effects of the salt water are consequently more lasting than those of fresh. (1895.)

Weymouth (Used for street-watering).—The salt forms a crust on the road surface, which keeps the dust from rising. I have never received complaints. The shopkeepers prefer the use of salt water, as it is more effective in keeping down the dust. No nuisance of offensive decay of street refuse is caused by the use of salt water. It is more economical to use salt water. (1887.)

Summary.—The advantages of a constant supply of sea-water to London may be thus shortly summarized:—

1. There would be less dust and smell, and more cleanliness in the streets.
2. Watering would be less frequent, and more efficient.
3. The road surface would be more durable, requiring fewer repairs.
4. The sewers would be less offensive.
5. The cost to the ratepayers would be probably a quarter, or even a third less than the present cost of water for public purposes.
6. Hospitals and schools would be provided with additional means to health.
7. Every house could be furnished with its own sea-bath.
8. The saving of fresh water would be very great, practically adding 25 per cent to the present supply.

DISCUSSION.

The CHAIRMAN said they were much indebted to Mr. Grierson for bringing forward this very important subject. The experiment of saline watering was tried in London some 15 years ago, when Mr. Cooper patented a method of watering streets with a solution of chlorides of sodium and calcium, claiming to get by their use a liquid which would not readily dry, and which would be so much more economical with regard to labor, as to fully repay the cost of the chemicals used. The plan was tried during one summer by the Vestry of Paddington and he took the opportunity of inspecting the result. It did precisely what had been described by the officials of the various towns referred to; it practically abolished dust, and the shopkeepers of the Harrow-road were delighted to find that their goods were no longer covered with dust. When there was any moisture in the air, the streets did not dry; and when they became dry, instead of the surface of the macadam becoming dusty, it caked, and made an admirable smooth surface for wheels. The experiment was not pursued after the period for which the first contract was made, but, he believed, its abandonment was not owing to any demerits, but depended on certain legal difficulties connected with the property in the patent. Any chemist would say that sea-water could not have any noxious effect. Nothing was said in the paper as to the prospect of this scheme being carried into effect. He should also like to know whether the £420,000 mentioned covered merely the laying of the mains shown on the diagrams, and whether any provision had been made for the vast expense which he should imagine would be required for laying fresh service-pipes to a large number of houses. On that point householders would have to remember that until the Acts under which they were at present taxed by the water companies were modified, they would have to pay just as much for fresh water as before, even though they did not use it so much, except in those cases where they could get rid of the special charge for baths.

MR. LEWIS ISAACS said such a scheme as this could not fail to interest him very greatly, and he had sent Mr. Grierson an official letter from the district under his charge, asking for further particulars, which had been answered by the engineer to the scheme very fully. Of course he was anxious to know the position, size, etc., of the mains proposed to be laid in the Holborn district, and was informed they were to be 12-inch pipes, laid under the carriage-way at a depth of 2 feet 6 inches. This point was very important, remembering the difficulties which occurred last year in many districts from the freezing of the water-mains, much to the injury of the reputation of some of the water companies; and this was enhanced when in the summer, which was exceptionally hot, the water-supply was in certain places very deficient. He congratulated the author on the comfort he had afforded them by the promise that a large quantity of water now used for non-domestic purposes would be set free and made available for household consumption. It had often struck him as a great reproach on this scientific age that we should so long continue the wasteful system of going to great expense in filtering, and rendering fit for drinking purposes, every drop of water which was used to water the streets and flush the drains. But he should have been glad if Mr. Grierson could have spoken a little more positively as to the saving which might be effected in this direction. The price paid for water for municipal purposes, was, in some cases, at any rate, not 9d., but 6d. per 1,000 gallons; and he should have liked a more definite statement than a mere opinion that the water supplied under this scheme for municipal purposes would not, at any rate, cost more than that now supplied. Looking to the fact that the water was taken from the sea, and that there were only two reservoirs in a length of about 60 miles, and one pumping-station, he should have thought the water could be brought to London at a cost which would enable the projectors to beat the

water companies completely out of the market. He should not have been surprised to hear that the cost need not be more than half. He could not speak from experience as to the suitability of sea-water for road watering, but he had seen some of the towns mentioned, and he must say the *volte face* of the authorities at Hastings within a few years was very surprising, and he thought there must be something behind which was not disclosed. He had seen the application of salt water for this purpose in four or five places, and came to the conclusion that, in the main, Mr. Grierson was right. Sea-water had a peculiar effect on macadam dust, forming a cake, which he would not say was quite so nice for draught as the result of watering by the ordinary process, but undoubtedly the effect was much more durable; it was probably within the mark to say it lasted twice as long, but he should hardly think three times. He hoped Mr. Grierson was right in saying that its application to sewage matter would be as beneficial as he stated, but he had heard doubts expressed on this point. It struck him that the salt must have a beneficial effect, though he had not sufficient chemical knowledge to speak positively, and if it could be obtained cheaply and municipal engineers had the opportunity of turning on a hydrant wherever they liked, they ought to be able to effect a great change in the condition of the London sewers. He did not know whether sea-water would be as useful in extinguishing fires as fresh water. Londoners were now so alive to anything beneficial in a hygienic point-of-view, and were so willing to spend money in luxuries, that he had little doubt of the financial success of the scheme if the pipes were once laid down. He should certainly be one of the earliest customers, and Mr. Weaver, surveyor to the Kensington district, who was a great swimmer, would, he was sure, be another. If they could be taken as fair samples of the average Londoner, there would be a good prospect of success. He might say unofficially, that so far as his own district was concerned he should offer every possible facility to the scheme.

MR. WEAVER said, looking at the question as a private individual, he thought it was quite time that London should have sea-water brought to it, as it was only 50 miles from the coast. Whether it would lead to any monetary advantage was a difficult question. They had to pay for water according to the rateable value, his contribution being £18 or £20 a year, and if he could see his way to reducing it to £10 he should yearn for the sea-water to come as quickly as possible, but he was afraid it would not have that effect. He had learned that the largest mains in his district was to be 30 inches, diminishing to 12 inches and 9 inches, and he must say he doubted whether 30 inches would be large enough if there were a large demand. As a road surveyor he remembered Mr. Cooper's experiment being tried in the southern division of his district, that gentleman having the contract for one summer. At that time the Brompton Road was laid in macadam, and the conclusion which he and his subordinates arrived at was that the salt had a very injurious effect on the macadam. It might cake the mud together, but on his roads there was very little mud left, and the effect it had was to make the macadam loose. It was consequently abandoned after the first year, and he thought it would be well for surveyors to make further inquiries on this point. He knew that at Brighton the use of sea-water was given up, not so much for the effect on the roads as for the objections of the public. The shopkeepers, especially the silversmiths, objected to it, and ladies complained of the injury to their dresses. He learned this from Mr. May, the borough engineer. Of course, in London the greater of the main roads were wood or asphalt, and on these surfaces, no doubt, sea-water would be preferable, as it kept the road damp much longer. In Kensington they only paid 6d. per 1,000 for water.

COL. ALLAN CUNNINGHAM said the most interesting aspect of the question to him was the great saving which would be effected in the use of fresh water. The time was rapidly approaching when potable water would be a most valuable commodity, as the population in all large towns kept on growing, and the means of getting fresh water did not keep pace with it, or could only be kept up by a vast expenditure; anything which could be done to husband it was most important. There was an enormous waste in filtering water until it would pass a chemical analysis as being fit for drinking, and then throwing it down the sewers. There had been a great deal of evidence from various towns as to the advantages of using sea-water, but it ought, probably, to be discounted to some extent, bearing in mind that all these towns were on the sea coast, where they would get sea-water cheap, and naturally were inclined to speak strongly in favor of it. Some disadvantages had already been referred to; a minor objection would be that in frosty weather they would feel it in their boots, and it would probably be a good thing for cobblers. Brine did not freeze very quickly, and therefore formed a much colder liquid than fresh water at the freezing point, and would be more disagreeable if one's boots got sodden. For the same reason, it would affect the feet of horses and dogs, and probably cab-ranks, where horses were kept standing, would have to be raised a little, as a matter of humanity. It was important to know how far the intake was from any possible pollution by sewage. It would also be a very expensive matter to introduce an entirely new set of fittings into houses for the use of salt water, and he feared there would not be much demand from the public for a long time, except from hotels, clubs, baths and very wealthy people.

MR. W. H. GARBUTT (Vestry Clerk of Marylebone) suggested that it would be well to have some information as to the possible

effect of salt water on ordinary fittings, and whether the iron mains would not soon be rendered worthless. He had heard that some of the cast-iron supports to piers at the seaside had been seriously injured in the course of a few years by the action of salt water.

MR. MACINTYRE, as the engineer to the scheme, said he would answer some of the questions which had been raised. The mains were designed to provide 10,000,000 gallons per day, but if the demand were found to exceed that quantity, additional ones could be laid. At present the main for the intake was 36 inches. About Dorking it was reduced to 32 inches as far as the reservoir at Epsom, and from there to London, the fall being more rapid, it would be 30 inches. Salt water was more efficient in extinguishing fires than fresh. A chimney on fire could often be extinguished by putting salt on the fire, the effect being an evolution of chlorine, which choked a fire at once. Care had been taken to select a spot for the intake, at least a mile distant from any source of pollution. It was suggested that salt water might affect horses' feet and people's boots in winter, but as a matter of fact the streets were not watered in winter. He was glad to find that Major Isaacs approved of the details supplied him as to the depths of the pipes; all these details had been carefully considered, and with regard to them they were desirous of consulting the authorities of the different districts as far as possible. The present idea was to erect standards at all the principal cross streets so that the watering of the cross streets could be conveniently carried out to the distance of about half a mile from the main on each side. The castings which had been referred to were exposed to the sea-water and air alternately, which was very trying to either iron or wood. These mains would be constantly full, the velocity of flow being 160 feet a minute. There would not be the trying alteration of wet and dry; but, of course, they would wear out in time like other pipes; all that had been taken into consideration. The estimate was ample, being founded on actual tenders from eminent contractors for the different classes of work. There would be 18 or 19 miles of mains in London, sufficient to introduce the water to all the principal parts. If the use of sea-water were found advantageous, no doubt other mains would be asked for, and they would be extended by agreement with the various authorities concerned.

MR. GRIERSON said it was very encouraging to hear it suggested that a 30-inch main would not be large enough to supply the demand in Kensington. His statement as to the average price of water for municipal purpose had been called in question, but his figure was based on official returns. He was aware that in some places, and for some special purposes, it was 6d., but in other cases it went as high as 1s. 3d., and the average was within a small fraction of 9d. With regard to the effect on macadam roads, he would refer to the report from Barrow-in-Furness, which dealt with that very point. With regard to the effect on horses' feet, of course there would be no salt water in the streets in time of frost, and the surveyor of Gosport, where sea-water had been used many years, said horsekeepers had great faith in salt water for keeping the legs of their cattle in good condition. Of course that applied to the summer.

THE CHAIRMAN then proposed a vote of thanks to Mr. Grierson, which was carried unanimously, and the meeting adjourned.



THE SOCIETY OF BEAUX-ARTS ARCHITECTS.

THE Committee on Education has to report that the judgment of the last Exhibition of Drawings entered in competition was held on the 17th of December last. The jury was composed as follows:

Prof. D. Despradelle, Mass. Institute of Technology; Prof. E. V. Seeler, University of Pennsylvania; Prof. A. D. F. Hamlin, Columbia College; Prof. C. F. Osborne, Cornell University; and Mr. J. H. Friedlander, Mr. John M. Carrère, Mr. John Galen Howard, Mr. Whitney Warren, Mr. A. L. Brockway, *Committee on Education*.

The exhibition of drawings was unusually large and of a character that should encourage the Society in its work. There were two classes.

CLASS A.—PROGRAMME: A FOUNTAIN AT THE JUNCTION OF TWO STREETS.

Medals were awarded to: A. M. Githius, University of Pennsylvania, and E. J. Willingale, pupil of Mr. Masqueray.

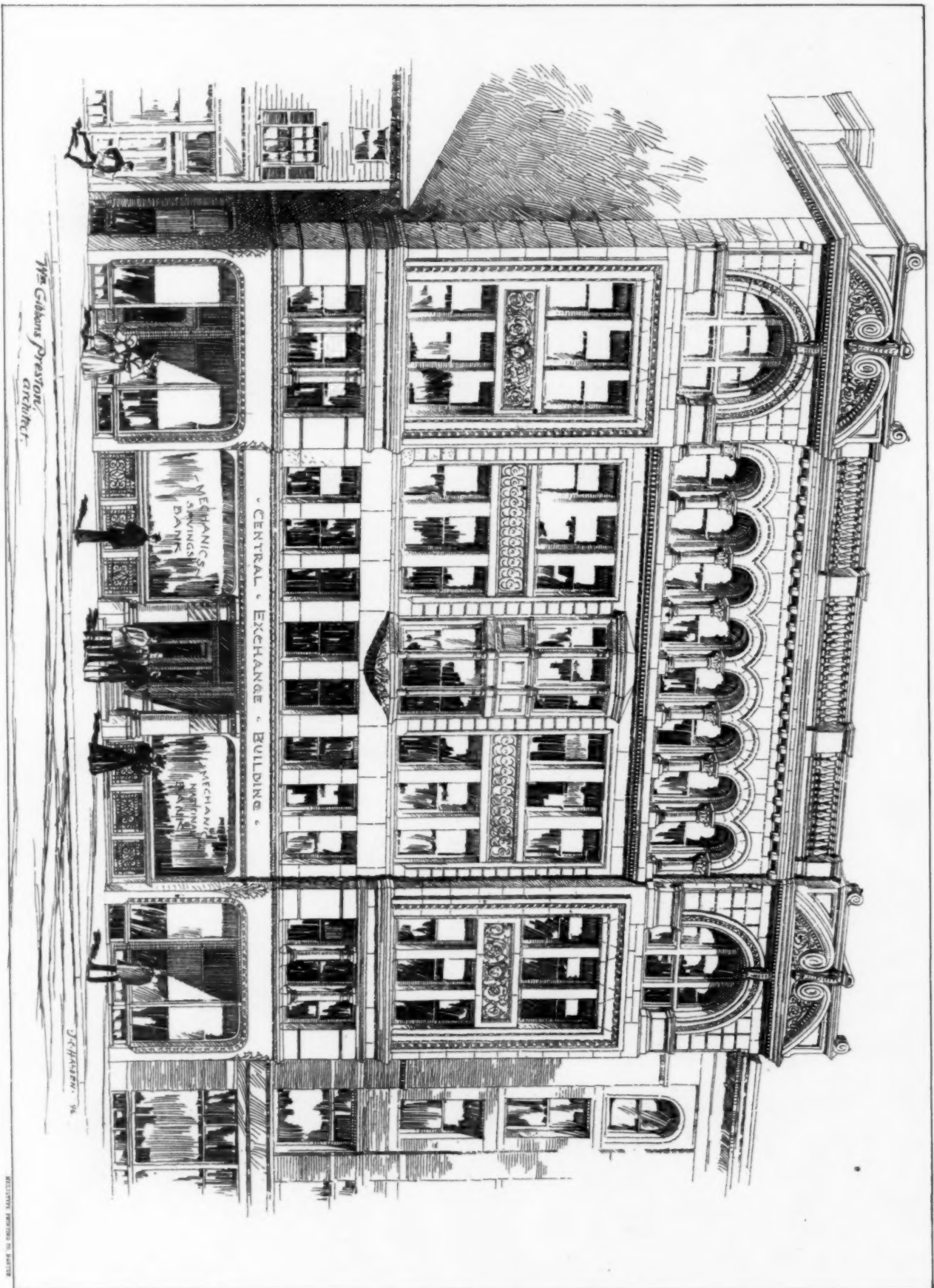
First Mention.—Arthur Shrigley, University of Pennsylvania; Carl Richardson, pupil of Mr. Masqueray.

Second Mention.—George C. Baum and Francis W. Bancroft, University of Pennsylvania; George M. Bartlett, pupil of Mr. Flagg.

CLASS B.—PROGRAMME: ENTRANCE TO A PARK.

First Mention.—Russell Selfridge, pupil of Mr. Masqueray, and Thomas Egleson, pupil of Mr. Flagg, by unanimous vote of the jury; C. E. Decker and Charles Hess, pupils of Mr. Masqueray; Conrad F. Knapp, University of Pennsylvania.

Second Mention.—Elliott E. Vernon, University of Syracuse; J. Edgar Hill, University of Pennsylvania; Ray Corwin Crosby and William Thomas Armstrong, pupils of Mr. Masqueray.



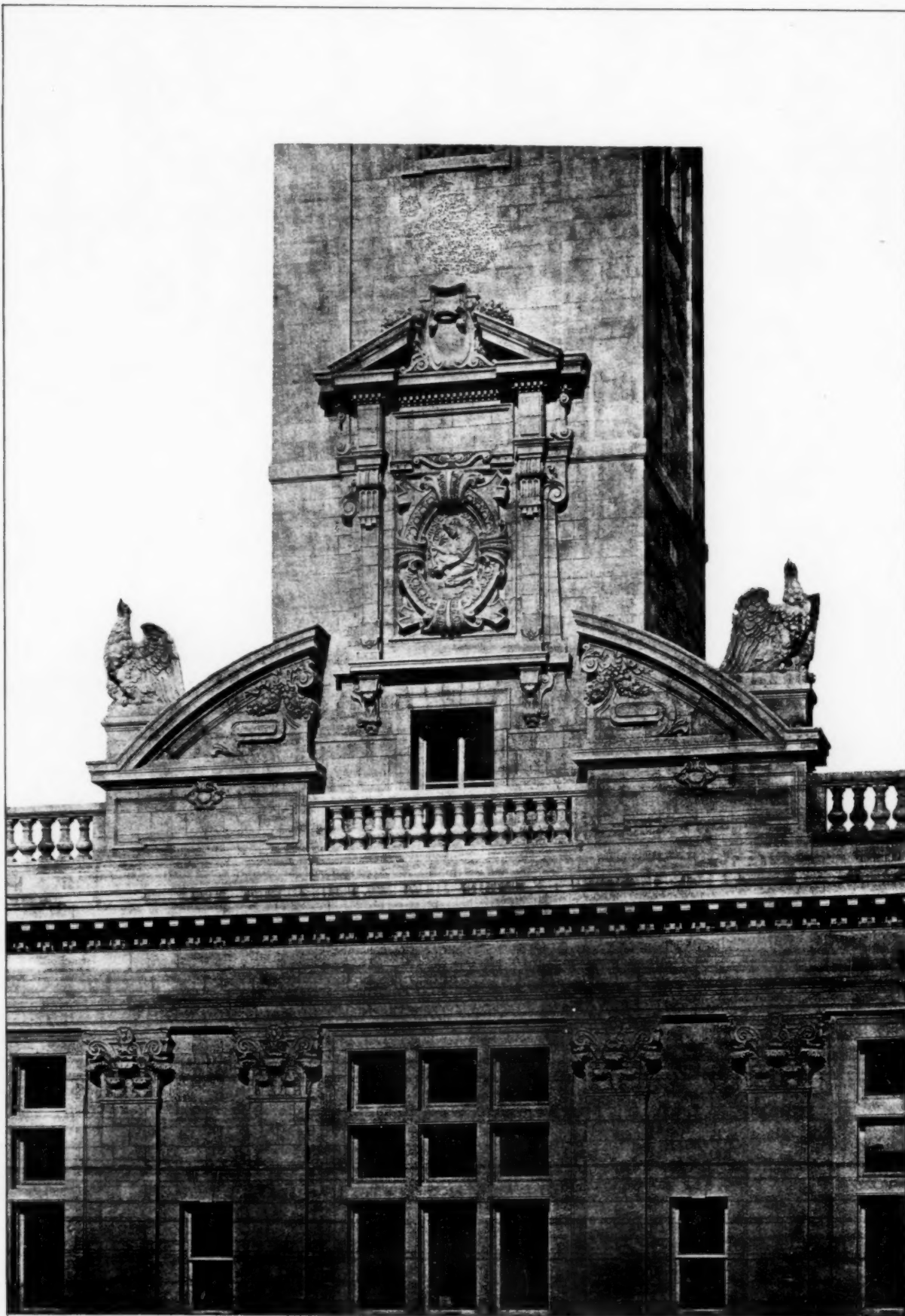
W. G. Preston,
architect.

CENTRAL EXCHANGE BUILDING, WORCESTER, MASS.

W. G. PRESTON, Architect.

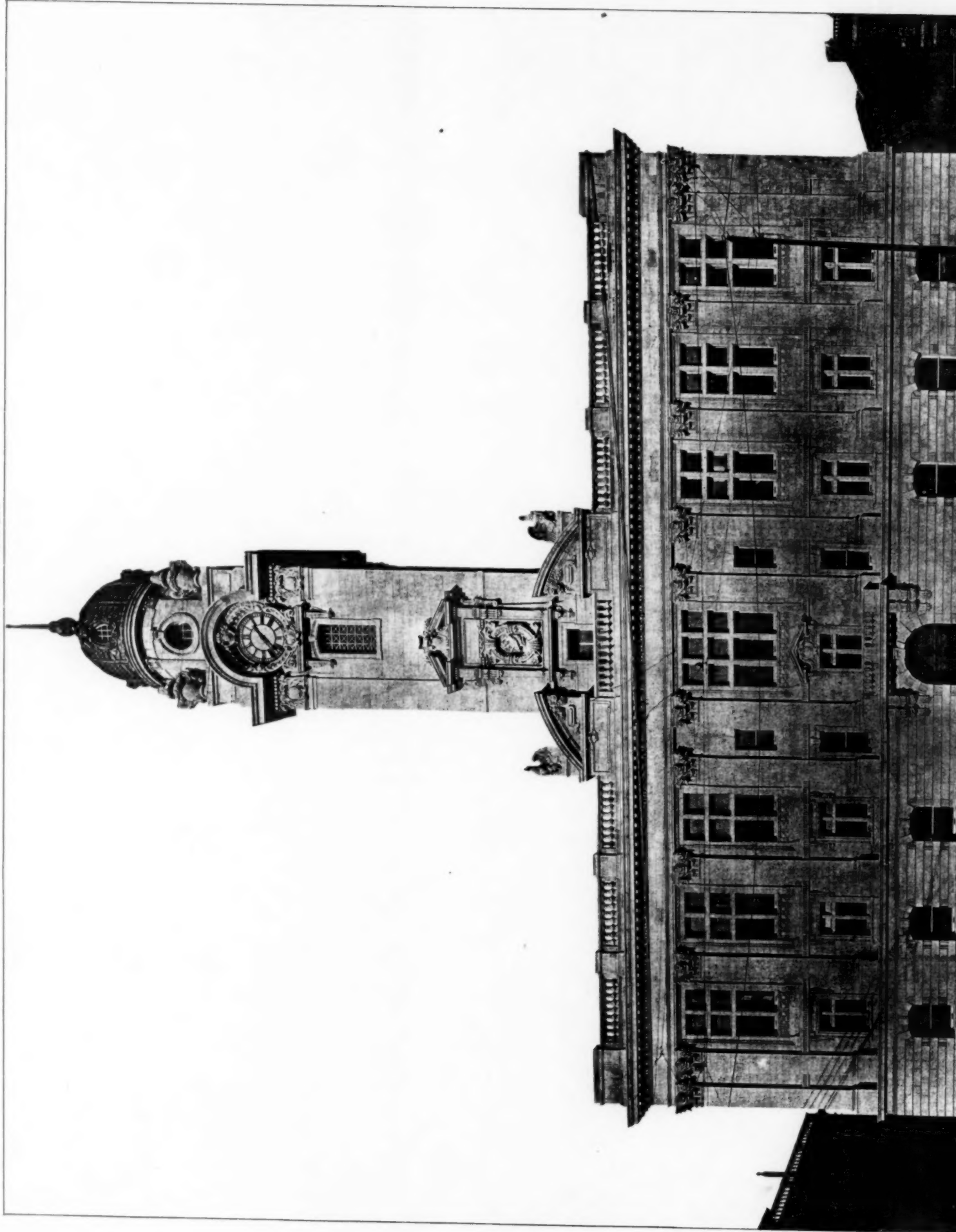
J. C. Hansen, '96

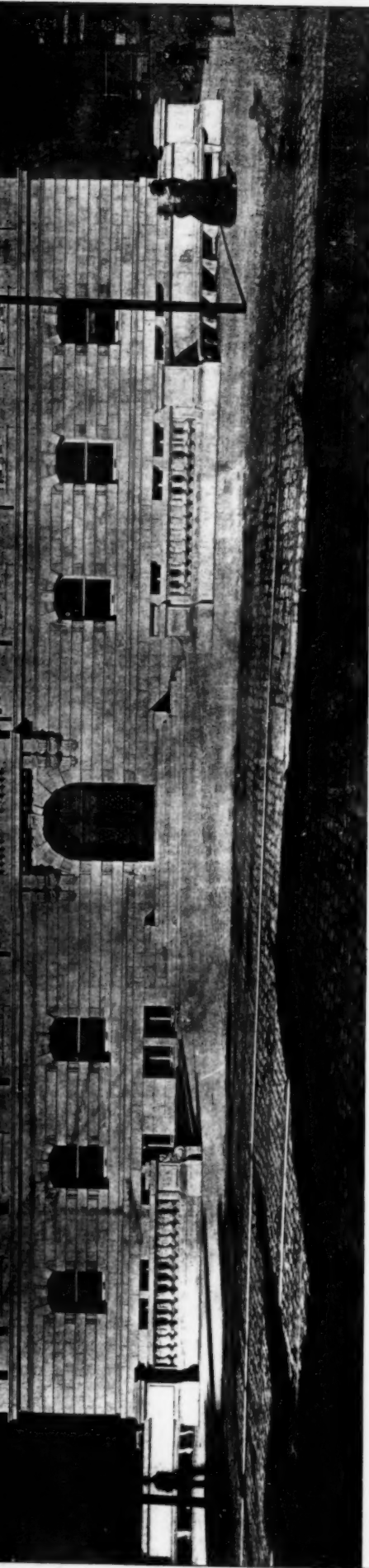
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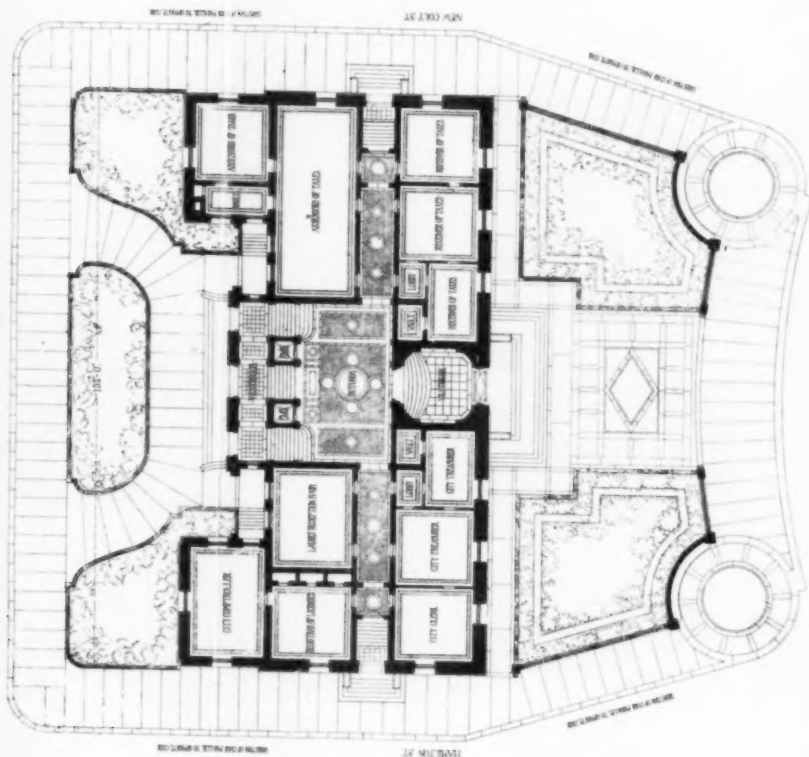




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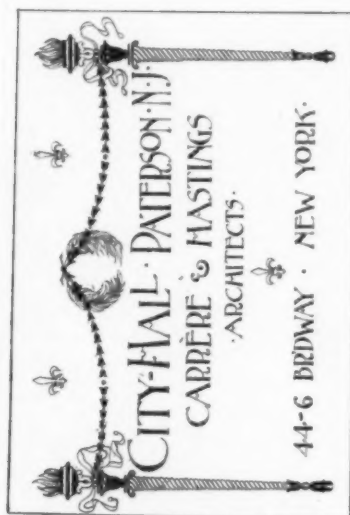
PLAN OF
MAIN FLOOR
AND
APPROACHES

ASTOR LENOX TILDEN FOUNDATION



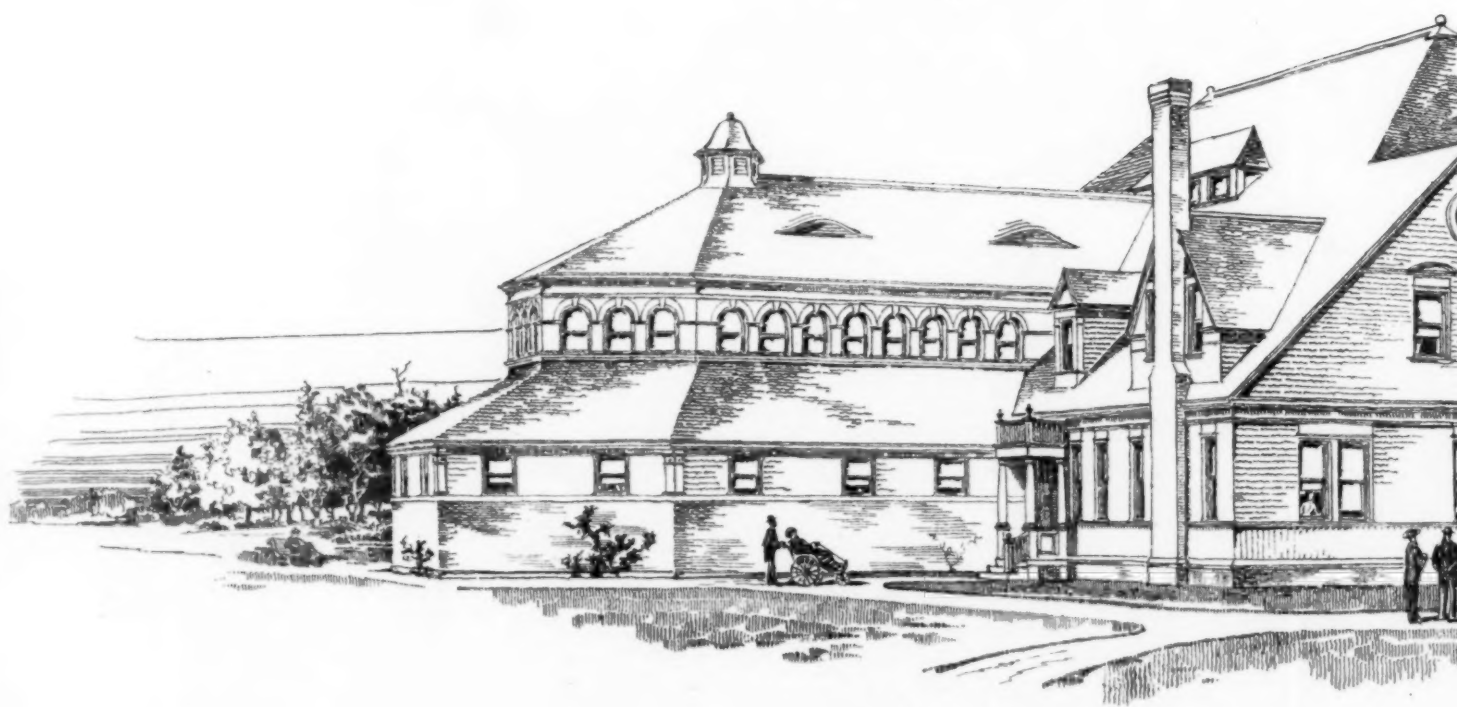
SCALE OF POINTS

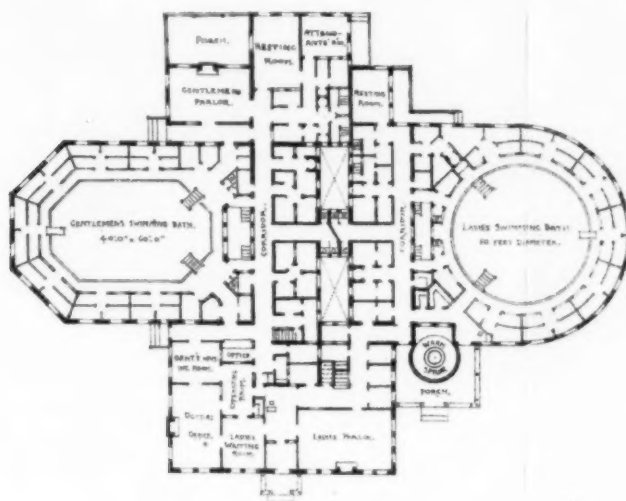
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DESIGN FOR
Bath House at Warm Springs, Va.
FOR THE
Southern Improvement Co.

—
C. H. READ, JR., ARCHITECT,
RICHMOND, VA.





PLAN OF MAIN FLOOR.



THE
OFFICE OF THE
TREASURER OF THE
UNITED STATES
DEPARTMENT OF THE
TREASURY

Third Mention.—Robert F. Daggert, Walter S. Gideon, Edgar O. Hunter and W. P. Russell, University of Pennsylvania; Charles E. Mack and George E. Sweet, pupils of Mr. Masqueray; William H. Orchard, Niagara Falls, N. Y.; R. Sheppard, pupil of Mr. Casey; James Hopkins.

The following competitors were placed *hors concours*:

W. E. Sanger: did not follow the plan.

Francis Bigelow: did not comply with the programme as to masonry posts.

Charles Bruismade, pupil of Mr. Flagg: character was good but no plan furnished.

R. D. Graham, pupil of Mr. Flagg: no plan furnished.

Norval Richardson, pupil of Mr. Masqueray: design was clever but no plan furnished.

Theo. Hopping, pupil of Mr. Flagg: no plan furnished.

THE WORCESTER CHAPTER OF THE AMERICAN INSTITUTE OF ARCHITECTS.

The Worcester Chapter of the American Institute of Architects will hold a banquet, at the Bay State House, February 27, 1896.

Architects Stephen C. Earle and Ward P. Delano were chosen a committee to revise the By-laws so as to conform with change made in Constitution of the American Institute of Architects.

Architects Stephen C. Earle and Elbridge Boyden were chosen a committee to prepare resolutions on the death of Architect A. P. Cutting which occurred last week in California.



[Contributors of drawings are requested to send also plans and a full and adequate description of the buildings, including a statement of cost.]

HOUSE OF R. MCK. JONES, ESQ., 6 WESTMORELAND PLACE, ST. LOUIS, MO. MESSRS. EAMES & YOUNG, ARCHITECTS, ST. LOUIS, MO.

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

CENTRAL EXCHANGE BUILDING, WORCESTER, MASS. MR. WM. GIBBONS PRESTON, ARCHITECT, BOSTON, MASS.

THE original building was among the oldest in the city, and the progress of rebuilding in the immediate vicinity has necessitated the remodelling of the old structure, to bring it up to modern requirements. The old front was set back from the line of the street, to provide basement entrances and steps, and a new front has been built well in advance of the old, which was not demolished until the new one was complete, with sashes, floors, etc., rendering the added portion habitable. Then the old wall, with its heavy granite piers, was taken down, and the tenants who remained in possession found themselves in a building quite different in lighting, design and construction.

The interior of the building has been provided with fireproof stairs, a first-class elevator, and other conveniences of a modern building.

The upper portion of the building will be utilized for two Society halls, and the Savings Bank and National Bank have continued to occupy their old quarters on the first floor, during the rebuilding and construction of the new front, the material of which is Indiana limestone. The main entrance will really give access to an extensive new property in the rear, which may be fitted up for offices or light mechanical purposes.

A curious situation developed in the erection of this front. The adjoining owners had a building whose cornice had a projection of seven feet, and it not only extended across their front, overhanging the sidewalk, but mitred around the corner, overhanging the old, and lower, Central Exchange Building seven feet.

The owners of the cornice did not claim the right to maintain it over the new and higher building, but they desired to preserve the portion beyond the line of the party-wall and overhanging the sidewalk of the Exchange Building, cutting up against the new front seven feet. The rights of the latter owners over their own sidewalk and front light were disputed. The cornice (which is not shown on the perspective) has been cut off its full width on the party-line.

THE CITY-HALL, PATERSON, N. J. MESSRS. CARRÈRE & HASTINGS, ARCHITECTS, NEW YORK, N. Y.

DETAIL OF THE SAME.

BATH-HOUSE, WARM SPRINGS, VA. MR. C. H. READ, JR., ARCHITECT, RICHMOND, VA.

[The following named illustrations may be found by reference to our advertising pages.]

THE MEDICI FOUNTAIN IN THE LUXEMBOURG GARDEN, PARIS, FRANCE.

This work, designed by De Brosse, in the Doric style, with imitations of stalagmites, between 1613 and 1624, has undergone some

changes since its erection. In 1861 the laying out of the Rue de Medicis caused it to undergo a removal of some feet, and its front has been modified by the addition of the sculptures by Otton (a modern artist) representing Polyphemus surprising Acis and Galatea. The rear façade has also been modernized.

THE COLONNADE ABOUT THE NAUMACHIA IN THE PARC MONCEAU, PARIS, FRANCE.

ONE of the few relics of the old attractions of the Parc Monceau is this semicircular Corinthian colonnade, the columns composing which were brought either from the Château du Raincy or from the mausoleum which Catherine de' Medici had begun to build for herself and Henri II near the Abbey of St. Denis.

MONUMENT TO WILLIAM AND FREDERICK, GIEBICHENSTEIN, GERMANY.

A GROUP OF EDUCATIONAL BUILDINGS.

[Additional Illustrations in the International Edition.]

A HÔTEL FOR AN ARCHEOLOGICAL SOCIETY. MR. ERNEST BOUÉ, ARCHITECT.

[Copper-plate Photogravure.]

CENTRAL FEATURE OF THE BUILDING OF THE CHICAGO NATURAL HISTORY SOCIETY, CHICAGO, ILL. MR. HENRY IVES COBB, ARCHITECT, CHICAGO, ILL.

[Gelatin Print.]

ENTRANCE TO THE SAME BUILDING.

[Gelatin Print.]

PICTURE ROOM: HOUSE OF THE LATE LORD FREDERIC LEIGHTON, HOLLAND PARK ROAD, LONDON, ENG. PROF. GEORGE AITCHISON, ARCHITECT.

PROPOSED NEW PREMISES, HIGH STREET, BIRMINGHAM, ENG. MESSRS. ESSEX, NICOL & GOODMAN, ARCHITECTS.

This building is about to be erected for Messrs. E. Fletcher & Co., upon the site of their present premises, together with some additional land at the side and rear, which has been acquired to provide extra accommodation.

The premises will have a frontage of 59 feet and a depth of 163 feet, and will comprise a large basement, 104 feet by 50 feet, with packing and receiving rooms at the back. The ground-floor shop will be 50 feet by 102 feet, by 26 feet high, and will be surrounded by a wide gallery, the centre of the shop being lit by a large lantern light, which will also assist in lighting the basement through a well-hole in the shop floor. Next the street on the first floor and leading from the gallery will be a large mantle room. The second floor (which will surround the central well-hole, lighting the shop underneath) is to be occupied by workrooms, and the third and fourth floors by assistants' living and bedrooms. The counting-house and offices, and dining-rooms and kitchen accommodation will be in a block in the rear. The front elevation will be carried out with red pressed bricks and buff terra-cotta, the tower being covered with tiles. The whole of the remaining roofs will be flat, to be used for packing-cases, etc., and a hoist will be provided for this purpose.



[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.]

"ELEVATOR SHAFTS."

NEW YORK, N. Y., February 5, 1896.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,—Responding to your wishes as stated at the end of a paragraph in your publication of January 18th last, page 26, second column, in regard to fireproofing elevator-shafts, we would call your attention to a fire-test which was made in Brooklyn, December 22, 1894, in the presence of the Chief Inspector of Buildings, local inspectors, several architects and builders. The shaft represented a dumb-waiter shaft, three feet square, constructed of frame studding 4" x 2", lathed both sides with wire-lathing, and plastered in the ordinary brown plaster without any hard finish. Between the wire-lathing the space of three inches was filled-in with mineral wool; total thickness of the walls was four and one-half inches. This flue or shaft stood eighteen feet from base to top and was piled with wood inside and out, set fire to and kept burning for forty minutes, which was considered to be long enough by the inspectors, architects and builders present; then the shaft was pulled down and critically examined as to its fire-resistance, with the result as given in the sub-joined letter of the Chief Inspector to Commissioner Bush of the Building Department, Brooklyn.

DEPARTMENT OF BUILDINGS, BROOKLYN, N. Y., December 24, 1894.

COMMISSIONER OF BUILDINGS:—

Sir, — As per instructions from you, on Saturday I visited the lot on the south side of Jefferson Avenue, about two hundred feet east of Bedford Avenue, and found there a piece of work similar to a dumb-waiter shaft, three feet square and fifteen feet high, standing on four brick piers twelve inches high. It was constructed of joists covered with American mineral wool, one-half of an inch thick on each side with wire-lath over that, and the wool filled-in between the studs. The inside of the shaft was plastered over about a quarter of an inch thick with a coat of brown mortar and the outside had a half of an inch coat of same. Fire was started inside of the shaft with several barrels of wood at 2.05 P. M., and kept up until 2.35, during which the outside of the shaft was cold except in a few spots which were slightly warm. The structure was then torn apart, and the inside was in a perfect condition, not even scorched.

It is certainly non-combustible and a valuable material for fireproofing.
(Signed) WM. H. HACKHURST, Chief Inspector.

Some of the architects said that such construction should by law be made imperative, especially in hallway partitions of tenement-houses, so as to give the inmates ample time and opportunity to save themselves and some of their belongings by other means than the perilous fire-escapes.

The value of mineral wool as a check to the spread of fire, and as an insulator of heat and cold is not yet fully appreciated by architects and builders, but many do so appreciate it as to specify and use it in almost all their buildings, not only of frame but also of brick and stone construction. In the latter kind it is generally used for the deafening of floors and under the roofs; this gives them cool and pleasant upper rooms in the summer and warm ones in the winter.

UNITED STATES MINERAL WOOL CO.



BOSTON, MASS.—*Paintings recently purchased; Japanese Paintings; Line Engravings, Mezzotints and Etchings by Rembrandt*: at the Museum of Fine Arts.

Paintings from the Paris Salons of 1895: at the Jordan Art Gallery, 450 Washington St.

Fifty-third Exhibition, Oil-paintings and Sculpture: at the Boston Art Club, January 13 to February 15.

Pictures by Childe Hassam: at the St. Botolph Club, January 27 to February 15.

Photographic Views lent by Walter G. Chase, and Flash-light Studies by Miss Bertha Lothrop: at the Boston Camera Club, 50 Bromfield St., February 5 to 15.

Pastels by J. Wells Champney: February 10 to 22, also, *Water-colors by Miss Florence Robinson*: February 10 to 15, at Williams & Everett's Gallery, 190 Boylston St.

BRIDGEPORT, CONN.—*Second Annual Exhibition of Pictures*: at the Public Library, January 25 to March 15.

CHICAGO, ILL.—*Works by Gustave Doré*: January 21 to March 21, *Sveedish Paintings*: February 4 to March 1, at the Art Institute.

CLEVELAND, O.—*Joint Exhibition of the Cleveland Art Association and the Cleveland Architectural Club*: at the Garfield Building, opened February 10.

NEW YORK, N. Y.—*Twenty-ninth Semi-annual Exhibition, including Loan Exhibition of Early American Paintings, Old English Paintings, and the Cullum Collection of Classic Sculptures*: at the Metropolitan Museum of Art.

Twenty-ninth Annual Exhibition of the American Water-color Society: at the National Academy of Design, February 3 to 29.

Eleventh Annual Exhibition of the Architectural League: at 215 West 57th St., February 15 to March 9.

Portraits and Pictures by R. W. Vonnob: at the Durand-Ruel Galleries, 389 Fifth Ave., February 3 to 15.

Symbolistic Paintings by P. Marcius-Simons: at the Avery Galleries, 368 Fifth Ave., February 7 to 22.

PHILADELPHIA, PA.—*Sixty-fifth Annual Exhibition of the Pennsylvania Academy of Fine Arts*: opens December 23, closes February 22.

PROVIDENCE, R. I.—*Water-colors by Ross Turner*: at the Rhode Island School of Design, February 8 to 22.

SPRINGFIELD, MASS.—*Nineteenth Annual Exhibition of Paintings*: at James D. Gill's Gallery, until February 29.

ST. LOUIS, MO.—*Drawings of London Society, by George Du Maurier*: at the Museum of Fine Arts, until February 22.



THE AMPHITHEATRE AT CAGLIARI, SARDINIA. — Among its relics of antiquity the amphitheatre of Cagliari is probably the most interesting, as it is certainly the largest. The Canon Spano, who has done so much for Sardinian archaeology, was the chief agent of its clearance from the immense amount of rubbish which had been cast into it during ten

or eleven centuries. As a rubbish pit it no doubt served excellently from the end of the eighth century onward. The last record of its use dates from the year 777, when bull-fights were held here to celebrate the temporary expulsion of the Saracens from the island. Thenceforward the citizens had little peace from their enemies, and the original purpose of the amphitheatre was probably unheeded. Unlike most theatres, this of Cagliari is an excavation not a superstructure. It reminds one of the Odeon of Herod Atticus in the side of the Acropolis at Athens. The rude outline of it was formed by a watercourse which existed here. The tufa yielded to the autumnal rains, even as it still does; and when the hint had taken root in the minds of the Cagliarians architects, it was easy to extend the area of dilapidation. It is not a very large excavation, though it is estimated that it could seat twenty thousand spectators. What it lacks in breadth, however, it gains in height, its elevation being about a hundred feet. Perhaps the most interesting part of it is the series of corridors and chambers which burrow under the lower tier of seats. These were concerned with the wild beasts brought here to die. The iron rings to which they were tethered may still be seen welded into the matrix. The Cagliari amphitheatre is not on show at half a franc or a franc a head. It is left very much indeed to itself. Under this hot sky it is, moreover, a trifle arduous to explore the excavation thoroughly. The seats are high, and there are fissures in the masonry which it would never do to slip into. Here and there a clump of cactus or prickly pear has perched itself above the theatre. A little boy may perhaps be seen amusing himself by leaping from seat to seat, and shouting to snare the echo. Else you and the amphitheatre and the blue sky which domes it are likely to be very much alone. Bees and butterflies and lizards are, of course, no account. Of these, however, there will probably be no lack. — *Frank Leslie's Monthly.*

THE ITALIAN FOUNTAIN. — The great creation of this Bernini School, which shows it as the sculpture born of gardens, is the fountain. No one till the seventeenth century had guessed what might be the relations of stone and water, each equally obedient to the artist's hand. The mediaeval Italian fountain is a tank, a huge washtub fed from lions' mouths as if by taps, and ornamented more or less with architectural and sculptured devices. In the Renaissance we get complicated works of art — Neptunes with tridents above sirens squeezing their breasts, and cupids riding on dolphins, like the beautiful fountain of Bologna; or boys poised on one foot, holding up tortoiseshells, like Rafael's Tartarughe of Piazza Mattei; more elaborate devices still, like the one of the villa of Bagnaia, near Viterbo. But these fountains do equally well when dry; equally well translated into bronze or silver, they are wonderful salt-cellars or fruit dishes; everything is delightful except the water, which spurts in meagre threads as from a garden hose. They are the fitting ornaments of Florence, where there is pure drinking water only on Sundays and holidays; of Bologna, where there is never any at all. The seventeenth century made a very different thing of its fountains — something as cool, as watery, as the jets which gurgle and splash in Moorish gardens and halls; and, full of form and fancy withal, the water never alone, but accompanied by its watery suggestion of power and will and whim. They are so absolutely right, these Roman fountains of the Bernini School, that we are apt to take them as a matter of course, as if the horses had reared between the spurts from below and the gushes and trickles from above; as if the triton had been draped with the overflowing of his horn; as if the Moor with his turban, the Asiatic with his veil, the solemn Egyptian river-god had basked and started back with the lion and the seahorse among the small cataracts breaking into foam in the pond, the sheets of water dropping, prefiguring icicles, lazily over the rocks, all stained black by the north winds and yellow by the lichen; all in those Roman gardens and squares, from the beginning of time, natural objects, perfect, and not more to be wondered at than the water-encircled rocks of the mountains and seashores. — *Vernon Lee in Longman's Magazine.*

BURIED IN A TREE. — One of the most curious mausoleums in the world was discovered the other day in an orchard at the village of Noebdenitz in Saxe-Altenburg. A gigantic old oak-tree, which a storm had robbed of its crown, was up for public auction. Among the bidders happened to be Baron von Thummel. The Baron, who lives on a neighboring estate had ridden to the auction place quite accidentally. As no one seemed eager to help out the auctioneer, he started the bidding at a small figure. This aroused the peasants' suspicion; they thought there might be some value in this old tree, and the battle raged for an hour, until finally the tree was knocked down to the Baron for \$60. Upon his arrival at the castle he told an old servant of his purchase, describing the tree and its situation. The old servant said he remembered attending the funeral of a Baron Thummel seventy or eighty years ago, and that the body had been buried in a 1,000-year-old oak, then standing on a plot of ground belonging to the parsonage. Investigation proved that the orchard had once been the property of the village church, and that at one side of the old oak was an iron shutter, rusty and timeworn, that the people of the village had always supposed to have been placed there by some joker or mischievous boys. This iron shutter proved to be the gate to the mausoleum of Baron Hans Wilhelm von Thummel, at one time Minister of State of Saxe-Altenburg, who died in 1824 and wished to be buried "in the 1,000-year-old tree he loved so well." The oak, which measures about ten feet in diameter, has for over a century been hollow, so it was learned, beginning at a point about five feet above its base. In this hollow Baron Hans caused to be built a sepulchre of solid masonry large enough to accommodate his coffin. The coffin was placed there, as the church records show, on March 3, 1824, and the opening was closed by an iron gate. In the course of time a wall of wood grew over the opening, which had been enlarged to admit the coffin and workmen, and for many years it has been completely shut, thus removing the last vestige of the odd use to which the old tree had been put. — *Exchange.*