

# THE AMERICAN ARCHITECT AND BUILDING NEWS

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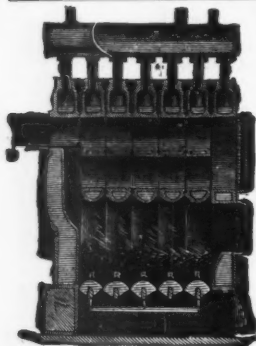
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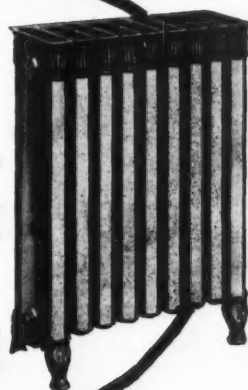
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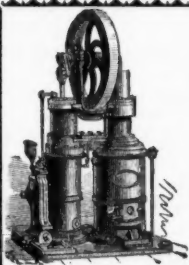


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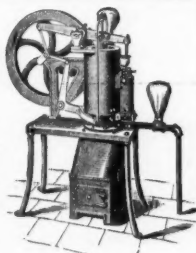
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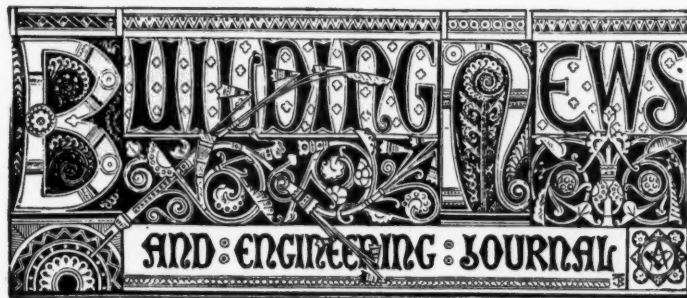
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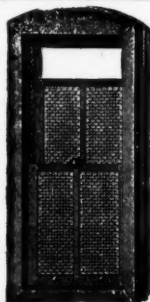
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# THE AMERICAN ARCHITECT AND BUILDING NEWS

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**A** CHARGE that a building commissioner of a great city "has not been seen in the office or about his duties by any of the inspectors since the second day of November, 1903," and that "there are members of the department [not a large one] who would not know him should they perchance meet," seems grave enough to call for careful investigation, even if it were alone and not the ninth and final one in a series of charges alleging malfeasance in office. These charges are brought against the present Commissioner of Buildings for Boston and will be carefully investigated by Mayor Collins, and it should not be difficult to get a line on the worth of the allegations by giving first attention to the final charge, as it should be easy enough to prove or disprove a statement at once so sweeping and so definite. It is only due to the Commissioner to state that the charges are preferred by an Inspector, long in the service of the Department, who has recently been discharged for making a false report on a certain case of building alteration where violation of the building law had occurred.

**W**E believe that it is, or used to be, the custom to half-mast the flag of the Treasury Department on the death of one who holds or has held the office of Supervising Architect, and that this honor, which is not accorded to the heads of other bureaus, is due to the fact that the Treasury is the tutelary deity which presides over architecture. Should the custom spread and be applied to every public building designed in the Government architectural office, the passing of a one-time incumbent of the position would be a widely heralded event. This is not likely to happen, though there is many a public building that would like to run up its flag mast-high on hearing the news and then permanently hide behind a veil the uncomely face with which he had endowed it. Mifflin E. Bell, who early in June died in Chicago, had the fortune to fill the office of Supervising Architect during the administration of President Arthur, and it was largely due to the eccentric character of the design for the public building at Detroit, prepared under his charge, that the profession felt that a change in the method of procuring designs for public buildings ought to be secured. Mr.

Bell came into notice through succeeding Mr. Piquenard, with whom he had been for a short time associated, as the architect of the Capitol at Springfield, Ill., which, for its time, was a good piece of design and construction, as was the State-house at Des Moines, Ia., of which he was the architect in association with Mr. Hackney, and it was felt that his work on these two buildings had peculiarly fitted him for carrying on similar work for the Government; and that there was justification for the belief was shown by his remaining in office as a "hold over" for eighteen months under President Cleveland. Mr. Bell was born in Iowa, and was about fifty-eight years of age at his death.

**I**T was always a pleasure to meet Clarke Merchant, of Philadelphia, who last week finished his life's work, for he was one of the men who do not find their ideas ready made for them in the morning newspapers but prefer to do their own thinking, and, as he had an extremely well-balanced mind, what he had to say was well worth listening to. We cannot recall whether he was educated at Annapolis, but he was in the regular navy and served during the Civil War, reaching the grade of lieutenant-commander, but resigned shortly after its close to enter upon a business career, which he followed with singular felicity and success. Beginning in rather a small way as a dealer in metals,—type-metal, solders and such things—he gradually developed the business, and thanks to his industry and powers of organization built it up to the stature of one of the great business houses of which Philadelphia is so justly proud. Early in his career as a business man, he began to specialize in roofing-materials and for many years he was an importer of enormous quantities of roofing-tin from the Welsh tin and terne plate works, which made the plates in conformance with his strict instructions and stamped each plate with his guaranty, so that Merchant's several brands were accepted by all users of tin-plate as the best of their kind. This great import trade was seriously interfered with by the enactment of the Wilson tariff act, which put so heavy an impost on imported tin as to lead to the establishment of many American tinning works and the creation of a great American industry, which incidentally caused immense losses and great suffering to the Welsh tin-plate makers and their workmen. In everything that he did, Mr. Merchant was prompt and fair-minded, as was shown by his action in the case of a certain job in Wilmington, Del. Hearing that a disgruntled contractor was defaming the architect of the building by alleging that he had been "got at" in the matter of the roofing contract, he took the first train to Wilmington, got hold of the detractor, took him by the ear, metaphorically, to the job and then forced him to eat his words in the presence of the same people who had listened to his false accusations, and this he did more in the interest of the architect than in his own.

**I**N Australia a "sundowner" is one who arrives at a ranch house, station or bush cabin at dusk, sure of finding there such hospitality as his needs require. In Washington the same term is applied to those Government clerks who, having finished at half past four the day's work a too paternal government exacts from them, devote the remainder of the afternoon and even-

ing to increasing their income by practising as physician, dentist, lawyer, architect or anything else, probably, that brings a relief from bookkeeping. The draughtsmen and young architects and engineers in the office of the Supervising Architect have long been wont to look on these sundown hours as one of the surest of stepping-stones over which to arrive at a substantial private practice, and we do not envy the fate that will be by their fellows meted out to those who have caused the issuance of a formal order in which the Treasury Department commands those employed on Government buildings to abstain from private practice. The measure seems to us harsh and unreasonable, unless it can be shown that the work of the sundowners during their official work day is always below the level of that done by their fellows who have not had the luck to secure private work and so do not have to incur the risk of over-fatigue and preoccupation. To say to the members of the somewhat flighty fraternity that they shall not work except in office hours is a most unpaternal thing to announce, unless it is deliberately intended to drive them into idle and vicious ways. The issuance of the edict is said to be due to the fact that certain persons in Government employ have been publicly advertising for private work in connection with the rebuilding of Baltimore.

**THROUGH** the efforts of divers patriotic societies Fraunce's Tavern has been "saved," and posterity can make believe to draw inspiration and experience pleasure when beholding its architecturally uninteresting—if not ignoble—exterior. Another building is to be saved, if possible, which, too, is said to be architecturally uninteresting and to which the adjective ignoble might also be applied, since it is the house at Chambéry, which sheltered the loves of Madame de Warens and Jean Jacques Rousseau. In both these cases sentiment, of a kind, involves the saving grace, but in the case of the Château de Maisons, of which the history was recently given in these columns, architectural considerations form the stimulating cause, as there is obvious good sense in preserving one of Mansart's masterpieces. In connection with this last movement, it has been suggested that, just as Coquelin aîné established a home for superannuated and broken-down comedians, so it might be possible to find some patron of the arts who would redeem Maisons and convert it into a retreat for unfortunate architects. The idea is a good one, although the institution would be likely to be a little over-crowded all the time, or, at least, a similar one in this country would find itself in constant need of enlargement. Perhaps we have a better view behind the scenes than others, but we feel quite sure that it is not generally known how commonly an architect would like to be able to turn to such a retreat in his declining years. As their clients are to be found mainly in the ranks of the well-to-do, architects have as a matter of business necessity to keep up a certain "appearance," not only in the way of office rent but in their style of living, so that family expenses run perhaps higher than they should. Moreover, the manner in which their income comes to them—"two and a half per cent on the completion of the drawings," or however else—puts them in possession of a large sum in a lump which seems to justify generous, if not lavish, expenditures, and so enlargements are made to the library that would not be dreamed of if the same sum came in in regular monthly instalments. The result is, that it is one of the commonplaces to receive a letter from an architect's

widow saying that her husband has left her little more than his library, and can we help her to realize on it. A home for unsuccessful architects would be well patronized, and so, too, would be a home for the indigent widows of architects. And yet our Senators believe architects are as a profession overpaid.

**A** COMPENDIUM of Treasury rulings determining what is sculpture and what is not, so far as tariff charges or free entry are concerned, would be interesting and curious reading. The General Board of Appraisers has had to pass on all sorts of sculpture, antiques, moderns, and grades between; sculptures for architectural embellishment; wood-carvings, in the flat and in the round; religious effigies for Catholic churches; mixed consignments for public or private collections, and so on, and the ingenious way in which the appraisers manage to exact the highest possible duty in each case should command the admiration of every American who believes in keeping out of the country the product of the art of other times and other peoples. One of the latest decisions denies free entry to religious casts imported for use in a Catholic orphan asylum, although the tariff act admits free sculpture intended for "institutions established solely for religious, philanthropical, educational, scientific or literary purposes or for the advancement of the fine arts." The Board rules that, as orphan asylums are obviously established mainly for the sake of affording a home to their unfortunate inmates, it cannot be successfully maintained that they are established "solely" for religious or philanthropical purposes, as the Act provides. This pettifogging quibble is quite worthy of companionship with earlier decisions.

**THE** paper showing the advantage of a thorough education in winning success as an electrical engineer, published elsewhere in this issue is interesting, but it merely develops facts that could be paralleled in every other profession. It is further interesting because it shows that the supply of competent young men is still readily absorbed by the industries of the country, and that the fear that the calling is becoming already overcrowded is as yet unfounded. In this connection we find in the catalogue of the Rose Polytechnic Institute of Terre Haute, Ind., a rather curious revelation. Glancing through the pages, our eye was caught by the number of young men who in 1893 took their degree as electrical engineers, seventeen out of the nineteen in the class electing this calling. As the earlier classes seem to have turned out mainly mechanical and civil engineers, we suppose that in 1889 a new course in electricity must have been established and at once achieved overwhelming popularity. The later classes seem to have recovered their balance, the percentage dropping from eighty-nine in 1893 to sixty-six in 1899, while from that time on the proportion settles to a more normal figure, only twenty-seven per cent of the class graduating in 1903 taking the electrical degree.

**FOR** as complete a massacre of the laws of English composition, it would be hard to find a parallel to a great sign which now adorns—the composer would doubtless say—a large building in the Back Bay, Boston, and it is so amusing that we reproduce it in full elsewhere under the pretext that, as it concerns a building and an attempt to prove the present building-laws of the city are inequitable, it has an architectural as well as literary interest.

TESTS OF CEMENTS.—I.

THE tests of constructive materials at the Watertown Arsenal have from time to time included cements, mortars and concretes, which have been generally made to meet specific purposes. In the year 1900 a more connected investigation of the general subject was inaugurated, and has since then been continued, the results of which appear in full in the reports entitled "Tests of Metals," published by the Ordnance Department, U. S. A.

In this series some twenty brands of Portland and Natural cements are included, of domestic manufacture, excepting one Belgian and two German Portlands introduced for purposes of comparison. One Slag cement is represented and two Portland composites, the latter being known as Silica cement and composed of a Portland mixed and finely ground in nearly equal parts with sand or crushed limestone. The composition of a number of the brands, which may be taken as representative of the different classes, is here given:

CHEMICAL ANALYSIS OF CEMENTS.

| Brand.                | Class.    | Silica. | Alu-<br>mina. | Oxide<br>of<br>Iron. | Lime. | Mag-<br>nesia. | Sul-<br>tri-<br>oxide. | Carb.<br>di-<br>oxide. |
|-----------------------|-----------|---------|---------------|----------------------|-------|----------------|------------------------|------------------------|
| Alpha. . . . .        | Portland  | 20.60   | 11.20         | 2.91                 | 59.00 | 3.25           | 1.40                   | 11.34                  |
| Star. . . . .         | "         | 22.00   | 9.00          | 2.50                 | 59.90 | 3.50           | 1.98                   | .75                    |
| Star, without plaster | "         | 22.45   | 9.27          | 2.53                 | 60.27 | 3.59           | .60                    | 1.00                   |
| Storm King. . . .     | "         | 22.94   | 6.30          | 2.90                 | 43.74 | 20.72          | 2.83                   | 1.00                   |
| Dyckerhoff. . . . .   | "         | 20.04   | 7.48          | 3.95                 | 63.02 | 1.23           | 1.62                   | 3.00                   |
| Cathedral. . . . .    | Composite | 57.76   | 3.60          | .98                  | 34.13 | 1.04           | 1.00                   | 1.49                   |
| Silica. . . . .       | "         | 23.10   | 4.74          | .92                  | 41.77 | 9.85           | .66                    | 9.00                   |
| Austin. . . . .       | Natural   | 19.02   | 8.96          | 1.24                 | 41.18 | 26.58          | 1.27                   | 1.75                   |
| Norton. . . . .       | "         | 26.66   | 11.48         | 3.02                 | 38.33 | 16.41          | 1.35                   | 2.75                   |
| Steel. . . . .        | Slag      | 30.98   | 14.82         | tr.                  | 43.00 | 4.16           | 3.44                   | 3.60                   |

The Star Portland, without plaster, was a special lot of cement kindly furnished by the manufacturers, in which the usual small quantity of gypsum employed as a "restrainer" to retard the rate of setting, was omitted. The favorable influence of this ingredient in respect to its effect on the strength of the cement in addition to its direct function as a restrainer was shown in the tests. The high percentage of magnesia in one of the Portlands will be noticed, although the amount present is not unusual with the Natural cements.

The large amount of silica and carbon dioxide in the Composites is due to the ingredients added to the Portland in the manufacture of these brands. The Natural cements contained about two-thirds the quantity of lime found in the Portlands. In the Slag cement the silica and alumina were both high, while in respect to lime this brand resembled a Natural cement. It was understood that this was a mechanical mixture of granular blast furnace slag mixed and ground together with slaked lime and not subjected to any subsequent burning.

The experimental inquiry began with determinations upon the

FINESS OF GRINDING.

The examination was made in the usual manner, using a series of different sieves up to the commercial limit of fineness, also employing a special wire-cloth sieve the wires of which were electro-plated, thereby reducing the size of the meshes below the limit of fineness attainable by weaving, and further grading by means of a winnowing device. In the latter apparatus a blast of air was directed against the cement as it fell from a fine bolting-cloth sieve, collecting the material as it settled in a trough at different distances away.

The openings of the meshes of the sieves were measured, a number of which are here given.

SIEVES.

| Description.                 | MESHES.   |             |           |           |
|------------------------------|-----------|-------------|-----------|-----------|
|                              | No. of.   | Per sq. in. | DIAMETER. |           |
|                              |           |             | Maximum.  | Minimum.  |
| Laboratory. . . . .          | 60 x 60   | 3,600       | .0148 in. | .0078 in. |
| Wire cloth, No. 100. . . .   | 98 x 100  | 9,800       | .0058 "   | .0057 "   |
| Wire cloth, No. 200. . . .   | 188 x 198 | 37,224      | .0031 "   | .0028 "   |
| Bolting cloth, No. 20. . . . | 174 x 182 | 31,688      | .0027 "   | .0025 "   |
| Electro-plated. . . . .      |           | (about)     | .0020 "   |           |

The 188 x 198 wire cloth and the bolting cloth were each rated as No. 200 sieves. The smaller openings of the bolting cloth were due to the difference in the size of the silk threads and the manner of weaving over the wire cloth, notwithstanding the wire

cloth had the larger number of meshes per square inch.

The practical limit of fineness is reached with the bolting cloth. Sifting with the electro-plated wire cloth was very slow work. The average sizes of the larger grains into which the winnowed material was sorted ranged from .0002" to .0013" diameter. The finer grains might be called dust. This tabular exhibit of the actual sizes of the cement grains is given since it conveys a better idea of the fineness of the material than by the ordinary designations of the sieves.

The shapes of the Portland grains were more rounded than those of the Natural cements and with less flocculent particles adhering to them. The relative proportions of each of the several sizes were found to be:

| Brand.           | Class.   | SIZE OF GRAIN. |           |           |           |           |
|------------------|----------|----------------|-----------|-----------|-----------|-----------|
|                  |          | >.0058"        | .0058 in. | .0034 in. | .0027 in. | <.0027"   |
|                  |          | Per cent.      | Per cent. | Per cent. | Per cent. | Per cent. |
| Star. . . . .    | Portland | 12.9           | 4.7       | 10.4      | 11.4      | 60.6      |
| Alsen. . . . .   | "        | 19.3           | 5.7       | 7.9       | 8.2       | 58.9      |
| Steel. . . . .   | Slag     | 2.8            |           |           | 9.1       | 88.1      |
| Hoffman. . . . . | Natural  | 14.1           | 1.9       | 6.4       | 12.5      | 65.1      |

The material in the first column, coarser than .0058" diameter, was retained on the No. 100 sieve. That which passed the No. 20 bolting cloth is shown in the last column, and is finer than .0027" diameter. From subsequent data it was judged that grouping into two sizes might properly be made with the line of demarkation established at the bolting-cloth size. This division is suggested by the practical difficulties encountered in grading at a finer limit, otherwise a smaller size of grain would be preferred.

Material which will pass a 10,000-mesh sieve and yet be retained on the bolting cloth is too coarse to be classified with that which passes the latter. If specifications contain a clause on fineness, it is not thought that so coarse a sieve as the No. 100 should be used.

In respect to the chemical composition of the coarse and the fine grains, they appear to be identical. A difference was reported in some earlier determinations which subsequent analyses did not confirm. This examination included five Portlands, one Slag and one Natural cement.

The coarse material taken alone does not display much strength as a briquette, and on the other hand there was no unusual display of strength by the very fine particles. If strength resides chiefly in the finer particles, as not infrequently asserted, a number of tests of the finer winnowed grades did not chance to show it.

The low cementitious value of the coarser particles when taken alone may be due to the limited areas of contact. The coarse material should not be regarded as inert matter nor as an adulterant and of no more influence than the same quantity of sand. Grains much coarser than those under consideration, even unground Portland clinker, will apparently hydrate, at least superficially, as shown by its behavior after mixing with water and exposure to the air. It will then effervesce when treated with hydrochloric acid, disengaging CO<sub>2</sub>, which is taken to indicate that the cement has hydrated and passed to a carbonate. The real question, an important one, is whether the coarse stuff, which is certainly not inert, is beneficial or detrimental in combination with the finer portions.

Comminution facilitates chemical reactions and the finer grains are in a favorable condition for prompt change of state. If concurrent action does not take place in the different sizes, if retarded action characterizes the larger ones, the presence of much coarse material must be regarded with apprehension, involving possible danger of rupture by the development of internal strains through local changes in density, as the several sized grains successively attain a completed state of hydration. Such action would explain reported instances of partial loss in strength, where cement, after reaching a maximum strength, was followed by a sensible decline in resistance.

The behavior of some briquettes among the Arsenal tests may be mentioned in this connection. Two batches of material were mixed, one a mortar of equal parts of Portland Cement and granite dust, the other a mortar in which coarse cement was substituted for the granite dust and of the same sized grains.

In the first batch the sizes of the cement grains were .0027" diameter or less, while those of the granite dust were .005" diameter. In the second batch the fine grains of cement were the same as before, the coarser ones also .005" diameter. Tension tests were made when the briquettes were one week old, the strength being in favor of the granite dust mortar. The fragments were set aside in a drawer, where two years later those containing the coarse cement in their composition were found in

a state of complete disintegration, while the briquettes in which granite dust was used remained intact and hard. The disintegrated briquettes swelled, the result, it was thought, of retarded hydration, the coarse cement present bursting asunder the indurated finer parts which had hydrated and set immediately upon gauging. Other briquettes made at the same time, of coarse cement taken alone or with granite dust, were also in a disintegrated state; while those made of the finer grains of cement, none of the coarser grains being present, still retain their integrity with strength and hardness apparently unimpaired.

#### SPECIFIC GRAVITY.

Specific gravity determinations of the loose material were made with a Schuman volumeter, in which a given weight of cement displaces a measurable volume of benzine. Hydrated material, in the cake, was weighed with a chemical balance, in air and water, account being taken in the computations of the water absorbed during immersion. The specific gravity of loose material from the barrels, of a number of brands, was found to be:

| Brand.              | Class.   | Specific gravity. | Remarks.               |
|---------------------|----------|-------------------|------------------------|
| Alpha . . . . .     | Portland | 3.11              |                        |
| Star . . . . .      | "        | 3.10              |                        |
| Storm King. . . . . | "        | 3.07              |                        |
| Whitehall. . . . .  | "        | 3.13              | 14 days after grinding |
| Dyckerhoff. . . . . | "        | 3.11              |                        |
| Steel . . . . .     | Slag     | 2.74              |                        |
| Austin . . . . .    | Natural  | 3.15              |                        |
| Newark & Rosendale. | "        | 3.06              | 12 days after grinding |
| Norton. . . . .     | "        | 3.03              |                        |

It will be observed that practically no difference in specific gravity is shown between the Portlands and the Natural cements, among the brands here quoted. There were, however, in the series two brands of the latter class which had values below 3.00; one was 2.94, the other 2.85.

Hydration causes a pronounced loss in specific gravity in both classes. The average results on reground hydrated material from some briquettes gave 2.66 for those which set in air and 2.59 for those which set in water. The specific gravity of the same brands, for the loose material taken directly from the barrels, averaged 3.03. These results signify, of course, that the volumes had increased upon hydration.

A given quantity of material necessarily gains in weight by combination with water when gauged or by the absorption of carbon dioxide from the atmosphere, but as a hydrate or carbonate the volume increases as well as the weight, and furnishes a lighter resultant material, that is, one of less specific gravity. Since a reduction in specific gravity and also a gain in weight accompanies hydration, either feature may be regarded as an index that chemical reactions have been inaugurated, although in the early stages no change in appearance of the loose material may be noticed.

Heating to redness, or ignition, as commonly expressed, liberates the water and carbon dioxide in combination and effects a restoration in specific gravity. The temperature adequate to accomplish this restoration is in the vicinity of that employed in the burning of Natural cement, much lower than the temperature essential to produce Portland clinker. Experiments bearing upon this feature were made by heating to redness the reground material from some briquettes, which resulted in a restoration of the specific gravity, the final values in fact being slightly above those found in the original cement as it came from the barrel. In these tests a certain loss in weight occurred upon drying at 110 degrees C., ranging from 2.1 to 6.5 per cent., which was attributed to the loss of hygroscopic moisture. A further loss took place when heated to redness, ranging from 4.5 to 13 per cent., taken to be water and carbon dioxide of combination. There was a slight gain in specific gravity, the result of drying at 110 degrees, but this did not reach an average value of .1 per cent.

It is known that cement exposed to air, of the ordinary state of dampness, loses in specific gravity. The swelling in the barrel when not fully protected from the air is a familiar illustration of this effect. Some experiments on loose material spread out in shallow trays showed that diminution in specific gravity could generally be detected after an exposure of two to four weeks. Subsequent heating to redness was attended with a decided loss in weight and followed by the usual restoration in specific gravity. In the case of a Natural cement from an open barrel, about ten years old, the specific gravity was found reduced to 2.75. Its cementitious value was about exhausted. Upon heating, its specific gravity was restored to 3.07, with a total loss in weight of 10.7 per cent. The characteristics here displayed being the same as those shown by cement which has been gauged and set under

service conditions, differing only in degree, it is therefore inferred that this material had partially set.

Assuming that a certain interval of time exists, of longer or shorter duration, immediately succeeding the time of gauging, in which there is a state of incomplete chemical action, and which additional time will overcome, then the evidence of such a transitional period might be looked for in the relative changes of the different sized grains, the more prompt reactions being expected among the finer particles, and similar results might follow in case a limited quantity of water was present, insufficient for the complete hydration of the whole.

Experiments bearing upon this question began with an examination of the loose material from the barrel, separated by sifting into lots of different sized grains. The cement was divided into five lots, those grains which were coarser than .0058" diameter constituting one lot, those finer than .0027" diameter another lot, and three of intermediate diameters. The finest lot had the lowest initial specific gravity, and when heated to redness lost twice as much in weight as either of the others. The fine grains of one Portland lost 2 per cent. against .9 to 1 per cent. for each of the other four sizes. These results are explained on the ground that incipient hydration had advanced farther among the fine grains than with the coarser ones, a limited quantity of moisture having gained access to the cement while in the barrel. The statement of manufacturers that their cements are benefitted by several weeks' "seasoning" is not unlikely due to the early hydration of some of the more active portions during that interval.

Another Portland, graded in the same way, was examined thirty minutes after gauging. The lot finer than .0027" diameter had then lost .16 per cent. in specific gravity, against an average loss of .04 per cent. for the other four sizes, and four days later the losses stood .62 per cent. and .16 per cent. respectively. In still another series the samples were gauged with an excess of water, being stirred frequently to prevent caking. The average results of twelve determinations on two Portlands, one Slag and three Natural cements were found to be:

#### AVERAGE SPECIFIC GRAVITY AFTER TREATMENT IN WATER FOR PERIODS OF

| One-half hour. | 16 hours. | 25 hours. | 2 days. | 5 days. |
|----------------|-----------|-----------|---------|---------|
| 2.87           | 2.78      | 2.73      | 2.68    | 2.62    |

The progressive changes in value with lapse of time will be noted. More experimental data might be quoted, but the results would be merely confirmatory. They show changes in weight and in specific gravity, in which the finer particles maintain their position as a group distinct from the coarser grains.

The results thus far presented have referred to the ground cement.

Experiments were made on hydrated material in the cake, using fragments of briquettes or cubes, the specific gravity being found in the vicinity of or below 2. The values ranged from 1.48 to 2.29 for material which had been gauged with ordinary quantities of water, while for grouts they were generally between 1.50 and 1.70. These results signify the presence of voids in the hydrated briquettes and cubes, since the specific gravity of the cake is much below that of the ground material. The numerous small cavities displayed by the fractured surfaces of ordinary mortar afford examples of the last remark.

The specific gravity of the cement rock, from which one of the Portlands was made, was 2.71, which after grinding to a fine powder retained about the same value. Upon burning the latter at a temperature of about 2,500 degrees F., the specific gravity rose to 2.98. The limestone, used with this rock in the manufacture of the cement, had a specific gravity of 2.70, which became 3.30 after burning to the state of quicklime, then fell to 2.30 when slaked, and was restored to 3.30 when again heated.

While the observed changes in specific gravity are regarded as indicative of chemical reactions completed or in progress, it is not inferred that the experimental data acquired necessarily indicate a restriction of the display of cementitious properties to the interval of time within which the changes in specific gravity occur. The two phenomena, if they are indeed distinct, go on simultaneously during a part of the time of their active state and from their close relationship may be only different manifestations of the same physical property.

The extent to which the cementitious properties become usefully developed depends in a measure upon the treatment of the material during its active period. If the cement grains are allowed to remain loosely associated the active stage is passed and comparatively little cohesive strength results. If, however, the cement during this period is well compacted, higher strength will be attained by the indurated material. It is essential that

the particles be brought into contact with each other during setting for the final acquisition of great strength and rigidity.

In illustration of these remarks the low strength of grouts may be compared with the higher strength of cements which have been gauged with less water and well compacted in the moulds, and with the phenomenal strength displayed by mixtures which have been placed under pressure while setting.

Wet mixtures do not admit of being further consolidated in the molds by tamping. They have the properties of liquids and the parts are merely displaced relatively by the process.

The excess of water in grouts mechanically separates the cement grains and is afterward lost by evaporation, leaving voids in the material. Dry mixtures are sufficiently adhesive to retain in part the consolidating effect of tamping, and when they are set under pressure reach the maximum density of structure, and in consequence of which it is believed also attain the maximum degree of strength.

J. E. HOWARD.

(To be continued)

#### EDUCATION AS AN ELEMENT IN SUCCESS.

IN a paper recently read before the Western Society of Engineers, by Mr. George A. Damon, dealing with "The Opportunities in the Electrical Business," he gives the following account of the results of his inquiry as to the bearing of education upon commercial success in this particular field:—

KNOWING that the leading electrical men of Chicago would afford a valuable field for studying results, a letter of inquiry was sent to one hundred of the leading men in Chicago engaged in the various branches of the electrical industry. An opportunity was given at the same time for the expression of opinion on various questions pertinent to the general subject. The response to the circular letter was hearty and spontaneous, and we are under obligations to one hundred of our friends who have so kindly consented to become living examples, and willing to be analyzed for the good of the cause. The following is an analysis of results.

Young men control the business. The inquiry was, therefore, confined to men between the ages of 27 and 45, upon the theory that the older men are the product of a set of conditions which have passed away, while the youngest men are, as a rule, still engaged in a period of preparation. The average age is thirty-three and one-half years.

The average income at each age was plotted on a gunshot diagram and a line of average incomes determined up to the age of thirty-eight, after which there was not sufficient data to locate the curve. This income curve starts with a value of \$2,170 at twenty-seven and extends to \$4,000 at the age of thirty-eight. The average income of the entire one hundred men is \$3,440 per year, which will give us a standard by which we can measure the different branches from a mercenary standpoint.

The hundred men may be divided into groups as follows:

|                                              | No. of men. | Average Age | Average Income |
|----------------------------------------------|-------------|-------------|----------------|
| Salesmen .....                               | 7           | 33          | \$2,400        |
| Sales Managers.....                          | 11          | 36          | 3,400          |
| Business Men.....                            | 10          | 36          | 4,800          |
| Sales Engineers.....                         | 8           | 35          | 2,350          |
| Electrical Engineers.....                    | 16          | 33          | 2,800          |
| Constructing Engineers.....                  | 6           | 33          | 2,850          |
| Electrical Experts.....                      | 8           | 33          | 3,200          |
| Operating Engineers.....                     | 3           | 32          | 2,250          |
| Operating Managers and Superintendents ..... | 10          | 34          | 3,550          |
| Professors and Editors.....                  | 8           | 34          | 2,500          |
| Patent Attorneys.....                        | 4           | 32          | 4,000          |
| Consulting Engineers.....                    | 9           | 40          | 6,400          |

Total number of men, 100; general averages: age, 33½ years; income, \$3,440.

Classified in reference to incomes, the record is as follows:

|                                          | Men |
|------------------------------------------|-----|
| Income over \$10,000 per year.....       | 5   |
| Income between \$5,000 and \$10,000..... | 9   |
| Income between \$2,400 and \$5,000.....  | 66  |
| Income below \$2,400.....                | 20  |
| Total.....                               | 100 |

It should be stated that there are in Chicago at least one hundred more men in the business whose incomes will average about the same as the first hundred selected. An effort was made to make the list representative, and the men were selected on account of their positions without reference to their incomes.

It is to be understood that the dollar is not the most desirable standard by which to measure men individually, but looked upon as a class, a study of the averages furnished by the inquiry is interesting and may be made instructive.

Salesmen who have technical ability or possess engineering information, as a rule, get better salaries than those who do not.

Add initiative and executive ability to the salesman's ability, and he becomes a sales manager with a still greater reward.

Enterprise and energy put the man in possession of his own business, or often result in a partnership arrangement. A technical man without the commercial instinct is only fairly well paid. Ability to develop new methods or apparatus puts him in the expert class where the rewards are greater and in proportion to his ability.

Routine work, such as operating, is the least remunerative work of all. Operating managers and superintendents, however, are very well paid.

The editors were classed with the professors as there were too few to form a class with an average of their own.

Our professors should form a union, as they are certainly entitled to higher compensation, and as we all appreciate their value we would help them win should they decide to strike. We must grant however, that they get rewards in seeing the living results of their work, which is a compensation worthy of considerable sacrifice.

The phenomenal development along all electrical lines, and particularly in the telephone business, makes the profession of patent attorney a paying one for those who are qualified for that kind of work.

The field of consulting electrical engineering looks attractive, but it will be noted that the average age is greater in this branch than in the others, which means that the successful consulting engineer brings to his work years of experience, and that it is therefore not a branch to be adopted at once by the young man.

Forty per cent of the men in the list are employed by what might be termed the "large" companies, such as the Western Electric, Chicago Edison, Chicago Telephone Company, etc.

Thirty-five per cent of the men either control the business in which they are engaged or own a partnership interest.

Twenty-five per cent of the men are not college graduates.

Twenty per cent of this hundred successful men never had any college education whatever.

The average age of the twenty men who are succeeding without a college education is 36 years, and their success measured by a monetary standard shows an income of \$3,670 per year.

The average age of 16 graduates of Cornell is also 36 years, and their success measured by the same questionable standard is \$4,490, which shows a balance of \$1,270 per year in favor of a college education.

It will be noted however, that the twenty men without the education are getting along financially slightly better than the general average of \$3,440 per year. This is explained by the fact that in their number are included several men who are prospering as a result of their business enterprise.

There are few non-technical men engaged in the strictly technical end of the business who reach the average income.

There seems to be more openings for the man without a college training in the telephone field than in any other.

The inquiry into the domestic arrangements of our hundred examples shows that 75 per cent of them are married. The families are composed of 45 boys and 30 girls.

Out of the hundred men selected only 56 per cent belong to the American Institute of Electrical Engineers.

The answers to the questions upon which an expression of opinion was asked resulted as follows:

Eighty per cent are inclined to think that a college education is essential to the highest success.

Seventy per cent are in favor of the technical graduate taking a shop course in a large manufacturing company, but many wished to limit this course to one year.

Fifty-five per cent are of the opinion that in choosing a life work better chances for advancement will be found with the smaller companies.

Seventy per cent are in favor of requiring a year's practical work of the student before graduation.

Fifty-five per cent agree that the larger companies would be consulting the interest of the art at large by offering an apprentice course open to students during an intermission of one or two years before completing the senior year.

A young man wishing to succeed in any branch of electrical industries makes a serious mistake if he fails to use every effort to obtain a technical education. A college course is becoming easier to obtain and it is already recognized as a general requirement for advancement. A young man of high aspirations, who is so situated that he cannot secure a university course, might better, nine times out of ten, take up some other branch of work which is less intricate than the electrical art. Thomas Edison the Dean of the profession, is not a college man, but a gold medal bearing his name is to be given hereafter each year to the college

graduate presenting the best thesis, and this incident is the best evidence of the present tendency toward technical education. Nearly every man who is now making his way in the electrical business without a college training, if asked what he would do if he had his life to live over will say: "I would secure a technical course in the best college I could find."

A technical course in a correspondence school which can give the proper training for an electrical engineer is yet to be produced. The correspondence schools are doing a good work and are to be recommended to those who cannot possibly avail themselves of a college course or get instruction in evening school, courses such as offered by Armour or Lewis Institutes, but a young man who will deliberately choose correspondence instruction if anything else is available is making a serious mistake. Of the hundred men in the list only two had completed a correspondence course. These two men were engaged in telephone work, and both voted in favor of a college course.

#### THE MAKING OF ANTIQUES.

**A**T this season of the year, when so many people are travelling to Italy for sunshine, and mostly with their eyes open for bargains in antiques, it may be well to indicate the fallacy of any such hope.

The modern craze for collecting anything old—or even anything having the appearance of age—has swept not only England clean of antiques, but also France and even Italy—the land which was, within our own memories, the paradise of the curio-hunter. The English housewife nowadays delights in her old oak, Chippendale or Sheraton—to which the fatal word "style" should generally be added—while the Englishman of means and the leisured American, knowing that our land has been denuded of everything, turn their attention to Italy, the country where della Robbia plaques are set in the wayside shrines, and where every contadino of the fields possesses some smoke-blackened Madonna or Pieta, and is ready to sell cheaply.

Misguided persons! One can only smile at their ignorance. As a resident in Italy through a good many years, and as a collector of antiques myself, I am personally acquainted with a good many dealers, many of the *mezzani*, or middlemen, and most of the manufacturers. I have, therefore, obtained an insight into the fearful and wonderful secrets of this ingenious trade, some of which may not prove uninteresting to the ardent collector who goes abroad in search of "finds."

Your average Tuscan looks upon the *forestiere* as a born fool if he makes any inquiry for antiques for sale. He knows that there are none, and only a foreigner would ask such a ridiculous question. His father's house was cleared of every stick that was of value twenty years ago—old dowry chests, Montelupo earthenware, the carved wardrobe, the blue-and-white terra-cotta Madonna from the house wall, his mother's necklet of old pearls, even to the old copper vessel in which they drew water from the well. The travelling agents took them all and were welcome, for they paid prompt cash for them. Yet the Inglese who spends the winter in Italy still wants antiques, therefore he must be supplied. Hence there has sprung up a trade of forgery and imitation which is well-nigh incredible.

I have stood in more than one sculptor's studio, both in Florence and in Carrara, and seen "age" given to marble by a newly discovered process which in twelve hours will give to a statue five hundred times its true value. One sculptor, in whose studio fifty men were hard at work making antiques, informed me that the greater part of his output was shipped to an agent in New York, who judiciously distributed it to dealers all over America. So clever is this mode of giving age that the combination of acids applied is absorbed by the marble and turns it yellow right through, so that even experts can be deceived by those ingenious imitations of Michael Angelo, Donatello and other celebrated sculptors.

Old silver is a fashionable craze, and time was when one could find in those tiny shops on the mediæval Ponte Vecchio genuine chalices, patens, and mass-bells of the cinquecento, goblets of the sixteenth century, and those curious old sugar-basins with the spoons hung around them. To-day the searcher for antiques can still find them all, and more, beautifully hall-marked, and at a price much lower than he would pay a London dealer. But examine your find when you get home. The English seventeenth century mark which caught your eye does not stand alone, for it is accompanied by the square Vienna date-mark, or perhaps, even the spread eagle of Frankfort-on-the-Main! You will find upon the goods offered you a variety of irresponsible marks and counter-marks that bewilder you—French and German, side by side—and the articles all genuine, of course! And yet even this rubbish is eagerly purchased and carried to England and America in ignorance that it was manufactured in Germany last year.

The largest profit is, however, made on arms and pictures. The

armory where the greater part of the "ancient" arms sold by dealers in Italy is forged is in a back street in Leghorn, and its proprietor is a veritable artist in iron. Here, in a couple of tumble-down old blacksmiths' shops every conceivable kind of armor is made, from the fourteenth century helmet or breastplate to the gauntlets, halberds, swords, and daggers of the various centuries, and of the most celebrated makers. I have watched those swords being stamped with the marks or monograms of the well-known Spanish armorers of the sixteenth century: the coronet in a shield of Domingo, the crossed scissors of Sanchez, the half-moon of Juan Martin, or the star of Gil de Alman, together with good "selling" Latin inscriptions, or owners' names with dates. I have stood by and seen how the steel is treated with acids; how the bronze hilts are painted with some solution to render them old, and how they are placed in troughs of damp earth to induce rust and patina before being sold to the dealers at so much a dozen assorted.

Where the foreign enthusiast in Italy betrays his greatest ignorance is in pictures. He is always in want of an old master, and, of course, he is supplied. Munich, Siena and Perugia are the centres of manufacture of false examples of the famous masters. The works of Rubens, Raphael or Titian are too well known, therefore the forger resorts to imitations of such artists as Reni, Sodoma, Andrea del Sarto, Van Dyck, the Gaddis or Ghirlandajo. Each forger possesses his own particular style, one turning out dark, time-stained portraits of Van Dyck's, another painting the wry-necked Virgins of one or other of the Gaddis, while the manufactory of spurious Ghirlandajos is in Perugia, where an artist is busy year in, year out, painting works by that maestro, which when complete and ready for sale are certainly marvels of ingenuity. His main secret lies in the use of a special varnish, which if not used properly and applied at a certain temperature may spoil months of work, but if put on in the right manner gives in twenty-four hours such an appearance of age that even certain directors of the national collections have been deceived.

An amusing incident occurred not long ago when an American purchased one of the Ghirlandajos through a dealer in Siena, and on being taken to the Uffizi for the official permit to allow it to leave Italy it was actually detained as a genuine specimen!

Again, a case of clever trickery with regard to a picture came before my notice a short time ago. A *mezzano* in Florence called upon a well-known and wealthy Englishman staying on the Lung' Arno, and in confidence informed him that there was a genuine Madonna and Child by Fra Bartolommeo in the private chapel of a villa up the Val di Pesa, about twenty miles from the city, and that the owner, a marquis, who was hard pressed, was prepared to sell privately. The Englishman saw at once the chance of securing a real art treasure, and invoked the aid of a well-known Florentine expert. In secrecy they went with the *mezzano* to the great, old, half-ruined villa, where they found a magnificent and genuine example of Fra Bartolommeo.

The Englishman was delighted, and after much haggling a bargain was made next day for 40,000 lire. The picture was delivered to a firm of unscrupulous exporters, who managed to smuggle the treasure on board a ship at Spezia, much to the relief of the purchaser, who soon afterwards left for England to hang his "find" in his private gallery. He is, however, in blissful ignorance that the picture he first saw has since been sold by the marquis to the Italian Government, and that the treasure delivered by the agent—who that same day decamped with the 40,000 lire—was a copy which had been carefully prepared, for the purpose of fraud!

The only reliable dealers in Italy are the priests, to whom needy families sometimes sell their treasures in confidence. There are certain priests in Pistoja, in Pisa, and in Leghorn, of whom genuine antiques can still be bought, while Etruscan gold ornaments are still turned up by the plough in the Maremma. But ancient art is certainly not to be found in the shop of the antiquario, and the foreigner acts very foolishly if he attempts to discover it.—*William Le Quex in London Daily Mail.*

#### TOWER CLOCKS.

**I** SUPPOSE there is no more famous clock in the world, none whose name would be more readily recognized when mentioned wherever the English language is spoken, than "Big Ben" at Westminster. Really, it is not the clock itself that is so called, but the great thirteen-ton bell on which the hours are struck, but few ever refer to the clock tower, and it is "the time by Big Ben" that is asked for when the exact hour is wanted.

And there is no object more "looked up to" in London. Its altitude of 320 feet detracts, however, from the visitors' astonishment at its size, for it looks but a small affair from the street level, and they are incapable of appreciating its dimensions from

the measurements glibly rolled out by the guide or given in the cold type of a guide book.

Mention of a 22½-foot dial, with two-foot-high numerals, and hour and minute hands 9 feet and 16 feet long respectively, conveys little to the mind until one is brought face to face with these component parts on an equal level; then the eyebrows rise with astonishment as one appreciates for the first time the actual size of a giant clock.

Take, for example, the dial plan for a "Big Ben" made for Toronto, Canada. Men beside it look like Lilliputians, and it would take four of them, standing on one another's shoulders, to equal its height, for it has a diameter of twenty feet. Its minute-hand is the height of two men, while the hour-hand is five feet in length.

Then the numerals have a height of 2 feet 9 inches, and the minute strokes are just half a foot in length. In performing its daily task of indicating the time, the long hand in this clock, which now announces the hour to the good people of Canada from the height of the town-hall tower, travels a quarter of a mile, or 91¼ miles a year!

The first consideration in the making of a huge clock is the meteorological conditions under which it will have to perform the duty required of it. As an instance, take the case of the clock that was constructed for Toronto. The hands do their work at an elevation of 250 feet, and, snowstorm or no, complete their daily round without resting. With hands not specially built to resist it, a Canadian snowstorm would do surprising things, even to twisting them and breaking them off.

Ordinarily, the hands of a turret clock are cut out of sheet copper, stiffened with ribs of brass at the back. Were this not done, the wind would blow them out of truth. But where they have to work under such conditions as the Toronto timepiece they are formed elliptical in shape, of double sheets of copper convex toward the centre, and strongly riveted every four inches of their length.

After the planning of the dial, the templet from which the mould is made has to be cut, and the great dial is cast whole in iron. The huge frames to contain the intricate and delicate mechanism of the works are likewise cast in one piece. Remembering that the clocks are exposed to the changing conditions of weather, and the influences of those conditions on metal, the necessity of dispensing with nuts, screws and bolts becomes apparent.

The giant dials vary from 18 to 60 feet in circumference, and the dial-room at a maker's of tower clocks is an interesting sight. There are dials, mostly skeletons, of iron, in various stages toward completion all around, being painted and glazed and gilded. Those intended to serve in illuminated clocks are glazed with opal glass, as this, better than any other, diffuses the light equally over the surface of the dial. But "skeleton" dials, intended for a tower whose wall will be the only background to the iron casting between the hour and minute spaces, are generally gilded. According to their size, they vary in thickness and weight. Such a one as the Toronto dial completed would not weigh much under four tons.

With the making of the actual works there is not space to deal here, and a description of them would only puzzle the lay mind. They are a mass of complicated but delicate machinery, and constitute a veritable marvel of mechanical construction.

Of course, no tower clock would be complete without its bells, and though the component parts of the metal from which these are cast are no secret, their making calls for much judgment and skill. There must, of course, be the proper proportions of tin and copper, the scientific mixing of them in the furnace, and one must know the exact moment to run the metal into the mould, after the cores from which the bells are shaped have been built up and dried.

Then there is the tuning of them. To tune a bell is declared to be a most difficult business, because when struck it sounds a trio of notes instead of one. Consequently, it requires an expert ear to catch the dominant note. By a special machine this difficulty has been largely overcome, and the operation of tuning much simplified. By the aid of this clever contrivance the tuning can be accomplished so gradually that the variations of the note are only distinguishable to the trained ear. The bell is inverted. It is held stationary by powerful vises, the steel cutters for paring the metal to secure the required note being in the interior. These cutters are revolved by machinery, and shave the metal as easily as a plane shaves a deal plank. In this manner the bell is toned either up or down, as desired, till the correct note is secured.

Some of the pendulum "bobs" weigh as much as four hundred-weight, while the weights that furnish the power to make "the wheels go around" require the united efforts of a couple of men to raise them. Both these parts, together with the tremendous hammers for announcing the flight of time, are cast in the foundry.

From this it will be gathered that the building of a giant clock is no light labor. It calls for the combination of scores of pairs of hands, and the workmen must all be experts at their particular branch of the business, from the humblest painter of dials to him who builds up the innumerable parts of the complicated mechanism.—*London Mail*.

#### THE SCHOOLMASTER ABROAD IN BOSTON.

THE following piece of "nervous English"—we suppose we should call it considering the character of manufacture in which the advertiser is engaged—occupies a space twelve by fifteen feet on a large building on the Back Bay land in Boston:—

THE Hotel Bartol is condemned for improvements by the full bench, to build up to its ridgepole and will remain closed until our rights are restored to us which we have enjoyed since the city received its charter in 1822 until within a few years. When built in 1886 it could not be built in the language of the future laws, as it is beyond the power of man to do, but did cost 15 per cent. per square foot more than any building built that year, to enable it to have the principle safety from fire it has. Only 5 per cent. of the hotels are insured as cheap, then the next best 15 per cent. pay from 40 to 65 per cent. advance, and when remodeled as our specifications given the three commissioners we have had, the difference of rates will be still greater. If the Bartol is remodeled as the law demands, its rate of insurance would be increased, based on hotels remodeled by each of the commissioners. We quote from one some thirty years old, the insurance was 130 per cent. more before it was remodeled and 330 per cent. more after it was than the Bartol and all of the cases were remodeled after the courts or full bench said they could not do it. The increased assessed value of the land, increased rates of taxes and the interest on betterments can earn no income unless we can enlarge to our ridgepole. When we occupied the building for our free Surgical Hospital we had 3872 helpless women and 135 beds in half the house; we can have 270 beds in the house and clear the law, but with our improvements which would make the building still safer and would not have over 150 beds we would violate the law, as it is now a hotel instead of a hospital, that is the reason we are refused a permit. The governor being advised of the evils of the present laws, has had a bill accepted by the Legislature to enable him to appoint a commission that will restore to us our rights on first class property, and as soon as the bill is passed in 1905 the Bartol will be remodeled and reopened with the same management that has made it so popular as a temperance hotel the last twelve years, confirmed by half the boarders who have been in it ever since it was opened.

If we had not built superior to the laws we should not have had this three years' fight for our rights. So be careful when you build.

(Signed) MURDOCK LIQUID FOOD CO., Owners.



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

A COMPETITIVE DESIGN FOR THE PUBLIC LIBRARY, MARLBOROUGH, MASS. MESSRS JENNEY & FROST, ARCHITECTS, BOSTON, MASS.

PLAN OF THE SAME.

A COMPETITIVE DESIGN FOR THE CATHEDRAL OF ST. JOHN THE DIVINE, NEW YORK. M. ALPHONSE GOSSET, ARCHITECT.

ALTHOUGH it is a long time since this competition was held, our readers may be glad to see this design which has an interest because of being the work of the author of the well-known book on domes, "*Les Coupoles d'Orient et d'Occident*." The plate has just appeared in a recent issue of *l'Architecture*.

THE TEXAS STATE BUILDING: LOUISIANA PURCHASE EXPOSITION, ST. LOUIS, MO. MR. CHARLES H. PAGE, JR., ARCHITECT.

THE author of this design has adopted a star-shaped plan, in recognition of the well-known symbol of the "Lone Star State."

#### Additional Illustrations in the International Edition.

EQUESTRIAN SCULPTURE AT THE LOUISIANA PURCHASE EXPOSITION:—

"ST. LOUIS." MR. CHARLES H. NIEHAUS, SCULPTOR.

"DE SOTO." MR. E. C. POTTER, SCULPTOR.

"LOUIS JOLIET." MR. A. PHIMISTER PROCTOR, SCULPTOR.

"FOUNTAIN OF LIBERTY," IN FRONT OF FESTIVAL HALL. MR. HERMON A. MCNEIL, SCULPTOR.

"COWBOY AT REST." MR. SOLON H. BORGLUM, SCULPTOR.

STATUARY AT THE LAUNCH LANDING. MR. SOLON H. BORGLUM, SCULPTOR.

QUADRIGA ON THE PALACE OF EDUCATION. MR. ROBERT F. BRINGHURST, SCULPTOR.



OILED ROADS A SUCCESS IN CALIFORNIA.—Santa Clara County, in California, began oiling roads in 1892, and now has about seventy miles of such highways. The results have been, according to the State Bureau of Public Highways, on the whole highly satisfactory. In the first stages of the experimenting with oil sprinkling there were strenuous objections by some of the people to this method of improving the highways. The chief grievance was the fact that when the oil was first applied it rendered the road disagreeable to travel upon and had a tendency to soil vehicles and clothing. This, however, proved to be only a temporary trouble, as a few days, when the oil had been properly worked in and the surface smoothed and packed by thorough rolling, sufficed to harden the surface and keep it clean. It was soon realized that the inconvenience caused by the first application of oil was not nearly so great as was caused by the first application of gravel. In the latter case it requires nearly a year for the road to become packed and smooth, while with oil the time required to put it in readiness for easy and dustless travel is only a few days. Oil has the advantage over water in the fact that where applied there is absolutely no dust, and where the roadbed is properly prepared there is practically no mud during the rainy season. The cost per mile of watering the valley roads of Santa Clara County has averaged about \$87 per season, exclusive of the cost of water, expenditures for water-wagons, repairs, etc., and with that added, the cost per mile per annum has been about \$123. The cost of oiling a mile of road the first season is about \$90. For the second season about \$50, with a decreasing expense each season following. This estimate includes the entire expense of oiling, and shows a saving of water of \$33 per mile the first year and \$73 per mile the second year, a saving in expense which is pretty sure to appeal strongly to the taxpayers. In applying the oil, Glover's road-oiling wagon and other wagons, with tank and sprinkler attached, have been used. From 100 to 400 barrels a mile have been used on the first application of oil to the road-bed, depending to some extent upon the width oiled, ordinarily about twelve feet. The famous "Alameda," between San Jose and Santa Clara, is oiled to a width of sixty feet. The oil is heated by steam to a temperature of 300 degrees at a cost of eight cents a barrel, the expansion resulting being about 3 per cent. The quantity used per mile is estimated after heating. Bakersfield oil is used, of a specific gravity of 14 to 17 degrees, costing 90 cents per barrel and upward, according to the distance to be hauled from the railroad station.—*N. Y. Evening Post.*

HOW WELLS ARE POLLUTED.—By a series of experiments which proved how readily deep wells and springs could experience pollution, the town of Quitman, Ga., has doubtless been saved from the danger of an epidemic of disease. In this place, says *Harper's Weekly*, the water-supply of the town is derived from wells, and in planning a sewerage system it was proposed to dispose of the public sewage by discharging through a bore-hole into an underground stream. The possibility that contamination might result, however, was early suggested, and led to practical experiments being undertaken by the United States Geological Survey and the Geological Survey of Georgia, in order to determine the matter definitely. Two tons of salt were placed in the well where it was planned to empty the sewage, and the water from the various wells which had been previously examined, especially as to their chlorine contents, was again analyzed, samples being taken at intervals during and some time after the experiment. It was found that the salt had permeated all of the wells in the town, demonstrating conclusively that disease germs could be readily communicated to the drinking water. These experiments are in line with some carried on in Europe several years ago, where it was found that bacteria, placed in certain wells, could be detected at other sources of water in the vicinity, and emphasized the importance of carefully examining and safeguarding water supplies under all conditions.

A FEMALE PROFESSOR OF ARCHAEOLOGY.—A woman who has been long the Director of a museum of archaeology is Miss Johanna Mestorff. About five years ago, when she was seventy, a diploma of professor was granted her; she is the first woman to reach that honor in Prussia. Miss Mestorff has been Director of the Schleswig-Holstein Museum for Home Antiquities at Kiel since 1891, when Prof. Handelsmann died. Virchow testified (1899) that among living women she was the one who had done most by active work in the field to further the cause of prehistoric archaeology.—*N. Y. Times.*

CHURCH SPIRES.—There are various circumstances which, though they do not affect the spire itself, produce greater or less difference in regard to the character of the structure of which it is a component feature. Very much, for instance, depends upon its situation in the general plan. At Salisbury, Norwich and Chichester the spire is raised upon a tower at the intersection of the cross or in the centre of the plan; whereas in most Continental cathedrals and large churches there are two spires on the towers of the west front, though in some instances (Strasbourg, Antwerp,) only one has been erected. Several, however, have a single tower and spire in the centre of the west front (Ulm, Freiburg, Thann in Alsace), in which case the tower itself begins to diminish almost from the ground, and the whole becomes of the tabernacle character. In most of our English churches (not cathedrals) the spire is placed upon a tower at the west end, as at Grantham, Louth, Bloxham, etc. If we except Peterborough, where they are very diminutive, the only English cathedral which has two western spires is Lichfield, which is further remarkable as having a central tower and spire also. Besides the richness and variety thus produced, the larger central spire serves to balance the whole composition, whereas else the body of the structure is apt to look low in comparison with the west end. At St. Stephen's, Vienna, the tower and spire are singularly placed on the south side of the edifice, it having been intended to balance them by a corresponding tower on the north side. At Gelnhausen on the contrary, there is a group of spires at the east end. Though so much depends upon circumstances, almost the only thing that is specified in the usual description of spires is the entire altitude from the ground, which single measurement, unaccompanied by others, gives no idea of the relative dimensions of the spire or how it is proportioned. Some of the loftiest spires, as they are popularly termed, are by no means lofty, being not above a third of the entire height and not more than four of their own diameters. The spire of Strasbourg, for instance, is only 110 feet out of 474, or less than one-third of the tower itself. At Antwerp again the spire is a mere peak crowning the uppermost stage of the tower, while the tower itself is twice as high as the roof of the church. If we compare Salisbury with Norwich the spire of the latter cathedral will be found, though of less dimensions, much loftier in relation to the rest than the other, being in the ratio of 163 to 308, while Salisbury is only 197 to 304.—*The Architect.*

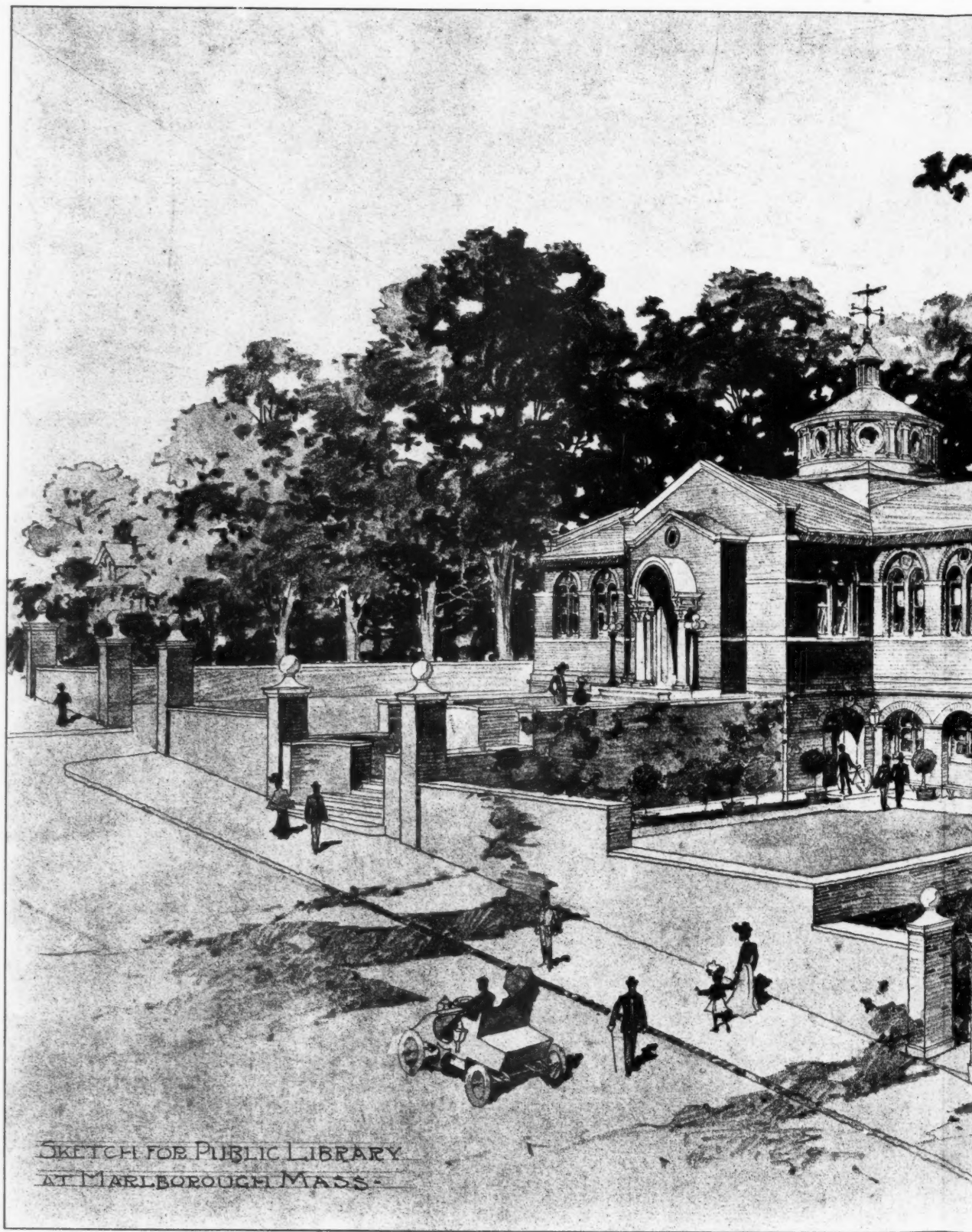
TIN IN ALASKA.—The outlook for tin mining in Alaska is improving. Lode tin has been found in the Lost River district, about thirty miles east of Cape Prince of Wales. The tin occurs in a dike of granite traversing limestone. Prospecting is now going on at this locality and the outlook appears to be good. The reconnaissance work of the United States Geological Survey indicates that the distribution of tin in the Seward Peninsula is wider than supposed, although the occurrence of placer tin has only been proved in the creeks at York, and in the valley of the Snake River, 100 miles east of York and about twenty miles inland from Nome. The cassiterite is grayish brown to black, and is more often confused with magnetite than with garnet. Even tourmaline has been mistaken for tinstone by prospectors unfamiliar with the mineral. With better knowledge and more extended search, it is likely that the United States may again include tin among its important metallic products.—*Engineering and Mining Journal.*

WHAT CAUSES FIRES.—The annual losses by fire in the United States, which have averaged as high as \$100,000,000 a year at certain periods, were attributed during a single year to the following causes, the number of fires from each cause being given: Incendiarism, 1,927; defective flues, 1,309; sparks (not from locomotives), 715; matches, 636; explosions (of lamps, etc.), 430; stoves, 429; lightning, 369; spontaneous combustion, 326; prairie and forest fires, 280; lamp and lantern accidents (other than explosions), 238; locomotive sparks, 211; cigar stubs and pipes, 203; friction, 179; gas jets, 176; engines and boilers, 150; furnaces, 135; and from firecrackers, 105.—*Harper's Weekly.*

SOME PARISIAN PARADOXES.—Pius X, though less witty than his predecessor in the Chair of St. Peter, is credited with a rather clever remark about France, a country which just at present occupies his thoughts both by day and by night. "What a paradoxical nation the French are!" he exclaimed. "The palace of their Senate bears the name of a city which no longer belongs to them, namely the Palais du Luxembourg; the palace of the Chamber of Deputies (the Palais Bourbon) that of a dynasty which they have expelled, while the President of the republic lives in a palace (the Palais de l'Elysee) bearing the name of a paradise in which the people no longer believe."—*Marquise de Fontenoy in N. Y. Tribune.*

WHO SLEEPS IN THE CITY OF LONDON.—Estimates framed by Dr. Collingridge for his annual report to the Court of Common Council place the number of those who sleep in the City at 24,958, and of those who are engaged in business there during the daytime at 358,930. Of the 839 deaths registered in the district in 1903 no fewer than 631, which occurred in St. Bartholomew's Hospital, were of persons who had resided outside its boundaries.—*London Telegraph.*

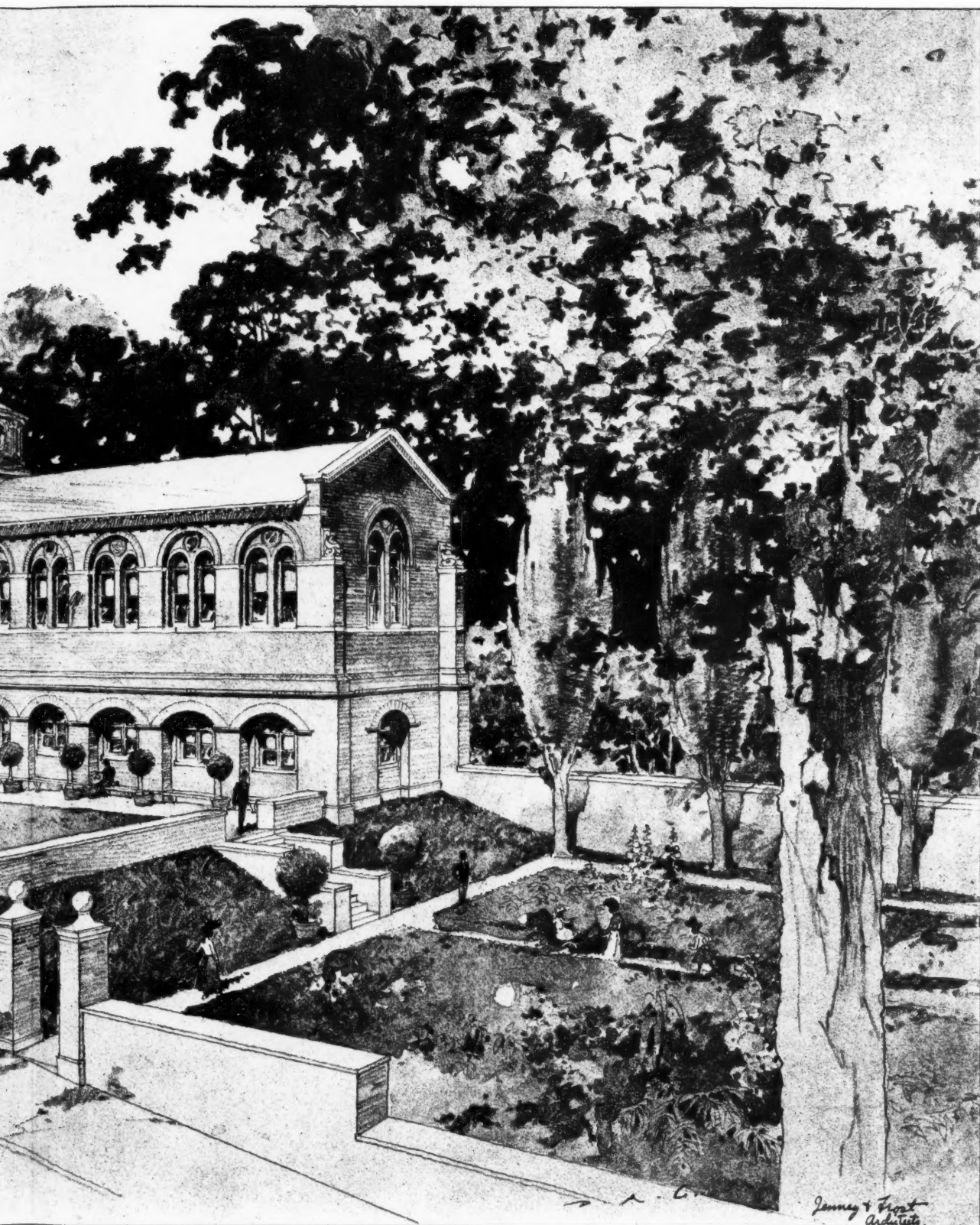




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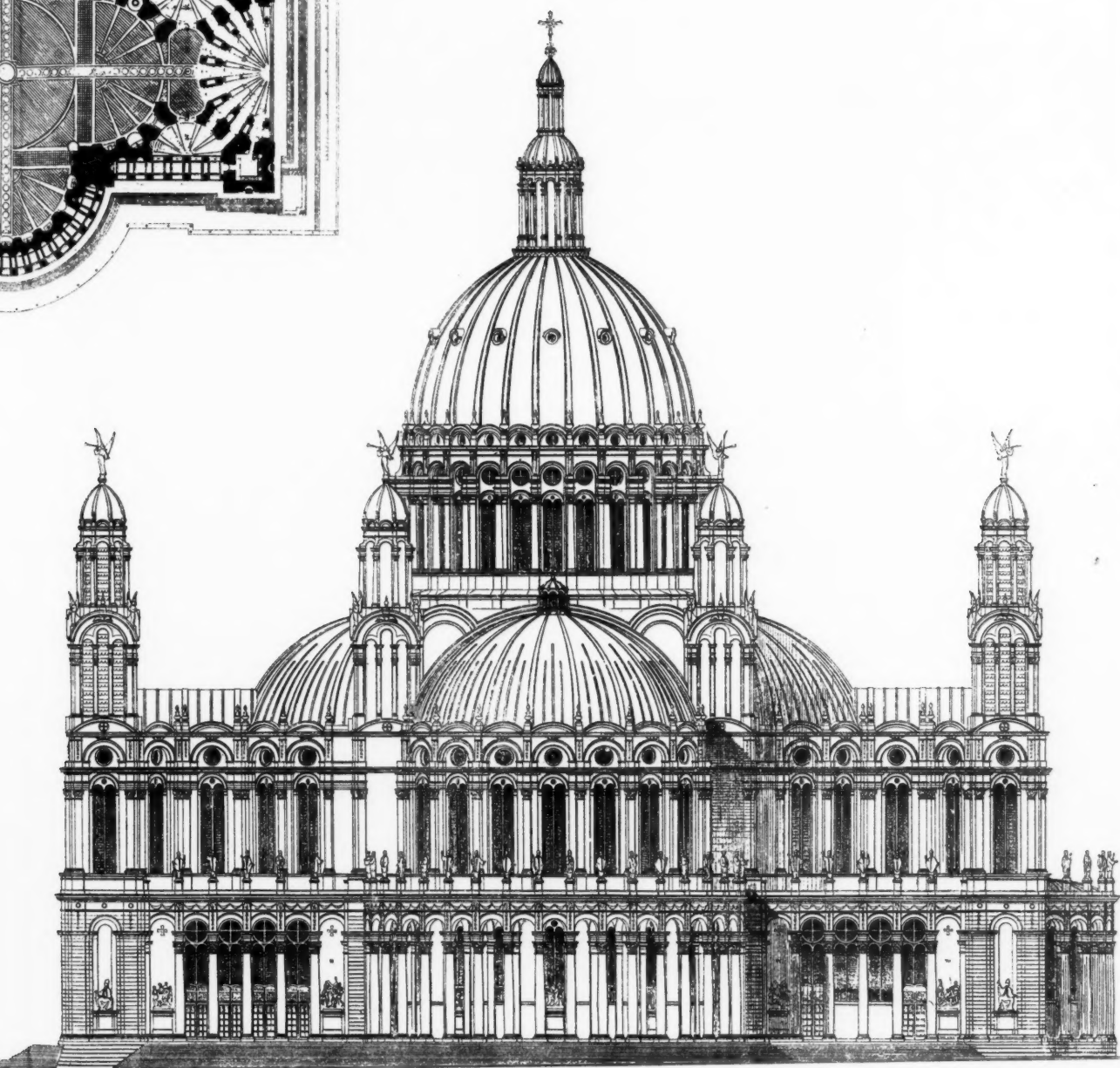
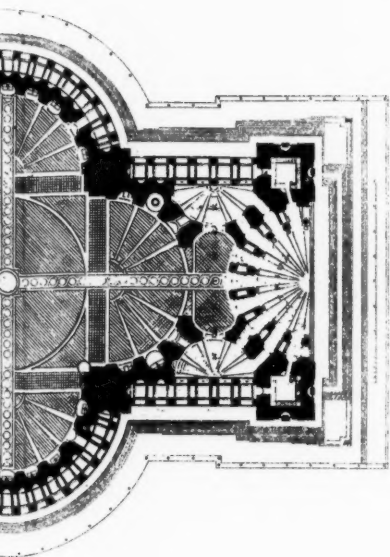






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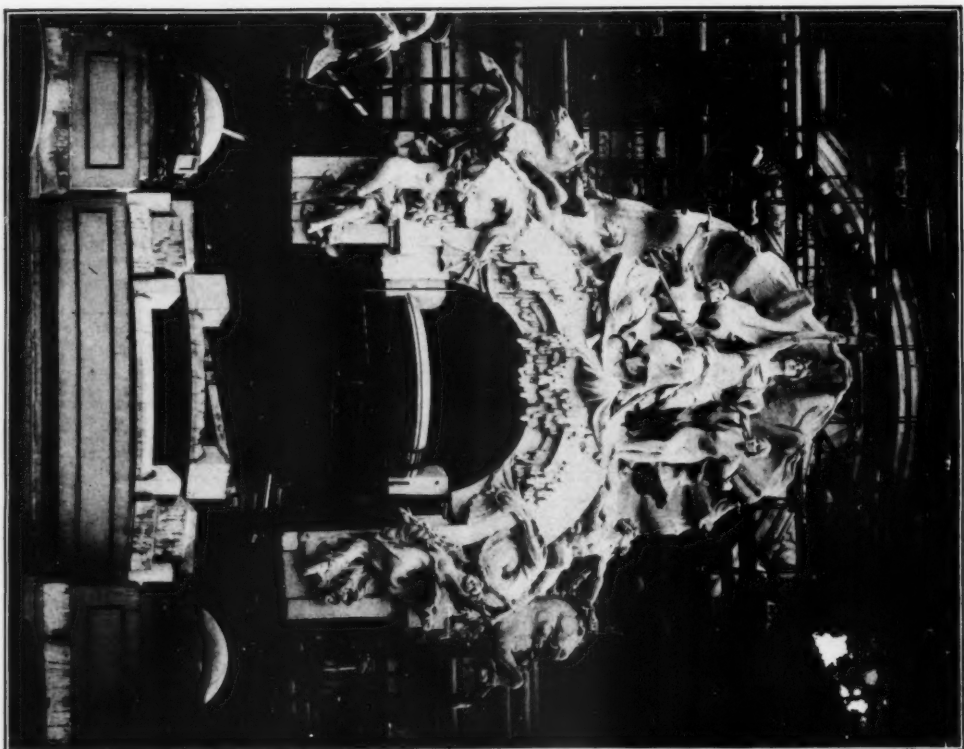




"De Soto," E. C. Potter, Sculptor.

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Equestrian Sculpture at the Louisiana Purchase Exposition.



"Fountain of Liberty," In Front of Festival Hall. Hermon A. McNeill, Sculptor.

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"St. Louis." C. H. Niehaus, Sculptor.

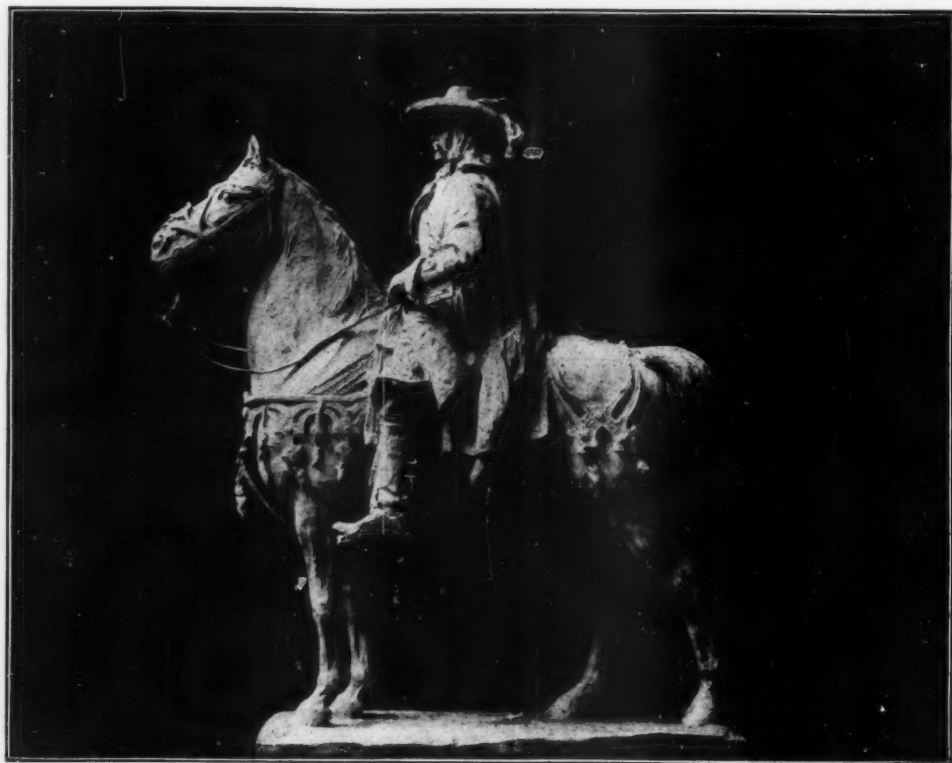
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*Equestrian Sculpture at the Louisiana Purchase Exposition.*

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*"Louis Jollet." A. Phimister Proctor, Sculptor.*

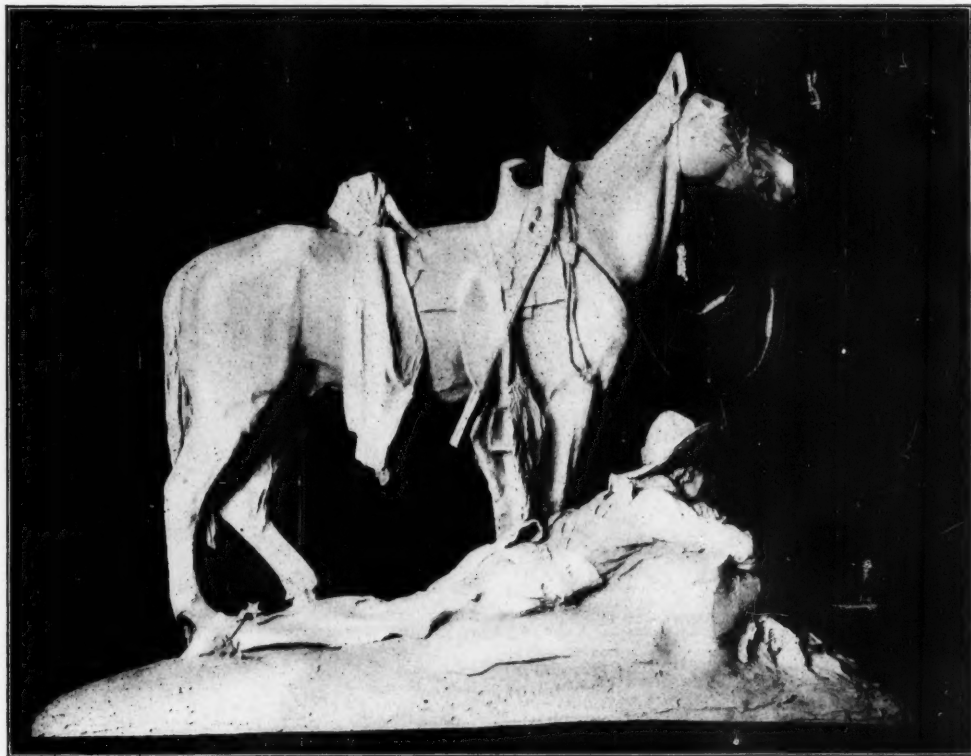


*Quadriga on the Palace of Education. Robert P. Brinhurst, Sculptor.*

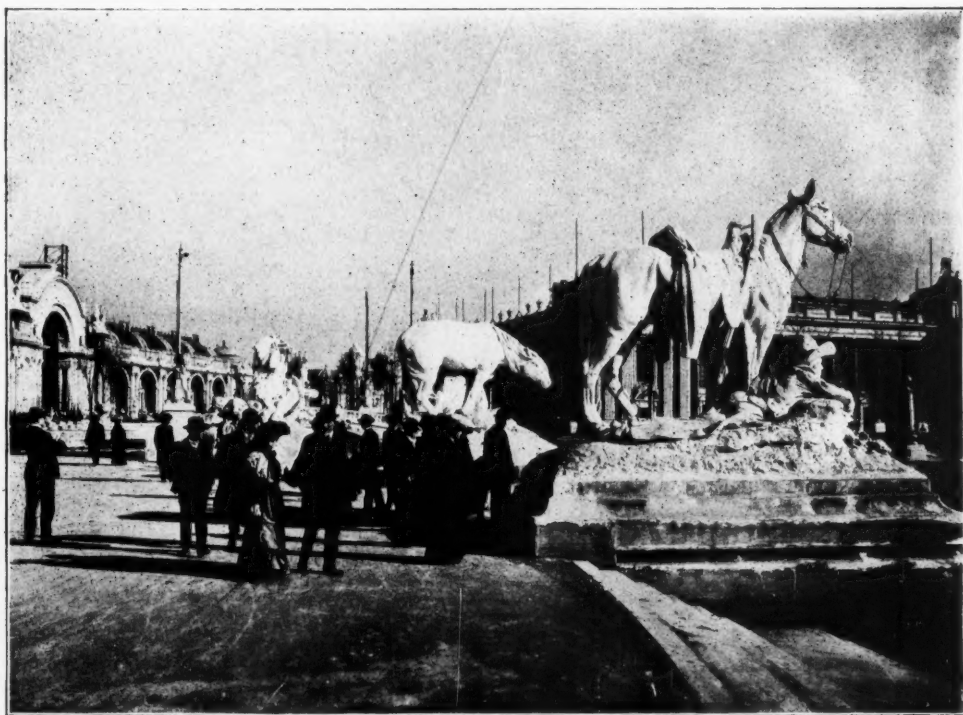
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*"Cowboy at Rest." Solon H. Borglum, Sculptor.*



*Statuary at the Launch Landing. Solon H. Borglum, Sculptor.*

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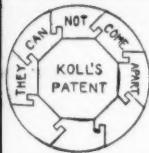
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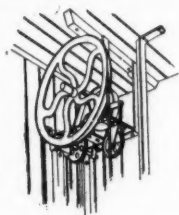
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New Advertisements.

GEORGE A. NEWMAN, (Philadelphia, Pa.), Perspectives. Page viii.

See last or next issue for the following advertisements:—

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### BUILDING INTELLIGENCE.

(Reported for the American Architect and Building News.)

(Although a large portion of the building intelligence is provided by their regular correspondents, the editors greatly desire to receive voluntary information, especially from the smaller and outlying towns.)

#### ADVANCE RUMORS.

AKRON, O.—Architect J. W. Northrop, of Bridgeport, Conn., is working on plans for a large residence to be erected here, for S. P. Ritchie. It will be a brick and stone structure, finished in mahogany and other hard woods. The cost will be in the neighborhood of \$40,000.

BELOIT, WIS.—The cornerstone has been laid for the Carnegie library building at Beloit College. Cost, \$50,000.

BOSTON, MASS.—Gen. Eben S. Draper, of Hopedale, has purchased Mrs. Isabella Stuart Gardner's former home, at 152 Beacon Street. It is the intention of Mr. Draper to begin operations at once in razing the structure and erect on the site a magnificent residence.

An ordinance has been passed by the Common Council appropriating \$40,000 to complete the bathhouse in Ward 6.

BRIDGEPORT, CONN.—Plans have been completed for the foundation of the proposed church to be erected on Stratford Avenue by the Newfield M. E. Society. It will be a frame structure, 50x60 feet. W. P. Jessup, 55 Adams Street, chairman of the building committee, will receive all bids.

CANTON, O.—The McKinley National Memorial Association has completed plans for the final competition for the monument to be erected in memory of the late President. From the preliminary competition E. P. Casey and Arthur Dillon, H. R. McGonigle, A. R. Ross of New York, and Guy Lowell of Boston have been selected as architects, and the trustees have invited A. W. Brunner, Cass Gilbert, McKim, Mead & White of New York, Wyatt & Nolting, Baltimore; Eames & Young, St. Louis, and D. W. Burnham, Chicago, to submit plans also. From these ten the final selection will be made by a committee consisting of Gov. Franklin Murphy, Cornelius N. Bliss, E. W. Bloomingdale, W. A. Lynch, and William McConway, assisted by professional advisers. The monument will cost \$400,000.

CHICAGO, ILL.—A permit has been taken out by Richard Boericke for the construction of a three-story apartment house at 1831-1841 Melrose Street, to cost \$60,000.

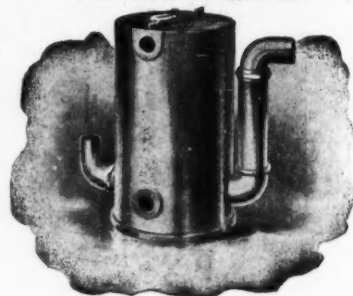
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### BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Plans are being prepared for a new church to be erected by the First Baptist congregation of Hyde Park, at the southwest corner of Woodlawn Avenue and Fifty-sixth Street. It will cost \$80,000.

Plans have been prepared by Francis T. Bacon of the construction department of the Illinois Central railroad for a new depot to be built at the foot of Randolph Street. It will cost \$40,000.

Shepley, Rutan & Coolidge have prepared plans for a three story building, 125x110x85 feet, to be built on the triangular site at the intersection of Ashland Avenue, Gross and Forty-Seventh Streets for the People's Trust and Savings bank. The building will cost \$40,000.

The building department has issued a permit to the Chicago & Northwestern Railroad company for the erection of a \$2,000,000 fourteen story brick office building at 213-21 Jackson boulevard. Work on the building will start at once.

William F. Gubbins has designed a new church for the Italian Roman Catholic Maria Incarnata congregation. It will be built at 12-16 Alexander Street. Cost, \$50,000.

It is stated that the plant of the Manhattan Brewing company at Thirty-Ninth Street and Emerald Avenue is to be enlarged by a one story racking-house, 50x100 feet, and a three story wash-house, 80x100 feet, to cost \$50,000.

Alterations will be made to two theatres, to bring the houses within the building ordinance. E. S. Hall has designed those of the Alhambra, which will cost \$35,000, and Oscar Cobb is the architect of those of the Criterion, which will cost \$20,000.

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## BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

CLEVELAND, O.—J. Milton Dyer has completed drawings for the new twelve-story bank and office building that will be erected this summer for the Guardian Trust Company on Euclid Avenue. The building will be on the site of the old Brainerd building, at 54 Euclid Avenue, which will be torn away.

COLUMBUS, IND.—Caldwell & Drake, of this city, will build the new school building to take the place of the old Central, the contract having been awarded to them after the School Board had reviewed the situation carefully. The bid of the local firm is \$71,777.

DALLAS, TEXAS.—Plans have been completed and are now in the hands of the promoters of the new auditorium which will be built by private parties in the near future, and which will cost \$55,000. This is entirely separate and apart from the auditorium which will be built by the Fair Association.

DAVENPORT, IA.—Plans have been drawn by P. T. Burrows, McManus Building, for a high school to be erected in this city. In about thirty days the School Board will ask bids for constructing same. The cost, not including heating, plumbing or furnishings, will be \$175,000.

DES MOINES, IA.—Smith & Gage, architects, are making plans for two buildings for Drake University other than the law building, bids for the building of which are now being received. Of these two additional buildings it is probable one will be erected this season and the other next season. One is for the accommodation of the theological school and the other for the university's library.

DETROIT, MICH.—Joy & Bancroft have prepared plans for a \$10,000 residence to be erected by Dr. Herbert Bernard on Dela-

## BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

ware Avenue, near Woodward Avenue. The first story will be of paving brick and Bedford stone and the second story of stained shingles. The interior will be handsomely finished in hardwood and white enameled work.

It is reported that the Dannish College will make extensive improvements costing \$12,000.

E. M. Ellingson & Co. contemplate erecting a three-story cold storage plant, 50x138, at West Seventh and Vine Streets, to cost \$30,000.

GALT, ONT.—A by-law appropriating \$30,000 for the erection of a Collegiate Institute Building is reported to have carried at the recent election.

GEORGETOWN, MASS.—The plans of Cooper & Bailey, of Boston, have been accepted for the library building. Work will probably be completed during the present year.

GRAND FORKS, N. D.—Plans have been prepared for a \$25,000 hospital to be erected by the United Lutheran Church.

HANOVER, N. H.—Plans have been completed for a new Dartmouth hall at Dartmouth college to take the place of the building destroyed by fire, and to cost about \$250,000. Charles A. Rich, 35 Nassau Street, New York city, is architect.

HARRISBURG, PA.—It is announced that a \$40,000 clinical amphitheatre is to be erected at the Hahnemann Medical College.

HOPEDALE, R. I.—The new fire station to be erected here will cost \$40,000. It will be of brick, equipped with the modern appliances and apparatus. The site for the station has not yet been selected, but work will be started this summer.

INDIANAPOLIS, IND.—The erection of a \$250,000 building by the Brotherhood of Locomotive Engineers is reported under consideration.

## BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

LAWRENCE, KAN.—State Architect John M. Stanton has submitted plans for a \$50,000 law building to be erected at the Kansas University.

LUDLOW, MASS.—The building of a \$20,000 Polish church is contemplated.

LYNN, MASS.—Wheeler & Betton, 59 Exchange Street have drawn plans for a brick manual training school for that city.

MANCHESTER, N. H.—Work will begin at once on the erection here of the new county court house. Its cost will be \$37,000.

MANHATTAN, KAN.—The erection of a \$25,000 Y. M. C. A. building by the students of the State Agricultural College is under consideration.

MANITOWOC, WIS.—The County Board has appointed a committee to secure plans for a \$150,000 court house.

MINNEAPOLIS, MINN.—A permit has been issued for a brick addition to the City Hospital, to cost \$42,000, and also for a Clifton Avenue house to cost \$40,000. The latter will be a two-and-a-half-story brick and stone dwelling.

The Minneapolis Brewing Company has secured a permit for a brick and steel addition which will cost \$21,000.

NASHVILLE, TENN.—Mr. Jake Wells has secured a permit for the Bijou Theatre, which will be erected this summer on the site of the old Grand Opera House. The permit calls for an outlay of \$60,000. Work on the new theatre will be begun at once.

NEW HAVEN, CONN.—Plans for the construction of an addition to the present library building of Yale university have been drawn. The addition is to be constructed with the funds from the Russ legacy, amounting to \$250,000.

NEW YORK, N. Y.—As the site for a ten-story loft building the property No. 19 East Eighth Street has been sold to a purchaser whose name is withheld. At present there is a four-story and basement brown stone front dwelling on the plot, which is between University Place and Fifth Avenue.

Plans have been filed by C. B. J. Snyder, for a new public school to be built by the city in the block on the east side of Forsyth Street and west side of Eldridge Street, 125 feet north of Canal Street. The building will be six stories high in its main part and have four five-story wings on the north and south. It will have a large roof playground and two lecture auditoriums in the basement. Its facades are to be of brick and limestone, with terra cotta trimmings. The cost is estimated at \$275,000.

Plans for remodeling the St. Nicholas Skating Rink have been filed. The building will be made into a theatre. The improvements will include a new gallery, fireproof floors, fireproof staircases, and a fire wall separating the stage from the auditorium. The cost of the remodeling is estimated at \$30,000. Tracey & Swartwout, architects.

Plans have been filed for a new twelve story fireproof hotel, at Nos. 17 and 19 East Twenty-seventh Street, for the Wells Realty and Construction Company of Philadelphia. The cost is estimated at \$275,000.

Plans are being prepared by Arnold W. Brunner, 33 Union Sp. West, for a five-story and basement building, 150x57 feet, to be used by the School of Mines of Columbia University. The new building will be on the Broadway side of the university quadrangle, south of Earl Hall. It will contain laboratories, etc., for the instruction of mining engineers. The new building is the gift of Adolph Lewisohn, and will cost about \$250,000.

Schickel & Ditmars, 111 Fifth Avenue, are preparing plans for a twelve-story office building to be erected by the Goelet estate at 114-16-18 West 39th Street. The plot has frontage of 75 feet and adjoins the Casino Theatre. The new structure will have a limestone base extending through the first two stories, and the superstructure will be faced with light brick.

The J. C. Lyons Building & Operating Co., will erect an eleven-story loft building on a plot 50x100 feet, at Nos. 11 and 13 West 32d Street, from plans by Buchman & Fox, of 11 East 59th Street. The new



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## BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

building will be of light brick, limestone and granite. There will be one passenger and one freight elevator, electric lighting and steam heating apparatus. It is estimated that the building will cost about \$185,000.

**NORRISTOWN, PA.**—The cornerstone of the Home for Women Nurses, at the Norristown Hospital for the Insane, for which the State appropriated \$55,000 was laid recently.

**OTTUMWA, IA.**—G. M. Kerns has plans for the building for Ottumwa Hospital, to cost \$25,000.

**PITTSBURG, PA.**—W. A. Thomas, Park Bldg., has prepared plans for a \$50,000 hotel which J. Willard Connell intends erecting.

**PLYMOUTH, MASS.**—Two new eight-room school buildings will be erected at once. They will be known as the Corniche and Knapp schools. Gay & Proctor of Boston, architects.

There are plans and an appropriation for a \$70,000 building for the registry of deeds and probate. J. Williams Beale, 54 Summer Street, Boston, architect.

**PORT ARTHUR, TEXAS.**—Two new schools, to cost \$80,000, are to be erected here.

**PROVIDENCE, R. I.**—Plans have been selected for a twelve-room grammar school building to be erected on Ontario and Niagara Streets, to cost \$80,000. The material will be brick and limestone.

**REVERE, MASS.**—A tract of vacant land on Endicott Avenue, belonging to the Boston Land Co., has been sold. There are seven lots each having a total area of 5000 square feet. The owner, Nora Hallahan, buys to improve.

**SANTA FE, N. MEX.**—It is stated that the Presbyterian Board of Home Missions intends erecting a school for boys here, at a cost of \$50,000.

**SEATTLE, WASH.**—Plans are completed for the city jail and emergency hospital, to be erected on 5th Avenue and Yesley Way. The plans provide for a five-story and basement brick structure. Cost \$125,000.

**SIOUX FALLS, S. D.**—A Norwegian Lutheran normal school will be erected here at a cost of \$40,000.

**SOMERVILLE, MASS.**—Almost \$35,000 has been pledged for the erection of a Y. M. C. A. building here.

**SOUTH NORWALK, CONN.**—Plans have been drawn for the new \$20,000 factory which the Boese-Peppard Mfg. Co. will build. The factory will be 143 by 67 feet.

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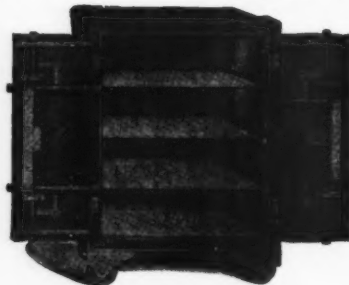
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## BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

**ST. CLAIR, MICH.**—It is stated that negotiations are under way for the purchase of a 400-acre tract of land on the St. Clair River just south of St. Clair for the establishment of an industrial, training, and educational institute, which will represent an investment of \$500,000. Parker H. Sercombe, of Chicago, is said to be the originator of the plan.

**ST. PAUL, MINN.**—It is reported that W. H. Elsinger of St. Paul and others are to erect a \$50,000 rescue home for women on land to be purchased for the purpose somewhere between Minneapolis and St. Paul, and to be operated under the auspices of the Salvation Army.

**TERRYVILLE, CONN.**—Brown & Von Beren, of New Haven, have submitted plans for a \$25,000 school to be erected on Prospect Street.

**VINCENNES, IND.**—It is reported that the Elks Lodge intends erecting a \$50,000 lodge and office building, and will award the contract for construction as soon as plans have been prepared. Address Secy.

**WALLA WALLA, WASH.**—Press reports state that the City Council has accepted plans for a 2-story brick and stone city hall. Bids for erecting same will be asked at once. Estimated cost, \$40,000.

**WALTHAM, MASS.**—The Waltham Trust Co. is figuring plans for a \$30,000 bank and office building. Ed. P. Hapgood, 141 Trumbull building, Hartford, Conn., is architect. H. L. Bowden, 181 Essex Street, Boston, Mass., is chairman of building committee.

**WESTPORT, CONN.**—Ambrose Hurlburt one of the wealthiest citizens of Westport, has announced the gift by him to the Westport Library association of a vacant lot at the corner of Imperial Avenue and State Street. A library building will be erected on the lot as soon as \$10,000 is raised.

**WINNIPEG, MAN.**—It is understood the medical college has secured additional lands for the erection of new college buildings.

**WORCESTER, MASS.**—Construction of a home for aged men in connection with St. Vincent's hospital, will be begun immediately.

## BUILDING INTELLIGENCE.

APARTMENT-HOUSES.

**NEW YORK CITY.**—*Riverside Drive*, nr. 84th St.; twelve-sty apart. house; \$475,000; o., William R. and James M. Stewart, 120 Riverside Drive; a., S. B. Ogden & Co., 954 Lexington Ave.

**ST. PAUL, MINN.**—*Dale St.*, nr. Lincoln, three-sty bk. and st. apart., 60x100; gravel roof; steam; \$23,000; o., H. M. Molloy; a., Louis Lockwood.

HOUSES.

**MINNEAPOLIS, MINN.**—*Pleasant and Grove-land Aves.*, 2½-sty and base. frame dwell., 32x39; furnace; \$6,000; o., John De Laitre; a., Sedgwick & Saxton.

*Pillsbury Ave.* and 24th St., 2-sty bk. dwell.; hot water; \$15,000; o., A. W. Strong; a., Bertrand & Chamberlin.

MISCELLANEOUS.

**NEW YORK CITY.**—*One Hundred and seventh St.*, nr. Amsterdam Ave.; four-sty office building and four-sty power station, two buildings; \$90,000; o. and a., New York Edison Co., 55 Duane St.

## COMPETITIONS.

### ELKS BUILDING.

[At Paducah, Ky.]

Competition of architects are solicited for Elks Building, Paducah, Ky., same to be five stories high, 57 ft. x 104 ft. Cafe, first floor; second and third floors for hotel accommodation; fourth floor, club-rooms, parlor, dining room, billiard hall, closet and bath room; fifth floor, lodge room, ante-room, etc. For further particulars apply to BEN WEILLE, Chairman, Paducah, Ky. 1487

## PROPOSALS.

### PAVING.

[At Charleston, S. C.]

Sealed proposals for 30,000 sq. yds. more or less, of brick paving and for 1,200 sq. yds. more or less, of granite block paving, will be received by the Board of Public Works, City Hall, Charleston, S. C., until 12 M., June 27, 1904. Bids will be considered for: All material and labor; material and labor, excepting brick and blocks; paving brick; granite blocks. Specifications can be had from the City Surveyor, at whose office the profiles can be inspected. JAMES R. JOHNSON, Vice-Pres. Board of Public Works. 1486

### HOSPITAL AND DORMITORY.

[At Council Bluffs, Iowa.]

The State Board of Control at Des Moines, will receive bids June 28, for erecting a hospital, also an administration and dormitory structure at School for Deaf, in Council Bluffs. 1486

## PROPOSALS.

## JAIL, RESIDENCE, ETC.

[At Jamestown, N. D.]

The County Auditor of Stutsman County, North Dakota, will receive at his office in the courthouse, in the city of Jamestown, N. D., separate bids for:

1. Erecting a Sheriff's residence, jail building and tunnel.
2. Erecting a boiler-house and tunnel.
3. For a steam-heating plant.
4. Plumbing for above buildings.
5. Steel and cell work for jail.

All bids to be as per plans and specifications on file in the County Auditor's office and at the office of E. J. Donohue, architect, 58 Gillilan Block, St. Paul, Minn. Bids will be received until August 22, 1904. ANDREW BLEWETT, County Auditor, Stutsman County, N. D. 1480

## METALWORK.

[At Washington, D. C.]

Office National Zoological Park, Washington, D. C. Sealed proposals will be received at this office until the 6th day of July, 1904, for structural metalwork, and the furnishing and setting of the tile roof of an animal house in the National Zoological Park. Plans, specifications, forms of proposals and other information may be obtained on application to the architects, Messrs. Hornblower & Marshall, No. 1516 H St. n. w., this city. S. P. LANGLEY, Secretary, Smithsonian Institution. 1487

## HIGH SCHOOL.

[At Dover, N. H.]

Bids will be received June 23, for erecting a high school to cost \$50,000. Architect, A. T. Ramsdale, of Dover; J. H. NEALLY, Chmn. Com. 1486

## BUILDING.

[At Browning, Mont.]

Bids will be received July 12 by W. A. Jones, Com. Indian Affairs, Dept. Interior, Washington, D. C., for furnishing material and constructing dormitory, employees' quarters, water and sewer system, etc., for school, at Blackfeet Agency, Browning, Mont. 1488

## PLUMBING.

[At Portsmouth, N. H.]

Sealed proposals will be received at the Bureau of Yards and Docks, Navy Dept., Washington, D. C., until June 25, 1904, for furnishing and installing the plumbing system in the new Naval Prison, Navy Yard, Portsmouth, N. H. Plans and specifications will be furnished by the Bureau upon deposit of \$ 0 as security for their return, or can be seen at the navy yard named. MORDECAI T. ENDICOTT, Chief of Bureau. 1485

## BUILDING.

[At Columbus, O.]

The Columbus Savings and Trust Company, Room 317, Outlook Building, will receive bids until June 25, for furnishing material and labor necessary to erect all or any part of a twelve-story building 62 x 188 feet, on Long and High Sts. 1486

## BUILDING.

[At Fort Slocum, N. Y.]

Sealed proposals for construction of Post Exchange Building will be received here until June 25, 1904. Information furnished on application R. W. KINGMAN, Q. M. 1486

## COURTHOUSE.

[At Kountze, Tex.]

Jack Dies, County Judge, will receive bids until June 23, for erecting a courthouse. 1486

## CHILDREN'S HOME.

[At Evansville, Ind.]

Bids will be received by the Board of Co. Comrs until June 27, for furnishing material and erecting a Children's Home. HARRY STINSON, County Auditor. 1486

## COURTHOUSE.

[At Huntington, Ind.]

Bids will be received by the Co. Comrs. until July 1, for \$260,000 courthouse bonds. 1487

## HIGH SCHOOL.

[At Jersey City, N. J.]

Bids will be received about June 23 by the Board of Education for erecting a high school. 1486

## OFFICE-BUILDING.

[At Lexington, Ky.]

Bids will be received at the Lexington City National Bank until June 23, for erecting an 8-story office-building. J. W. STOLL, cashier; Richards, McCarty & Bulford, architects, Columbus, O. 1486

Treasury Department, Office of the Supervising Architect, Washington, D. C., June 11, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 18th day of July, 1904, and then opened, for the low pressure steam heating apparatus, complete in place, for the extension to the U. S. Custom-house and Post-office, at Hartford, Conn., in accordance with drawings and specification, copies of which may be had at this office or at the office of the Superintendent at Hartford, Conn., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1487

Treasury Department, Office of the Supervising Architect, Washington, D. C., June 9, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 14th day of July, 1904, and then opened, for the construction (including plumbing, heating apparatus, electric wiring and conduits) of the U. S. Post-office extension at St. Joseph, Mo., in accordance with drawings and specification, copies of which may be had at this office, or at the office of the Custodian at St. Joseph, Mo., at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1487

Treasury Department, Office of the Supervising Architect, Washington, D. C., June 9, 1904. Sealed proposals will be received at this office until 3 o'clock P. M. on the 29th day of June, 1904, and then opened, for the construction of new mechanical equipment and fixtures in, and remodeling of the laboratory of the Supervising Architect in the U. S. Treasury Building, Washington, D. C., in accordance with drawings and specification, copies of which may be had at this office, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1487

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York.....

### ELEVATORS, ETC.

Kimball Bros. Co., Council Bluffs, Ia.  
Morse, Williams & Co., Philadelphia.  
Whittier Machine Co., Boston.....

### ELEVATOR SIGNALS.

Herzog Telesome Co., New York...