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TOO late in the season to allow us to perfect our plans and make announcement earlier, we determined to make a change in the manner and method of publishing our International edition, and we now give notice that the change impends and will have effect in the second quarter of the year. The change consists simply in gathering the extra illustrations which constitute the International edition into four quarterly issues in place of their being, as now, scattered through thirteen weekly issues. The result will be that the subscriber to the International edition will receive each week a copy of the Regular edition and with each quarter a quarterly volume in which will be collected the gelatine and other International plates. That is, a subscriber will receive exactly what he now receives, but it will reach him in what, we believe, will be a more acceptable and agreeable form. Amongst other advantages incident to this condensation of matter is the fact that it will enable us to publish in the same issue all the plates in illustration of a given building, instead of being forced to let them dribble out, a few at a time, in four or five different weekly issues, as in the past. — *From our issue for Jan. 4.*

THE inaugural address of Mayor Collins of Boston calls attention to the imperative need of a new City Hall. The present building is crowded and inconvenient, and only accommodates a small portion of the necessary offices, so that the city is obliged to pay about thirty thousand dollars a year rent for offices in various outside buildings, some of them at a considerable distance, so that business is carried on in them at great inconvenience. As the sum annually paid for the rent of inconvenient outside accommodations would provide interest on at least a million dollars, while the ground occupied by the present City Hall, with the old Court House, now occupied for city offices, is of immense value for business purposes, and would probably meet with ready sale, the financial advantage of making a change is manifest. Where the new City Hall should be placed is not so evident. Mayor Collins thinks that the present location among the banks and lawyers' offices in the northern part of the city is not so convenient as a more central one would be, but he forbears to specify particularly any other. It is, however, well known that a situation either in the neighborhood of the Public Garden or of Copley Square is favored by the people who have paid most attention to the interests of the city. The old plan, of erecting a building on Beacon Hill, near the State House, seems to have been definitely abandoned. A few months ago, a carefully studied scheme was proposed for extending Arlington Street across the old Providence-Station grounds, and placing the new City Hall in the space between this new street and Park Square. This would provide adequate space, in a very accessible location, although it may be questioned whether such a building would not deserve a more conspicuous site than an open space behind the back gates of the Boylston-Street buildings. Artistically and, in some ways, practically, the best location

now available would probably be the Art-Museum lot, on Copley Square. The cost of this lot, which contains more than two acres, and borders on four streets, would probably not be excessive, while a building on it would show to the fullest advantage in the company of the Public Library, Trinity Church, and the other splendid structures which already adorn Copley Square, or will soon do so. As lines of electric cars from nearly every part of the city and suburbs pass through Dartmouth Street, Boylston Street or Huntington Avenue, this lot would be as accessible as that on Arlington Street. Either lot would, without question, form an admirable site for the structure, and, while architects, who naturally like to see a fine building placed in a conspicuous location, would probably favor Copley Square, a City Hall on the extension of Arlington Street could, by judicious management of the surroundings, be made imposing and beautiful.

THE profession will hear with great regret of the death, after a long illness, of Mr. Edward Clark, Architect of the Capitol at Washington. Mr. Clark was born in Philadelphia in 1822, and was assistant to Dr. Thomas U. Walter when the latter was engaged in the construction of the wings and dome of the Capitol from his own designs. On Dr. Walter's resignation of his position, in 1865, Mr. Clark succeeded him, and has ever since had charge of the building. As an available expert of high reputation, he was called upon to carry out many other duties in connection with the Government building work in Washington, and served on many commissions, those for the completion of the Washington Monument and the construction of the Congressional Library among others. He had long been a member of the American Institute of Architects, as well as of various other artistic and scientific bodies, and was highly esteemed by his associates, not only for his professional skill, but for his uniform courtesy and kindness to all with whom he was brought in contact.

THE President of the Boston Manufacturers' Mutual Fire Insurance Company, 31 Milk Street, Boston, asks information from architects in regard to their experience of the corrosion of structural steel under various circumstances. He says that it has been observed in England that concretes made with "breeze," or what we should call cinders, are often very destructive to iron and steel, and that, within his own knowledge, beams imbedded in concrete in foundations have been found to corrode very rapidly, in consequence, apparently, of some corrosive qualities of the concrete surrounding them. It is hardly necessary to say that these observations are of the very greatest importance to every one connected with the art of building. Many millions of dollars are invested every year in this country in buildings supported solely by columns of steel, surrounded by masonry set in cement, with, in the best buildings, a grouting of cement between the masonry and the metal. Experience has shown that corrosion, if it occurs at all, is likely to be most serious in the portions of the frame nearest the ground, for the reason, probably, that the moisture which all masonry contains, or absorbs from heavy rains, sinks by gravitation into the bottom of the mass; and it is precisely at this point that the loads are greatest, and failure of the metal would be most disastrous. Most engineers and architects in this country believe that if the metal is thoroughly cased with masonry in cement, or cement-concrete, in contact with it, there is almost no limit to its duration. Of course, no architect or engineer of experience would leave structural members of iron or steel in contact with plaster-of-Paris, which is well known to corrode the metal rapidly; and very recently it has been shown that paint, on iron intended to be buried in concrete or masonry, is of doubtful utility, if, indeed, it is not seriously injurious; but we do not think that any case has been made known to the profession, otherwise than as mentioned by Mr. Atkinson, where the corrosion of structural iron could be directly traced to cement-concrete in contact with it. It is possible that the cement used for making concrete in England may have contained ground slag, which often contains sulphur, and might, perhaps, develop a corrosive action on iron in consequence; but it is difficult to understand how the English "breeze," unless it is something very different from our coal cinders, could contain anything corrosive, or how, if it did, it could exert any material action on the metal through the pores

of the concrete of which it formed the aggregate. So far as our materials are concerned, we believe that there is little to fear from acid concrete or cement, and still less from acid cinders, but it is not impossible that the coating of paint so universally used may be more injurious than has been supposed. In a steel-frame building which was altered some years ago in New York, the first-story exterior columns were found deeply corroded, from some cause not explained, and it would be well worth while, in the case of similar alterations, to have the condition of the metal thoroughly examined; or even, where such immense sums are at stake, without insurance, as in the modern office-buildings, to lay bare, occasionally, the lower portion of one or two of the important supports of the frame for inspection. If any of our readers have any experience in the matter, it would be particularly desirable to make it known just now, when it will be of assistance in planning the thorough tests which Mr. Atkinson hopes to have made, primarily for the information of his insurance company, but incidentally for the advantage of the whole community.

THE attention of architects who have five thousand dollars that they are anxious to get rid of is invited to a proposition of the Milwaukee Commissioners of Public Works, who advertise for competitive plans for a school-house, to contain twenty class-rooms, assembly-hall, teachers' rooms and so on; to have approved systems of ventilation, heating and sanitation, and to cost complete, including fees of architect and inspector, not more than seventy-five thousand dollars. As this is about half the usual cost of school-buildings of these dimensions the Commissioners very prudently make sure that the architect shall contribute to the expense by requiring that he shall furnish an approved bond for five thousand dollars, guaranteeing the erection of the building complete, including the fees mentioned, for the specified sum; and as a reward for the ingenuity and generosity involved in such an undertaking, they promise the fortunate professional man "the usual compensation allowed by the city for such work," that is, four per cent on the first ten thousand dollars, three and one-half per cent on the second ten thousand, and three per cent on the remainder.

THE management of the St. Louis Exposition announce that an international competition is to be held for a design for a symbol, or emblem, to be used on the seals, stationery and other "publicity material" connected with the Exposition. No rules are laid down as to the lettering, sentiment, size or style of the design. It is only stipulated that it shall be symbolical of the historical event commemorated by the Exposition: the purchase by the United States, in the year 1803, of the Louisiana territory from France, by which, for the sum of fifteen million dollars, the United States secured the control of the Mississippi Valley. Under the terms of the competition, eight sculptors are to be selected, who are to be paid two hundred and fifty dollars each for their designs, but all artists are admitted to submit designs, which, it is promised, shall be judged on an equality with the others, by a jury of national reputation, and the author of the design placed first is to receive a prize of twenty-five hundred dollars. Six months is allowed for the preparation of the designs, but, as the circular is not dated, we are unable to say when the six months will expire, and we have no information as to the place at which competing designs are to be delivered. Probably these details will be given later. Meanwhile, it may be useful to know that more than two hundred volunteer designs have already been submitted, using such materials as a map of the Louisiana Purchase; portraits of Thomas Jefferson and Napoleon Bonaparte; the fleur-de-lis, the eagle and the Napoleonic N; the intertwined flags and arms of France, Spain and the United States; the Mississippi Bridge, and other devices, none of which were considered suitable; so that competitors will do well to avoid these combinations.

L'ARCHITECTURE quotes from the *Bulletin* of the French Société des Architectes Diplômés an interesting article on a matter of professional etiquette. It seems that a member of the Society, in considering a matter of employment to carry out some municipal works, was told by the town officials that a brother architect had guaranteed, in a similar case, if the cost of the building carried out from his designs should exceed the contract price, to pay the excess out of his own pocket up to a certain limit, the inference being that, if he wanted to secure the commission, he must make a similar promise. The member had doubts of the propriety of such a course, and

applied for counsel to the officers of the Society. He received two replies, one from M. Louis Bonnier, President of the Society, who advised him "very politely, but very firmly" to decline compliance with the suggestion; and the other from M. Guadet, perhaps the most distinguished of French architects, who, in a letter which was shown to the officials of the municipality, and which led them to recede from their position, said that an architect could not, and should not, agree with any client to pay the excess of cost of a building over the contract price, for the reason, among others, that the architect does not participate in the contractor's profits, and that an agreement to assume all, or a part, of the losses of an undertaking, without a provision for sharing in the profits, is forbidden by the French law. M. Guadet observed also that a contract of the kind proposed, between an architect and his client, even supposing that it could be legally made or enforced, would destroy the position of the architect as the guardian of his client's interests by creating for him an interest directly opposed to that of his client, and inciting him to admit, for the sake of saving his own pocket, economies which it would be his professional duty not to tolerate; and he pointed out, as we have ourselves done in a similar case, that such a contract, even if it were legal, would, in practice, be absolutely worthless as a protection to the client, for the reason that the slightest modification from the plans and specifications, made at the desire or request of the client, after they had once been accepted, would release the architect entirely from his guaranty; and, as M. Guadet says, no building was ever carried out without such modifications. In this country sharp town officials, who probably understand better than the architects the illegality and futility of such contracts, usually put their proposition in the form of a demand that the architect shall deposit a certified check or a sum in cash as a guaranty. We do not know that we ever heard of an architect's complying with the demand; but the object of making it is, evidently, to enable a municipality, by setting up absurd claims in place of those which, in practice, never have a real or legal foundation, to compel the architect to engage in a long and costly lawsuit to get his money back; and, in that way, to induce him, as an alternative, to submit to a "compromise," or, in other words, to pure and simple extortion.

M. GUADET speaks of another point which has been much discussed in this country, and in regard to which professional opinion, as well as professional practice, varies. He mentions, in a postscript to his letter, that an agreement is sometimes made between architects and municipalities, or other important clients, that the architect shall not receive a commission on any excess of cost of the building over the contract price, unless it shall appear that the excess was due to changes or increase in the amount of work made at the desire of the client. Such an agreement he considers legal and unobjectionable; and, although it opens the way to differences of opinion as to what extras, if any are ordered, should be added to the sum on which the commission is reckoned, it does not act as an inducement to the architect to wink at violations of the contract for the purpose of reducing the cost; and a skilful architect and a reasonable client rarely find any difficulty in settling their accounts.

THE citizens of Cleveland, Ohio, have in contemplation a scheme which promises great results. It happens that a new post-office, a court-house, and some other public buildings are to be erected in the city within a short time, and the suggestion was made that the buildings should be so arranged as to improve the effect of all by suitable grouping. The suggestion was received with a favor which is most creditable to the intelligence of the city, and the Federal Government signified its willingness to aid the scheme by taking land for the post-office in such a situation, within reasonable limits, as might be best adapted to the general plan. In general, the scheme proposed is to form a wide street, running north and south, on either side of which the public buildings are to be arranged, the cross streets accommodating the private structures which always crowd into the neighborhood of the public ones. Nothing could be either more simple or more convenient than this plan, and it is much to be hoped that it may be carried out. We should like to see the central "boulevard" laid out with occasional deviations from perfect straightness and of varying width, believing that the beauty of effect of the buildings and of the street could be enormously increased in that way; but it is, perhaps, too much to hope that any American city engineer would consent to such an innovation.

NOTES ON IRON AND STEEL CONSTRUCTION.¹—II.

THE principal structural members in any framed construction are the beam, or girder, and column, and since all the rules and formulas for determining the strength of such members are based upon values which are called the properties of the section, it is necessary to understand the calculations and methods for finding these values and their application, in the design of the structural members.

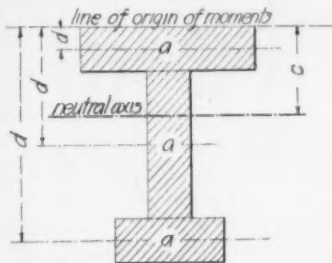


Fig. 1.

The two values of interest to the structural-engineer are the moment-of-inertia, and the radius of gyration. These terms are more or less meaningless and are simply names given to the values of a structural section in resisting flexure, and failure through flexure from compression, and are the only values by which one section can be compared with another in its ability to withstand the stresses to which the members are subjected.

In determining the moment-of-inertia, and the radius of gyration is found from this value, the determination of the moments of the individual fibres, or infinitely small areas of the section about a certain line, is the principle of the calculation. This line is called the neutral axis, and is considered as passing through the centre-of-gravity of the section, and is always taken at right angles, or perpendicular to the direction of the load action.

When the section is symmetrical—that is, equally proportioned on each side of a centre line, the neutral axis is coincident with the centre line, and requires no determination. When however, the section is not symmetrical, there are three methods which may be employed in the determination of the position of the neutral axis; they are: the mechanical, the mathematical, and the graphical. Where only approximate results are required and the section is somewhat complex, the mechanical method is sufficiently accurate for all practical purposes. This method has been recommended by Trantwine and others, and consists of cutting out an accurate scale pattern of the section, from an even thickness of cardboard, and balancing it on a knife-blade so that the blade is perpendicular to the direction of the load, in a beam section, or, in the case of a column section, usually perpendicular to the least diameter of the column section. A line marked where the knife-blade rests when the pattern is balanced is the position of the neutral axis.

The mathematical method of determining the neutral axis is quite simple, and consists of multiplying each simple elementary area by the distance between its centre-of-gravity and a line without the figure, called the line of origin of moments, and dividing the sum of these products by the entire area of the section. The result so obtained will be the distance that the neutral axis is located from the line of origin of moments. This distance is usually designated as the distance c . The algebraic formula which expresses this rule is clearly understood when reference is made to the preceding sketch, designated as Figure 1. In the formula which may be written thus:

$$c = \frac{\sum a d}{A}$$

c equals the distance which it is desirable to obtain, a equals the area of each simple elementary section, d the distance from the centre-of-gravity of each simple elementary section to the line of origin of moments, while $\sum$ signifies, as usual, the summation of the antecedent quantities. The application of this formula may readily be understood from the following:—

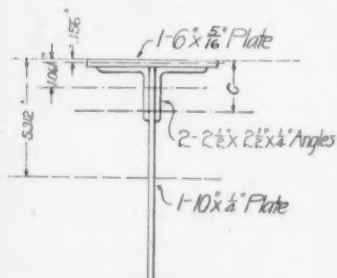


Fig. 2.

Example.—In the section marked Figure 2, what is the distance c from the line of origin of moments?

Solution:—

Area a of	$6'' \times \frac{1}{2}''$ plate.....	= 1.872 square inches.
Area a of two	$2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{1}{4}''$ angles = 2.38	" "
Area a of	$10'' \times \frac{1}{4}''$ plate.....	= 2.50 " "
Total area.....		= 6.752 = A .

The $a d$ for each elementary section equals:—

Flange plate	$1.872 \times .156 = .292$
Flange angles	$2.38 \times 1.062 = 2.527$
Web plate	$2.50 \times 5.312 = 13.280$

And the summation..... = 16.099

Upon substituting these values just found in the formula $c = \frac{\sum a d}{A}$ it becomes $c = \frac{16.099}{6.752}$ or 2.38, which is the distance in inches from the outside fibre of the flange-plate to the neutral axis.

The graphical method of determining the neutral axis or the

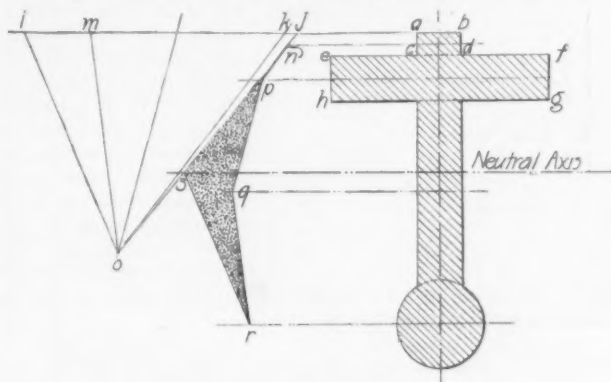


Fig. 3.

position of a line passing through the centre-of-gravity of a section is readily applied, and is preferred by many on account of its simplicity and reliability.

Figure 3 shows the section of a cast-iron rib, which may be a cast-iron rafter member in a skylight, or any other structural member. The problem, to determine graphically the position of the neutral axis of this section, may be proceeded with as follows: Through the centre-of-gravity which may be determined by inspection of each simple elementary section, such as $a b c d$, or $e f g h$, draw horizontal lines as shown in Figure 3. From the outside line of the section draw any indefinite horizontal line, as $a i$, and upon this line lay off spaces to scale which represent the areas of the respective elementary figures composing the section. For instance, the area of $a b c d$ equals one-half of a square inch, and the area of $e f g h$ equals 5 square inches; if the selected scale has been such that one-half of one square inch equals one-half inch in length, then the distances $j k$, $k l$, which represent the areas of $a b c d$ and $e f g h$, will be one-fourth and $2\frac{1}{2}$ inches respectively. Having laid off also the distances $l m$ and $m i$, equal respectively to the areas of the web and bulb of the section, proceed with the figure by drawing to any point outside the horizontal line, as o , lines from the point $j k l m$ and i as previously laid off. From n draw a line $n p$ parallel to $k o$, and from p draw a line $p q$ parallel to $l o$; likewise from q draw a line parallel to $m o$, and from the last point, r , just found, draw the line $r s$ back until it intersects $j o$ at s . A horizontal line drawn through the point s will coincide with the neutral axis and will pass through the centre-of-gravity of the figure. The method just described is quite useful when it is necessary to deal with a very irregular figure, and is a part

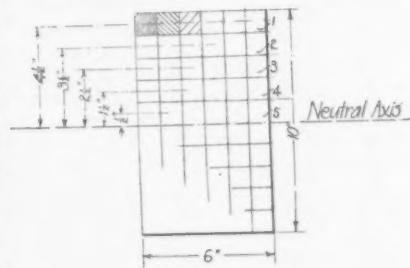


Fig. 4.

of the graphical method for determining the moment-of-inertia of complicated sections which will be described directly.

The principal end in view in determining the position of the neutral axis is in order to be able to conveniently calculate the moment-of-inertia. This value, the moment-of-inertia, may be found for any section by dividing that section into as nearly

¹ Continued from No. 1358, page 5.

as possible unit areas, and finding the sum of the products of each elementary unit area by the square of the distance from its centre-of-gravity to the neutral axis. In applying this rule take, for instance, the following problem, which consists of the solution for the determination of the moment-of-inertia of the rectangular section shown in Figure 4.

The outside elementary or unit areas marked 1 have a value equal to $4.5^2 \times 6$ (their number), or 181.50; there are, however, an equal number on the other side of the neutral axis, and, consequently, the rectangular section under consideration has twelve elementary areas possessing the same value when considered in reference to their distance from the neutral axis; in fact, the elementary or unit areas are here considered as one inch square, though they may as well have been regarded as

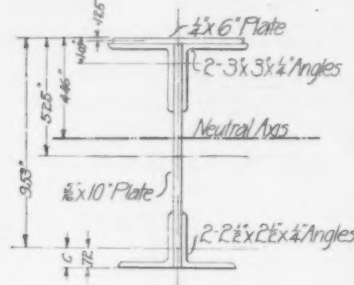


Fig. 5.

entire value, or the moment-of-inertia of the section, may be calculated and tabulated as follows:—

Fibres or areas marked 1 = $12 \times 4\frac{1}{2}^2$	= 243.00
Fibres or areas marked 2 = $12 \times 3\frac{1}{2}^2$	= 147.00
Fibres or areas marked 3 = $12 \times 2\frac{1}{2}^2$	= 75.00
Fibres or areas marked 4 = $12 \times 1\frac{1}{2}^2$	= 27.00
Fibres or areas marked 5 = $12 \times \frac{1}{2}^2$	= 3.00
Total.....	= 495.00

This value, then, represents the moment-of-inertia for the rectangular section designated in Figure 4, and is sufficiently accurate for all practical purposes.

This method just described is useful from the fact that it can be applied to any section, no matter how irregular, and all that need be done is to draw the section to scale and divide it into elementary areas as accurately as possible, and proceed with the calculation as explained.

Where the section is a simple geometrical figure, such as a rectangle, circle, triangle, or where it is a combination of several such elementary sections, it would be somewhat tedious to make an extensive calculation like that just explained. Since, therefore, these simple elementary sections are used almost exclusively in construction, formulas which will express the value of the moment-of-inertia for the different sections have been deduced by higher mathematics, and are included in the usual memoranda, or data, of the structural-engineer, as follows:—

PROPERTIES OF USUAL SECTIONS IN CAST-IRON — CORRECT VALUES.

A = total net area of section. I = moment-of-inertia.

Section.	Moment-of-inertia.	Section modulus.	Least radius of gyration.	Distance from lower edge of section to neutral axis.
	$\frac{b d^3}{12}$	$\frac{b d^2}{6}$	$\frac{b^2}{12}$	$\frac{d}{2}$
	$\frac{a^4 - b^4}{12}$	$\frac{a^4 - b^4}{6b}$	$\sqrt{\frac{a^2 + b^2}{12}}$	$\frac{a}{2}$
	$\frac{A d^2}{16}$	$\frac{A d}{8}$	$\frac{d}{2}$	$\frac{d}{4}$
	$.0491 (D^4 - d^4)$	$.0982 \frac{D^4 - d^4}{D}$	$\frac{D}{2}$	$\frac{1}{4} \sqrt{(D^2 - d^2)}$
	$\frac{b'n^3 + b'm^3 - (b - b') a^3}{3}$	$\frac{I}{c}$	$\frac{I}{A}$	
	$\frac{bh^3 - 2b'h'^3}{12}$	$\frac{2I}{h}$	$\frac{I}{A}$	
	$\frac{h^4}{12}$	$.1178 h^3$	$\frac{h}{3.46}$	

PROPERTIES OF USUAL ROLLED-STEEL SECTIONS. — APPROXIMATE VALUES.

A = total net area of section. For minimum sections.

Section.	Moment-of-inertia.	Section modulus.	Least radius of gyration.	Distance from lower edge of section to neutral axis.
	$\frac{A d^2}{6.1}$	$\frac{A d}{3}$	$\frac{b}{5.2}$	$\frac{d}{2}$
	$\frac{A d^2}{6.73}$	$\frac{A d}{3.3}$	$\frac{b}{3.56}$	$\frac{d}{2}$
	$\frac{A d^2}{10.4}$	$\frac{A d}{7.4}$	$\frac{d}{3.5}$	$\frac{d}{5}$
	$\frac{A d^2}{9.9}$	$\frac{A d}{6.7}$	$\frac{db}{2.6(d+b)}$	$\frac{d}{3.1}$
	$\frac{A d^2}{10.9}$	$\frac{A d}{6.7}$	$\frac{b}{4.66}$	$\frac{d}{3.3}$
	$\frac{A d^2}{19}$	$\frac{A d}{7.6}$	$\frac{d}{4.74}$	$\frac{d}{2}$

While the first of these tables is accurate, the second is only approximate. That this second table of formulas cannot be exact is due to the fact that a certain depth and weight, of beam or channel, may have the metal in its section distributed in several ways,—for instance: the beam may have the bulk of the material in its section located in its web, while another beam of the same depth and weight per foot, maybe, will have the greater proportion of the material located in the flanges.

In the formulas for determining the transverse strength of beams is introduced a value derived from the moment-of-inertia, and it is usually called the section modulus, though it has been called, rather erroneously, it would seem, resisting moment or moment of resisting, and, also, resisting inches.

This value, the section modulus, is found by dividing the moment-of-inertia of the section by the greatest distance from the neutral axis to the outside fibre of the section. If the section modulus is represented by Q , and the moment-of-inertia by I , with the distance from the centre-of-gravity or neutral axis of the section by c , the formula for the value is $Q = \frac{I}{c}$. This

value Q is necessary in determining the resistance to transverse strength of beams and built-up sections, and, consequently, it is often necessary to determine the moment-of-inertia of compound sections in order to ascertain their section modulus, and, subsequently, strength of the beam represented by the section.

Since nearly all compound structural sections composed of rolled steel are made up of several rectangular sections, or of rolled sections whose properties are known, the moment-of-inertia of such sections is readily obtained by observing the following:

Rule:—The moment-of-inertia of any compound section is equal to the sum of the products of each elementary rectangular figure composing the section, by the square of the individual distance between its centre-of-gravity and the neutral axis of the entire section, plus the moment-of-inertia of each elementary rectangular figure.

This rule is more concisely stated in the formula $I = \Sigma a d^2 + i$, in which Σ , or Sigma, represents, as before stated, the summation of the several values found by applying the succeeding formula to the several elementary rectangular sections: a equals the elementary area; I equals the distance from the centre-of-gravity of the elementary area in question to the neutral axis of the section, and i equals the moment-of-inertia of the elementary area or figure under consideration.

In applying the above rule and formula, let us consider the moment-of-inertia for the section shown in Figure 5.

It is first necessary to find the location of the neutral axis, which is accomplished by applying the formula previously given: $c = \frac{\Sigma a d}{A}$ and making the calculations as follows:—

Flange-plate	$\frac{1}{4}'' \times 6''$; $a d = 15 \times .125 = 1.875$
Flange angles.....	$3'' \times 3'' \times \frac{1}{4}''$; $a d = 2 \times 1.44 \times 1.09 = 3.139$
Web-plate	$\frac{5}{16}'' \times 10''$; $a d = 3.12 \times 5.25 = 16.380$
Lower flange angles $2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{1}{4}''$;	$a d = 2 \times 1.19 \times 9.53 = 22.681$

The sum of $a d$ for each elementary section..... = 44.075

The total area of the entire section equals 9.88, and, consequently, distance c equals $44.075 \div 9.88$, or 4.46 inches from the

line *ab*, or origin of moments. The section redrawn, with the neutral axis located and the dimensions given, necessary in order to calculate the moment-of-inertia, is shown in Figure 6, and the calculation may proceed as follows:—

$I = \Sigma ad^2 + i$

Then $a d^2 + i$ for

Flange plate.....	$\frac{1}{4}'' \times 6''$	=	$1.5 \times 4.335^2 + .0078$	=	28.19
Flange angles.....	$3'' \times 3'' \times \frac{1}{4}''$	=	$2 \times 1.44 \times 3.37^2 + 2.48$	=	35.16
Web plate.....	$\frac{5}{16}'' \times 10''$	=	$3.12 \times .70^2 + 26.04$	=	26.23
Lower flange angles	$2\frac{1}{2}'' \times 2\frac{1}{2}'' \times \frac{1}{4}''$	=	$2 \times 1.19 \times 5.07^2 + 1.40$	=	62.56

Total, or $\Sigma ad^2 + i = 152.14$

Which result is the value for the moment-of-inertia for the built-up section. The section modulus can be found by dividing the value, 152.14, just found, by the distance from the neutral axis to farthest outside fibre, which is 5.79 inches. Making this division, the section modulus for the section shown in Figure 5 and 6 is found to be 26.3.

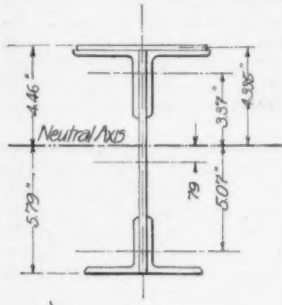


Fig. 6.

and formulas given, or they may be obtained from the tables printed by the several steel mills and issued in the form of a handbook to their patrons.

In making the calculations for the section shown in Figure 5 it will be noticed that the distance *e* for the angles had to be obtained in order to obtain the distance *d* used in the preceding calculation, and also that the moment-of-inertia for each section, or *i*, appears in the notation of the calculation.

The following tables, which are compiled from the "Passaic Rolling Mills Pocket Book," give the values used in the calculation, and will be found useful in determining the properties of any compound section composed of angles or plate, and in the design of any structure which will be treated of hereafter:

MOMENT-OF-INERTIA OF RECTANGULAR SECTIONS.—AXIS AT RIGHT-ANGLES TO GREATEST DIMENSION OF SECTION.

Depth in inches.	Width of rectangle in inches.						
	$\frac{1}{4}$	$\frac{1}{2}$	$\frac{3}{4}$	1	$\frac{5}{4}$	$\frac{3}{2}$	2
6	4.50	6.75	9.00	11.25	13.50	15.75	18.00
7	7.15	10.72	14.29	17.86	21.44	25.01	28.58
8	10.67	16.00	21.33	26.67	32.00	37.33	42.67
9	15.19	22.78	30.38	37.97	45.56	53.16	60.75
10	20.83	31.25	41.07	52.08	62.50	72.92	83.33
11	27.73	41.59	55.46	69.32	83.18	97.06	110.92
12	36.00	54.00	72.00	90.00	108.00	126.00	144.00
13	45.77	68.66	91.54	114.43	137.31	160.20	183.08
14	57.17	85.75	114.33	142.92	171.50	200.08	228.67
15	70.31	105.47	140.63	175.78	210.94	246.09	281.25
16	85.33	128.00	170.67	213.33	256.00	298.67	341.33
17	102.35	153.53	204.71	255.89	307.06	358.24	409.42
18	121.50	183.25	243.00	303.75	364.50	428.25	486.00
19	142.90	214.34	285.79	357.24	428.68	500.14	571.58
20	166.67	250.00	333.33	416.67	500.00	583.33	666.67
21	192.94	289.41	385.88	482.34	578.81	675.28	771.75
22	221.83	332.75	443.67	554.58	665.50	776.42	887.33
23	253.48	380.22	506.96	633.70	760.44	887.18	1,013.92
24	288.00	432.00	576.00	720.00	864.00	1,008.00	1,152.00
25	325.52	488.28	651.04	813.80	976.56	1,139.32	1,302.08
26	366.17	549.25	732.33	915.42	1,098.50	1,281.58	1,464.67
27	410.06	615.09	820.13	1,025.16	1,230.19	1,435.22	1,640.25
28	457.33	686.00	914.67	1,143.33	1,372.00	1,600.67	1,829.33
29	508.10	762.16	1,016.21	1,270.26	1,524.31	1,778.36	2,032.42
30	562.50	843.75	1,125.00	1,406.25	1,687.50	1,968.75	2,250.00
31	620.65	930.97	1,241.30	1,551.62	1,861.94	2,172.26	2,482.60
32	682.67	1,024.00	1,365.33	1,706.67	2,048.00	2,389.33	2,730.67
33	748.69	1,123.03	1,497.38	1,871.72	2,246.06	2,620.40	2,994.76
34	818.83	1,228.25	1,637.67	2,047.08	2,456.50	2,865.92	3,275.33
35	893.23	1,339.84	1,786.46	2,233.07	2,679.68	3,126.30	3,572.92
36	972.00	1,458.00	1,944.00	2,430.00	2,916.00	3,402.00	3,888.00
37	1,055.27	1,582.90	2,110.54	2,638.17	3,165.80	3,693.44	4,221.08
38	1,143.17	1,714.75	2,286.33	2,857.92	3,429.50	4,001.08	4,572.67
39	1,235.81	1,853.72	2,471.62	3,089.53	3,707.44	4,325.34	4,943.24
40	1,333.33	2,000.00	2,666.67	3,333.33	4,000.00	4,666.67	5,333.33

PROPERTIES OF ANGLES WITH EQUAL LEGS.—VALUES GIVEN FOR MAXIMUM AND MINIMUM SECTIONS.

Size of angle.	Thickness.	Weight per foot.	Area of section.	Distance from the neutral axis to the back of flange.	Moment-of-inertia, axis parallel to flange.	Section Modulus, axis parallel to flange.	Radius of Gyration, axis parallel to flange.	Radius of Gyration, axis parallel to flange.
6 × 6	$\frac{1}{2}$	34.0	10.03	1.87	35.3	8.17	1.87	1.20
6 × 6	$\frac{3}{4}$	14.8	4.36	1.64	15.4	3.52	1.88	1.20
5 × 5	$\frac{1}{2}$	24.2	7.11	1.56	17.0	4.78	1.55	1.00
5 × 5	$\frac{3}{4}$	12.3	3.61	1.39	8.74	2.42	1.56	1.00
4 × 4	$\frac{1}{2}$	20.8	6.11	1.35	9.45	3.32	1.24	.80
4 × 4	$\frac{3}{4}$	8.16	2.40	1.12	3.72	1.29	1.24	.80
3½ × 3½	$\frac{1}{2}$	13.5	3.98	1.10	4.33	1.81	1.04	.70
3½ × 3½	$\frac{3}{4}$	7.11	2.09	.99	2.45	.98	1.08	.70
3 × 3	$\frac{1}{2}$	12.1	3.56	1.03	3.20	1.48	.94	.60
3 × 3	$\frac{3}{4}$	4.9	1.44	.84	1.24	.58	.93	.60
2½ × 2½	$\frac{1}{2}$	7.85	2.31	.82	1.33	.76	.76	.50
2½ × 2½	$\frac{3}{4}$	4.05	1.19	.72	.70	.40	.77	.50
2½ × 2½	$\frac{1}{2}$	7.17	2.11	.78	1.04	.65	.70	.45
2½ × 2½	$\frac{3}{4}$	2.75	.81	.63	.39	.24	.69	.45
2 × 2	$\frac{1}{2}$	6.32	1.86	.72	.72	.51	.62	.40
2 × 2	$\frac{3}{4}$	2.41	.71	.57	.28	.19	.62	.40
1½ × 1½	$\frac{1}{2}$	4.72	1.39	.61	.39	.32	.52	.35
1½ × 1½	$\frac{3}{4}$	2.11	.62	.51	.18	.14	.54	.35
1½ × 1½	$\frac{1}{2}$	3.33	.98	.51	.19	.19	.44	.30
1½ × 1½	$\frac{3}{4}$	1.80	.53	.44	.11	.104	.46	.30
1½ × 1½	$\frac{1}{2}$	2.55	.75	.46	.123	.134	.40	.25
1½ × 1½	$\frac{3}{4}$	1.02	.30	.35	.044	.049	.38	.25
1 × 1	$\frac{1}{2}$	1.57	.46	.36	.045	.064	.31	.20
1 × 1	$\frac{3}{4}$	.78	.23	.30	.022	.031	.31	.20
¾ × ¾	$\frac{1}{2}$	.99	.29	.29	.019	.033	.26	.175
¾ × ¾	$\frac{3}{4}$	.68	.20	.25	.014	.022	.27	.175

PROPERTIES OF ANGLES WITH UNEQUAL LEGS.—VALUES GIVEN FOR MAXIMUM AND MINIMUM.—SECTIONS.

Size of angle.	Thickness.	Weight per foot.	Area of section.	Neutral axis parallel to shorter flange.			Neutral axis parallel to longer flange.			Least Radius of Gyration, axis diagonal.
				Distance from the neutral axis to the back of flange.	Moment-of-inertia.	Section Modulus.	Distance from the neutral axis to the back of flange.	Moment-of-inertia.	Section Modulus.	Radius of Gyration.
6 × 4	$\frac{1}{2}$	28.4	8.34	2.20	31.84	7.89	1.95	1.18	11.81	3.85
6 × 4	$\frac{3}{4}$	12.3	3.61	1.94	13.51	3.32	1.93	.94	4.90	1.60
5 × 3	$\frac{1}{2}$	20.3	5.98	1.78	15.15	4.53	1.59	1.03	6.23	2.39
5 × 3	$\frac{3}{4}$	10.4	3.05	1.61	7.78	2.29	1.60	.86	3.18	1.21
5 × 3	$\frac{1}{2}$	19.3	5.68	1.90	14.91	4.55	1.62	.88	4.27	1.85
5 × 3	$\frac{3}{4}$	8.16	2.40	1.68	6.26	1.89	1.61	.68	1.75	.75
4½ × 3	$\frac{1}{2}$	17.8	5.23	1.65	10.73	3.59	1.43	.91	3.80	1.75
4½ × 3	$\frac{3}{4}$	7.65	2.25	1.47	4.67	1.54	1.45	.72	1.70	.75
4 × 3½	$\frac{1}{2}$	17.8	5.23	1.37	8.12	2.95	1.24	1.12	5.83	2.33
4 × 3½	$\frac{3}{4}$	7.65	2.25	1.18	3.56	1.24	1.26	.93	2.55	.99
4 × 3	$\frac{1}{2}$	13.5	3.98	1.37	6.04	2.31	1.23	.87	2.73	1.28
4 × 3	$\frac{3}{4}$	7.11	2.09	1.26	3.38	1.23	1.27	.76	1.65	.74

Every practical consideration in connection with the properties of sections has been explained, except the graphical method of determining the moment-of-inertia. The principle of the method is the same as that to determine the neutral axis, and consists of dividing the area of the figure included between the points *J*, *n*, *p*, *q*, *r*, *s*, as shown in Figure 3, by the total area of the section of the member.

M. M. SLOAN.

[To be continued.]

THE PALACE OF THE QUEEN MOTHER, ROME.

AMONG the many buildings torn down in the improvement of Rome was the palace of Prince Buoncompagni-Piombino, which was removed for the enlargement of the Piazza Colonna.

The need of a new family residence led to the erection of this entirely modern palace, which was built under the direction of the designing architect, Gaetano Koch, who, on this occasion, has shown his great merit as designer and artist, and has erected a palace which compares most favorably with the older Roman palaces, from which he has drawn his inspiration, and one well befitting a princely residence.

Situated on the higher level of the Quirinal Hill, on the site of the Villa Ludovisi, it is surrounded by its extensive and lovely gardens containing two villas, one of recent construction, erected by Koch. The palace is artistically placed at the curve of Via Veneto, a large, handsome road leading up from the Piazza Barberini to the gardens of the Villa Borghese, and, while it commands a fine outlook, it also presents itself to the view in a most advantageous and striking manner.

The facade is in the sixteenth-century style and recalls to mind the Farnese Palace: in the centre is the main entrance, composed of three large arches which permit the passage of carriages into the spacious *atrio*; from this access is had to the vestibule leading to the grand stairway, which has been made a chief feature in the building, and here Koch has freely indulged his artistic feeling; at the foot of this stairway he has placed the well-known group by Bernini, "Il Ratto di Proserpina."

This statue formed a part of the Ludovisi Museum, formerly held in the Villa Ludovisi. The Palazzo Piombino, which took its place, was constructed not merely for a residence, but also to receive this valuable collection belonging to the family Buoncompagni-Piombino, and nothing was spared to give these precious works of art a worthy setting.

Koch, in his arrangement of the grand stairway and the connecting gallery, has fully complied with the requirements. This gallery of imposing proportions runs along the rear of the ball-room, dining-room, drawing-room, and bedrooms, which occupy the entire front of the second floor, and gives access to the same. In the decoration of the gallery he has made use of the handsome marbles, columns, tapestries and paintings of the Villa Ludovisi, and has most artfully combined these with the modern decorations.

After the assassination of Humbert I, the Queen left the royal palace of the Quirinal, but desiring to continue her residence in Rome. After diligent search the Palazzo Piombino was found to be the best adapted for a royal residence, and the whole property was purchased by the House of Savoy for an approximate sum of \$600,000. Queen Margherita has occupied it since December, 1900; her private apartment consists of five rooms on the second floor contiguous to the large salon in the centre.

The two villas, which were intended as residences for the children of Prince Piombino, are now destined for the use of the members of the immediate family of Queen Margherita during their presence at Rome. No changes were made in the buildings beyond necessary internal renovations, but the valuable collections contained in the palace have been purchased by the Government and will be removed to the National Museum in Rome, where they may be admired by the public, for whom they have been always inaccessible.

This palace, under the auspices of Queen Margherita, will become a centre for the encouragement of art, literature and charity; it is especially in charities that the Queen Dowager interests herself, and recently she purchased a near-lying bit of property which has been converted into an asylum for children whose fathers have met with violent death; this is being connected by means of an underground passage with the palace and will be under the personal supervision of Queen Margherita. Thus, surrounding herself with charitable works, this unfortunate Queen has formed for herself, in the palace that we have described, a peaceful abode, where in seeking to alleviate the misfortunes of others she may find consolation for her own great sorrow.

JAMES GILMORE.

COMMON CAUSES OF FIRES.

SPEAKING of the fires which occurred in this country in 1900, an insurance paper, *The Chronicle*, recently made two striking statements. Very nearly half of them—46.24 per cent, to be exact—were in dwellings, and 90 per cent of these were due to preventable causes. Almost the only unavoidable fires are those resulting from being situated next to another building which is ablaze. Practically everything else in the way of a conflagration *The Chronicle* attributes to some form of carelessness.

The defective flue is credited with making more mischief than any other one cause. Soot accumulates there by degrees without doing harm until peculiar conditions of draught, attended by chemical changes, perhaps, set the chimney on fire. If the flue is properly built no harm will ensue, but bad construction is liable to be followed by disaster at such times. Whether one rents or buys a house in which stoves, ranges, grates and furnaces are to be used, he should have his chimneys inspected by a competent and disinterested builder, to make sure that they are as they should be. *The Chronicle* insists that they should be of the best brick, preferably double-walled, or else lined with terra-cotta or fire-clay. The very best mortar should be used, and the bricks painted inside as well as out. This is better than plastering the whole inner surface, because smoke tends to dis-

integrate the coating. The slightest perforation in the chimney is likely to enable a spark to escape, or at least to invite the lodgment of soot.

A chimney ought to rest on the ground or have six courses of brick at the bottom in case it is supported by a timber foundation. A flue should never be so built on joists that a stove-pipe can enter it vertically. Cement or vitrified pipes ought not to be used as flues, and no woodwork should be allowed to come within 2 inches of the chimney.

In erecting stove-pipe, each joint should open back toward the stove. In that way the escape of sparks into the room will be prevented. Pipe should be inspected occasionally to see whether moisture has corroded it. When it passes through a ceiling or floor, it should be surrounded by a double-walled tin collar, with at least an inch of space between the two sheets of metal, and the collar should be of ample length. Unused stove-pipe holes in a chimney should be stopped with metal.

One of the most incendiary combinations against the welfare of a household is that effected by the average child and a match. Insurance-men are constantly advising the use of safety-matches alone, and the habit of keeping even these out of the hands of youngsters is strongly commended. Inasmuch as the life of the little ones is hazarded by too great license in this respect, the rule cannot be enforced too rigidly.

Gas-jets, when near woodwork or curtains, are a constant source of danger. Glass chimneys or globes afford a little protection, but a wire cage is much better. And if one is not willing to employ this, he would do well to adopt a fixture which cannot swing so as to come in contact with draperies. It is also necessary to guard against the possibility of a puff of wind catching a curtain and blowing it against the jet. Many fatal fires have thus been caused. At least 20 inches of space should intervene between a gas-jet and a lath-and-plaster ceiling. Otherwise there should be a metal screen, itself fully an inch from the ceiling.

There are people ignorant or careless enough to-day to need warning not to fill or trim kerosene lamps at night. A still larger proportion of the population is unaware of the risk of letting the oil get very low in the reservoir and of turning the wick down without entirely extinguishing the flame. The former practice is conducive to the generation of explosive gases in the lamp, and the latter overheats the burner. Of course, so long as one consumes high-grade oil he is safe, even under these circumstances. But where low-grade oils are burned there is a chance that the naphtha or gasoline which they contain will make trouble. The same precautions should be observed with oil-stoves as oil-lamps.

Regarding the furnace, *The Chronicle* offers the following suggestions:—

Place it on a solid foundation of brick or stone. Have stone, brick or metal not less than 36 inches wide in front of the ash-pit. The dome of the furnace should not be less than 18 inches from the unprotected woodwork above. The smoke-pipe should not be less than 12 and the hot-air flues not less than 8 or 10 inches from the side walls of combustible material. The hot-air flues should be constructed of IX bright tin, and they should be double where they pass through wood or lath-and-plaster materials. There should be an air-space of at least $\frac{1}{2}$ inch between the inner and outer flues. Set the register in soapstone frames not less than 2 inches wide and well bedded in plaster-of-Paris. Make register-boxes of IX bright tin, if they pass through floors. Have the joist and floor timbers framed around them so as to leave an air-space from 2 to 3 inches wide, and cover the exposed woodwork with tin on all sides.

Use a metal air-trunk or inlet, with a wire net or grating at its outer opening. Wooden air-trunks are exceedingly dangerous, for at some time a reversal of the draught is likely to occur and carry sparks into the wooden shaft. Have an expert inspect your furnace before lighting and see that the lining has not been burned through. Keep at least one of the registers open all the time.

THE ACTION OF WIND AND WATER ON SEA-CLIFFS.

BY the sea precipices of the West the foam-fringe and the winds are the greatest of all natural forces. These Atlantic winds, wave-compelling, rock-destroying, drive the hosts of ocean, rank behind rank, to the onset, and search from foot to crest each face and crevice of the towering cliffs. The foam and surge, the bondslaves of the winds, the heavy and light artillery of the ocean bands, are the visible agents of destruction, and on the Cornish coast develop a power so awful, with a display of form and motion so sublime, that the imagination could never picture one-half of the volume and immensity of the forces of the air and deep. When the southerly gales come tearing across the Atlantic, up the mouth of the Channel, they rush into Mount's Bay, and, spinning round as in a caldron, beaten and resilient from headland to headland, make their last and fiercest onset on the serpentine walls of the Lizard Peninsula. From Poldhu and Mullion, over to the Lizard lights, is the climax of the struggle between the forces of earth and air, the rocks and tempests, in which the sea intervenes as the willing and mighty ally of the kingdom of the winds. It is a battle of armies in position, a set-piece of natural combat, in which the meeting of the hosts is veiled in mist and smoke and spoutings, and earth and sky re-echo the thunder of their war. The fighting-line is the foam-fringe, which

comes into action then, as we watch it from one of the black projecting towers of serpentine which guard some deep cove in the Lizard front. From the blue deep of the bay, under scuds of storm-wrack and shafts of light, the waves advance with a frontage of miles, blue rank behind blue rank, and ever rising and sharpening towards their summits. The front ranks pass by the watch-tower, bursting invisibly on the left where the buttress projects, but the right mile of wave has not yet hit the coast. Part does, smiting the heads of the cliffs in succession and exploding like mines in smoke and spray; part rushes on in the cove below till we see the back of the waves, green and translucent, as wrecked sailors do, rising between us and the shore, till the billow rises, curls over like a scroll, and then pours forward the rolling fields of foam. The whole frontage of the bay holds nothing but this sea-froth, into which the jade-green, sun-pierced mountains of water are ever pouring fresh floods from ocean's store. Acres and acres of foam lie weltering there, some dashing 100 feet over the squared, black, yellow-stained cliffs, some eddying round or falling back on the sands of the cove, some following the spin of the waters round and floating on half-seen solid sea, lapis-blue or green. This welter of the sea divides into three forms: the solid sea water; the white water, which is sea and air mixed by the toppling of the wave or its explosion on the rocks and precipices; and the true foam, which is made of sea-bubbles stuck together like a lump of skates' eggs, and often detaches into masses like sponges, large and small, and floats inland in such flights and incessant driftings as to form a separate and peculiar feature of the fringe of these Cornish precipices.

The spray, which dashes over the cliff-faces when unbroken waves hit the rocks, is solid water finely divided, wetting and stinging, and destroying or blighting even the hardy vegetation of this strange and awful coast. From the top of Gue Graze, near Kynance, and on the cliffs adjoining, the forms and force of foam may be seen as at a "private view," for no one is there to share the sight but the ravens and the falcon on the cliffs. Across the inlet is a wall of black serpentine, 300 feet high, veined with invisible green, and patched with orange below where the spray does not fall. The serpentine wall stands upright, above a black cavern, Ogo Pons ("ogo" means "cave" in old Cornish), bored out by the Atlantic waves. Above, the serpentine is capped with short turf and Cornish heather and thrift. The whole cove or bay is one inlet of green foam-edged, bellying surge, dipping, heaving, swelling, contracting and expanding, with the rolling froth eddying this way and that, and smashed and drowned at regular pulsations by the green and white outpouring waves from the main ocean. As these roll in like minute-guns their right flank hits the projecting cliff before they break, and as from a cannon's mouth the smoking spray rises in a column wide and high as a cathedral tower. From base to summit this column of spray ever drenches the cliff, and keeps it wet, black and bare. It curls over the summit, and throws itself, widened and wind-borne, on the turf mantle at the top, and as the spray of a fresh fountain makes all the grass green within the spread of its refreshing dew, so the pillar of salt spray has turned all the acres of grass on which it falls into a tawny brown and bronze. This spray is violently thrown; it does not float upwards; but the winds here help to carve the rock, even as the sand-grains carve the crags round the Sahara desert. Vexed by the spray, baked by the heat, and frozen in winter cold, the marble-like face of the serpentine cliffs cracks at first into square blocks, whose sheltered sides are slowly overgrown by an exquisite bloom of grays, and powdery yellows, and green lichenous dust, like pastel smoothed on a dark gray ground. These split and split again, and are then carried in tiny squares to the top of the cliffs by the wind. For the wind plays strange tricks as it strikes the cliff-face from the open sea. In a forty-mile gale blowing straight from the ocean you may stand on the cliff edge, if at a height of over 200 feet from the water, almost in a calm. This is one of the mysteries of this home of the wind and foam, and is explained thus:—

All the wind-force which strikes the cliff-face rushes upwards, perpendicularly with the face of the precipice, and with greater violence than the horizontal force which strikes the air above the summit. Thus the vertical ascending wind acts as a screen from the horizontal blast, and the watcher on the cliff is shielded from one blast behind the protection of the other. It is on this upward blast that the seagulls float in gales close to the cliff-face. It also scrapes off and carries upward from the serpentine little loosened cubes of the rock, green and dark azure, and streaked with bloody red where it is fresh broken, and lifting these above the cliff-top, drops them on the flat summit when the horizontal blast overpowers the ascending one. The turf is strewn with these little chips of the wind's undoing. Against lower cliff-faces the course of the wind is more wilful. The foam-flakes trace its currents and mark in their slow and devious flight the course and winding of these wandering winds. In Dollar Cove, a low-browed circular niche in the black coast, some thirty yards across, with a cave under the eastern side, the towering waves rolled before an ocean breeze on the ebb tide and piled masses of sea-froth, brewing like wort, 4 feet deep on the strip of sand which lay at the feet of the rock-face. Into the cove and against the shore, the wind blew steadily, and flakes and masses of the froth, of all sizes, from that of an apple to the rope fender of a coaster, detached themselves from the mass, rose, and followed the course of the wind. There were four main currents, each as clearly marked by the successive and slow travel of the froth masses in air as is the current of boiling water by the sawdust in a chemist's flask. Some

rose on either side of the little horseshoe of rock, travelled slowly up the face of the cliff, and then moved off right and left inland along two depressions in the down above, where they made a long trail of slowly expiring bubble masses. Others, when they reached a point to the right or left of these ascending winds, turned backwards in a curve, followed the horseshoe towards the outer edges, and then curled back over the sea, following in the air almost exactly the same course as the reflux waters were taking below. This cove is possibly named from a Dutch brig, the "Dollard," laden with wheat, from Trieste for Falmouth, in 1862. One of the crew saved himself by jumping on to a rock and climbing the cliff. The captain, his son and four seamen perished, and the ship went to pieces in ten minutes. But a month later, at low water, some fishermen made their way into the cave, or "ogo," the bottom of which is always awash, and there found parts of the masts and spars of the "Dollard," which had been churned about in this subterranean cavern ever since the wreck. — *The Spectator*.

BOOKS PAPERS

MR. ALFRED WHITMAN'S new book¹ upon engravings deserves notice for two reasons — because such a book is eminently useful to collectors and would-be ones, and because being an official in the Department of Prints and Drawings in the British Museum, he speaks authoritatively and with knowledge — two qualities which do not always go together. The book explains the various kinds of engravings — mezzotints, etchings, line, stipple, printing in color, aquatint, woodcuts and lithographs. The illustrations are some eighty in number, mostly by the half-tone process, but, in order to show the different styles of technique of the originals, some of them are reproduced in collotype — a distinct advantage. Etchings reproduce line for line, but line-engravings and mezzotints lose their especial technique by the half-tone process, the screen used destroying the texture of the original work, or, rather, it adds another texture to it.

Mr. Whitman gives a chapter upon each branch of engraving, and, incidentally, upon the various frauds indulged in by dishonest dealers of former times and of the present day, and so instructs collectors as to the rocks to be avoided. He also gives a chapter upon prices attained in these latter days. Fashion and fads, of course, rule the collection of prints as of other things worth collecting, but the prices which colored prints (printed in colors) have fetched in London lately seem exorbitant, and Mr. Whitman points out that an amateur may make a very good collection of engravings at small cost, if he be content with good specimens, but of less popular subjects. Thus, although a Rembrandt etching (the "Rembrandt with the Sabre") fetched £2,000 at the Holford Sale, an amateur known to the author picked up some genuine and very good ones at old shops for 6d. apiece! These are the prizes which are sometimes obtained by those who poke into dirty portfolios in squalid shops. Fine French line-engravings may be bought reasonably now — they are not in fashion; whereas, if you want mezzotints after Reynolds, you must bring a heavy purse. In the one case two figures may be enough; in the other, the price may rise even to four figures.

Morland's colored prints fetch large sums: they are the fashion; but it is a fashion which will probably decline. His pictures of animals are, of course, worth the prices they fetch, but the transcriptions printed in colors of his figure-subjects are very inferior.

As in books, so in prints, the least thing will enhance or diminish value. A first edition of "Martin Chuzzlewit" with the hundred pounds on the title-page printed thus, "100£," is of much value; but the later first editions where the correction appears as "£100" is of next to none. So the "Portrait of Ephraim Bonus" etched by Rembrandt with a black ring, sold in 1893 for £1,950; whereas at the same sale (Holford), an impression in the second state, with a white ring, went for only £135. This makes the difference; as it is known that only three impressions of the former are known, all the others are of the second state. As of these three impressions in the first state one is permanently preserved at Amsterdam, while the second is in the British Museum, the Holford impression, as in the case of the "Rembrandt with the Sabre" was the only one that could possibly ever come into the market.

A reproduction of "La Rue Transnonian," lithographed by Honoré Daumier, shows that artist in all his dramatic force.

Mr. Whitman has hit upon a very useful idea in reproducing a portion of some of the prints enlarged three times. It is always difficult to describe art techniques, but by these examples we see at once, say, the effect of the "rocking" process upon a mezzotint ground; if we could have had a photograph of the "rocker" we should have had still less difficulty in understanding this particular process.

The description of the vicissitudes of an equestrian portrait of Charles I. by Vandyke are strange. It is in line and has passed through five stages. No. 1 is without a head. No. 2 has an etched head of a wigged and moustachless gentleman, which might be Marlborough or William III. No. 3 is Cromwell. In No. 4 Charles re-appears, and in No. 5 we see old Oliver resuscitated! The erasures round the heads are quite plain, and speak of the popularity

¹ "The Print-Collector's Hand-book." By Alfred Whitman. London: Bell & Son. 1901. 15s.

and unpopularity of the two persons. As the pendulum moved toward monarchy or democracy, so this copper-plate was placed under the hands of the engraver to bring the head up to date (!) in representing alternately the King and the Lord Protector.

ILLUSTRATIONS

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

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CORRIDOR: PALAZZO MARGHERITA, ROME, ITALY. SIG. GAETANO KOCH, ARCHITECT.

THE KUNSTLERHAUS, MUNICH, BAVARIA: GALLERY IN THE BANQUET-HALL;—THE MAIN STAIRCASE. HERR GABRIEL SEIDL, ARCHITECT.

This and the following plate are copied from *Deutsche Bauzeitung*.

DETAILS OF THE BANQUET-HALL: DAS KUNSTLERHAUS, MUNICH, BAVARIA. HERR GABRIEL SEIDL, ARCHITECT.

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

MONUMENT TO CHARLES MATHIEU, LOURCHES, NORD, FRANCE. C. MOYAU, ARCHITECT. C. TREUNISSEN, SCULPTOR.

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[Additional illustrations in the International Edition.]

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For description see article "The Palace of the Queen Mother" elsewhere in this issue.

MAIN STAIRCASE IN THE SAME PALACE.

HOUSE OF MRS. CATHERINE MINOT. MESSRS. PEABODY & STEARNS, ARCHITECTS;—HOUSE OF ROBERT S. BRADLEY, ESQ. MESSRS. LITTLE & BROWN, ARCHITECTS, BOSTON, MASS.

"THE AMALIENBURG," MUNICH, BAVARIA.

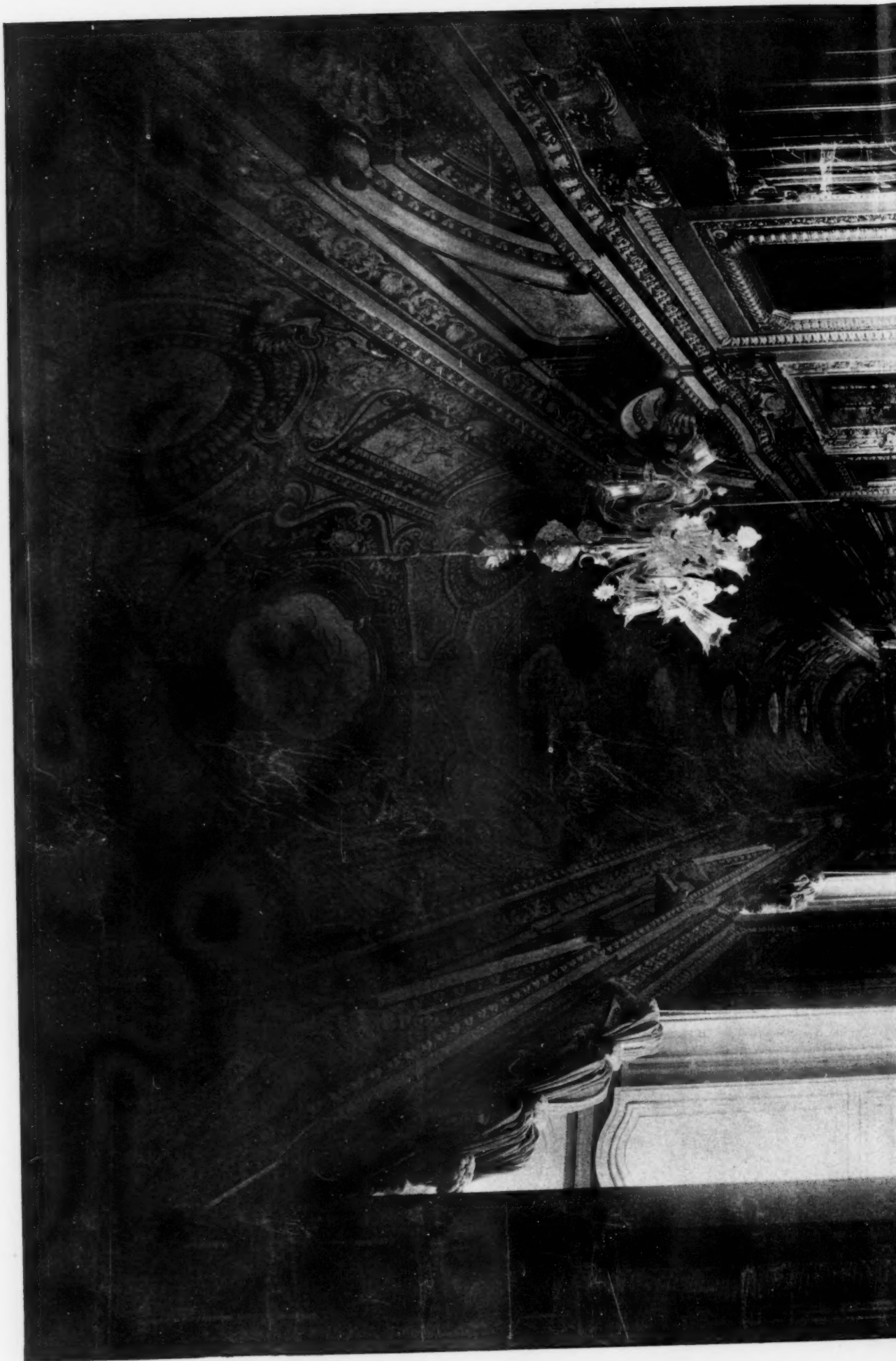
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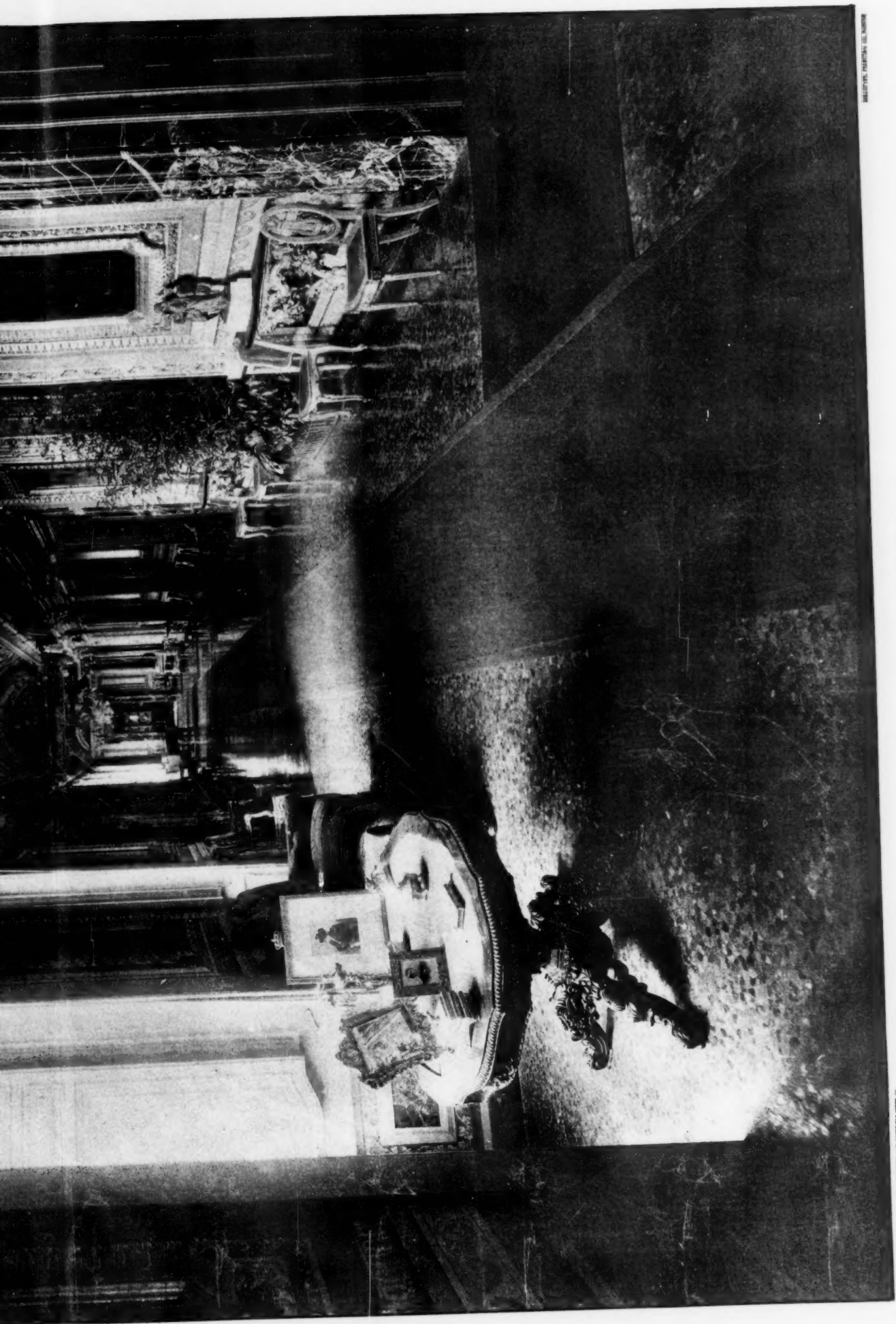
THE PROPER POLICY FOR PICTURE-GALLERIES. — Mr. Claude Phillips is up in arms over the latest manifestations of that curious method which is followed by the authorities of the National Gallery in adding to its possessions. A huge altar-piece by Signorelli has been bought for Trafalgar Square from the Mancini Collection at Citta di Castello. Although it is authentic, the critic argues that it is far from being a worthy example, and that as Signorelli is already adequately represented in the National Gallery, this immense painting is undesirable whether the price paid for it was a high or a low one. He pertinently advances the idea that it is better for the authorities to hoard their money and wait for first-rate opportunities than to buy superfluous works like this, especially as the outlook in the picture-market is well calculated to make possible purchasers put themselves in readiness to spend freely. "The wave of disintegration is again passing over England," says Mr. Phillips, "and the many who look upon the possession of great and epoch-making works of art as one of the national glories must tremble when they remember the breaking up in comparatively recent times of the famous Blenheim, Dudley, Ashburnham and Francis Hope collections, and the partial dispersal of one of the most interesting of all—that of the Earl of Northbrook. Transatlantic capital batters in now, by sheer force of metal, such few doors as are not thrown wide open to meet it half way. Among the collections which have already suffered from its seemingly irresistible encroachments—and may, therefore, suffer more in the future—are those of Castle Howard, Cobham, Warwick Castle, Kingston Lacy, and, alas! even that of Dorchester House, which, as one of the finest and best-chosen private galleries in the Kingdom, every one must honestly desire to see maintained intact, or, if it should come to the worst, handed over intact to the nation." The National Gallery has long suffered from the short-

sighted policy to which Mr. Phillips refers. Either through the bad judgment of the Director, through the disagreements of Trustees, or through the lack of funds which should easily have been procured from private sources when Government grants were unavailable, good pictures have been allowed to pass into the hands of foreign buyers, and the sense of loss has been aggravated among outside observers by expenditures as ill advised as the one to which specific exception has just been taken. There were groans in London last summer when the chance to buy a fine Hals was missed. The Continental museums are better off. The directors in Amsterdam, Berlin, Paris, Vienna, and Munich are kept so well informed that they or their representatives are promptly on the scene whenever there is a chance of acquiring a valuable work of art; and, somehow, they seem able to raise funds enough to make them formidable competitors when the sale comes off. There is a lesson here for us. The Metropolitan Museum is receiving every year more and more generous support, and, indeed, the recent Rogers bequest is one to excite envy among the directors of art-museums all the world over. But it is important that the Metropolitan should be kept constantly supplied with a really large sum in cash for the purchase of such works as may come into the market, and that it should be represented abroad by agents on whom the Director and Trustees might rely for early and absolutely trustworthy information and for that discretion in the making of purchases which is as necessary as the money itself. — *N. Y. Tribune*.

PARMA, THE CITY OF THE FARNESE. — On almost every Italian town, whatever succession of masters it may have known, some one family has left its dominant mark, and Parma is distinctively the city of the Farnesi. Late-comers though they were, their lilies are everywhere, over gateways, on palace-fronts, and in the aisles of churches; and they have bequeathed to the town a number of its most characteristic buildings from the immense unfinished Palazzo della Pilotta to the baroque fountain of parti-colored marbles which enlivens, with its graceful nymphs and river-gods, the grassy solitude of the palace square. To Rannuccio I, the greatest of these ducal builders, Parma owes the gigantic project of the Pilotta, as well as the Farnese Theatre and the University. To this group Duke Ottavio, at a later date, added the charming "Little Palace of the Garden." . . . The Farnese Theatre is one of those brilliant improvisations in wood and plaster to which Italian artists were trained by centuries of hurriedly organized *trionfi*, state processions, religious festivals, returns from war, all demanding the collaboration of sculptor, architect, and painter in rapid evocation of triumphal arches, architectural perspectives, statuary, chariots, flights of angels, and galleons tossing on simulated seas: evanescent visions of some *pays bleu* of Boiardo or of Ariosto, destined to crumble the next day like the palace of an evil enchanter. To those who admire the peculiarly Italian gift of spontaneous plastic invention, the art of the *plasticatore*, to borrow an untranslatable term, such buildings are of peculiar interest, since, owing to the nature of their construction, so few have survived; and of these probably none is as well preserved as Aleotti's Theatre. It is true that the painted ceiling is gone, and that the splendid Farnese dukes bestriding their chargers in lofty niches on each side of the proscenium are beginning to show their wooden anatomy through the wounds in their plaster sides; but the fine composition of the auditorium, and the Olympus of plaster divinities peopling the niches and balustrades and poised above the arch of the proscenium, still serve to recall the original splendor of the scene. The dusty gloom of the place suggests some impending transformation, and when fancy has restored to the roof the great glass chandeliers now hanging in the neighboring museum, their light seems to fall once more on boxes draped with crimson velvet and filled with lords and ladies in the sumptuous Spanish habit, while on the stage, before a perspective of fantastic colonnades and terraces, Isabel and Harlequin and the Capitan Spavento, *plasticatori* of another sort, build on the scaffolding of some familiar intrigue the airy superstructure of their wit. — *Edith Wharton in Scribner's Magazine*.

SAFEGUARDING THE CITIZENS' HEALTH. — A recent decision of the Appellate Division (Third Department) of the New York Supreme Court in the case of *Margaret Munn vs. the City of Hudson* (61 App. Div. 3423) holds that where a city allows its sewerage system to get out of repair, the householder whose property is injured can recover damages not only for the injury done to the property, but also to the health of the householder. In some respects this seems an advance on the idea hitherto entertained in New York. In this case the city built its sewer in such a negligent and insufficient manner that after several years' use part of the sewer became filled up, with the result that injury was done to the property and to the health of the householder. The trial resulted in a verdict of \$800 for damage done the property and \$1,000 for injury to the health of the plaintiff. In sustaining this verdict, the Appellate Court said the facts were such as to have given the city ample notice to repair the sewer. The city argued, however, that, as a matter of law, damages could not be recovered for injuries to health. Replying to this argument the Appellate Court said: "It was the duty of the defendant to use reasonable care in constructing the sewer according to the plans and specifications, and it was also the duty of the defendant to use reasonable care in keeping the sewer in proper repair." Accordingly it followed, the Court held, that "where, by reason of the negligence of a municipality, a trespass is committed upon premises by allowing the contents of a sewer to overflow thereon and a private nuisance is thus created, we see no reason why the owner of the premises cannot recover as damages, not only the injury to the property, but all other damages that are the natural and proximate result of the wrong. The damages must depend upon the proof in each case, and are only limited by the ordinary rules that require that they should not be remote or speculative." This decision, if sustained, may lead to much interesting litigation as to how far cities may be bound to see that householders do not suffer in their health from the negligent failure of cities to keep their sanitary arrangements in order. — *N. Y. Evening Post*.

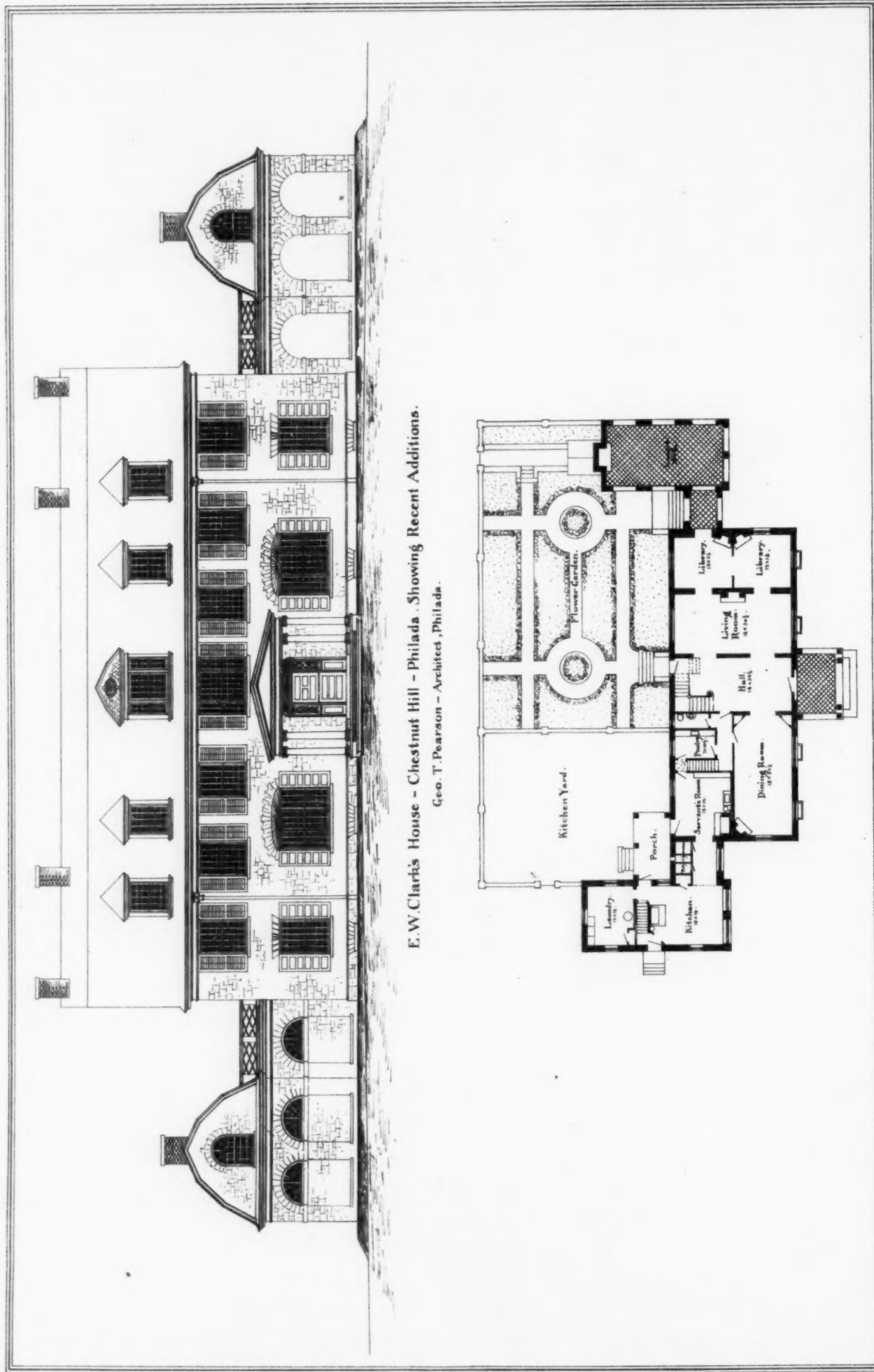




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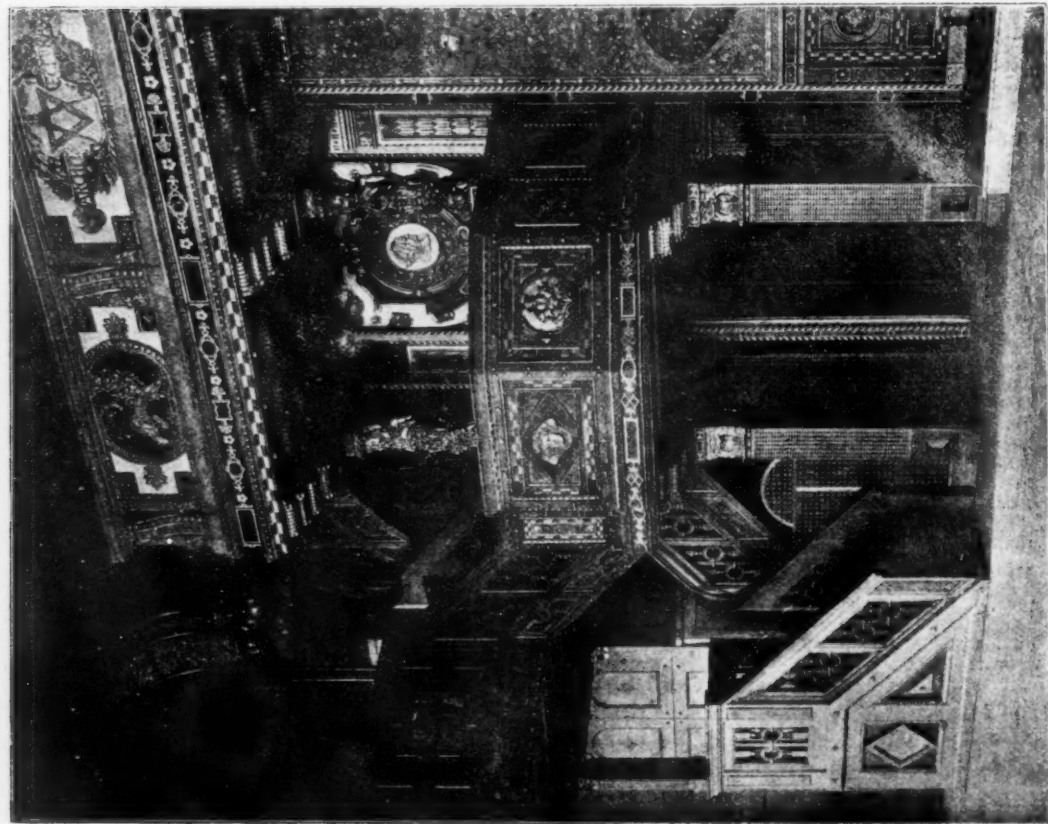
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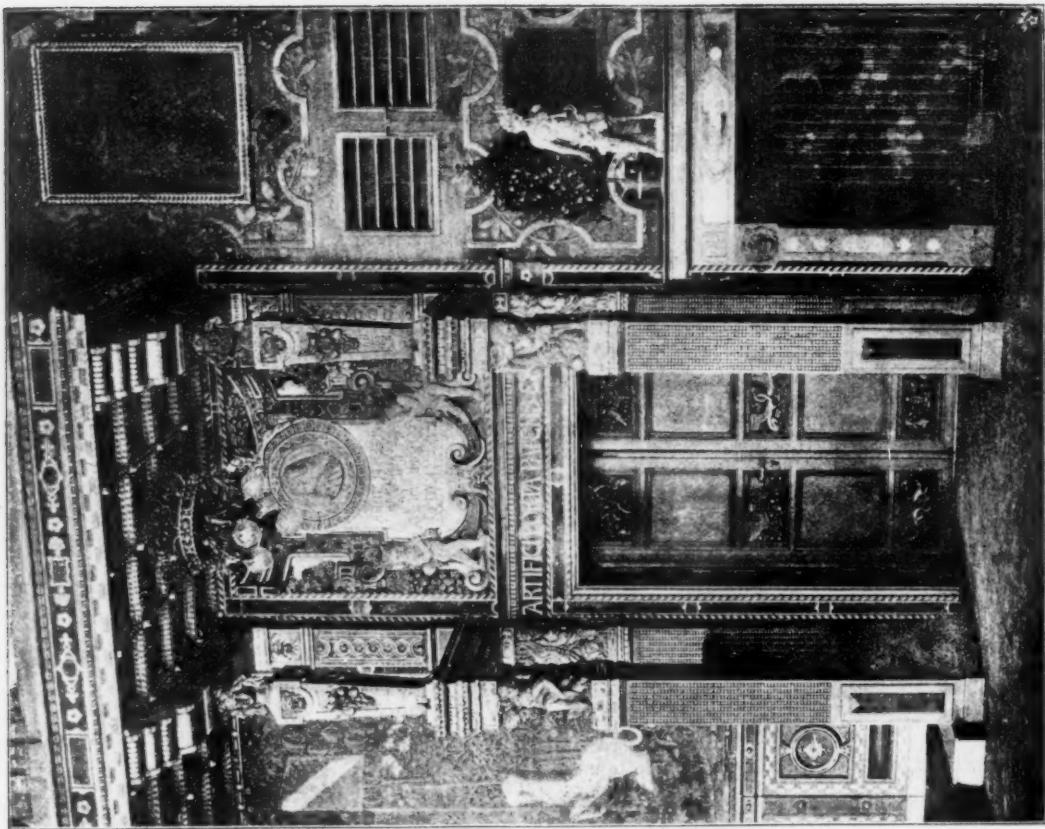
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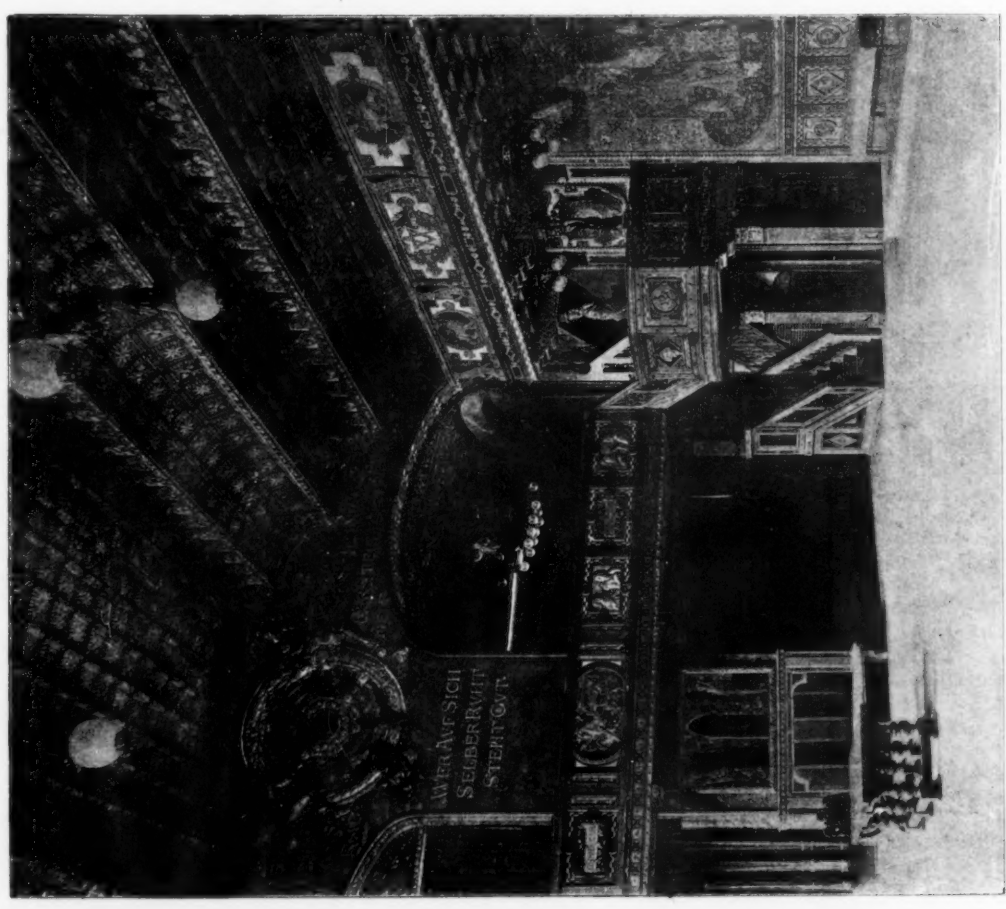


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DETAILS OF THE BANQUET-HALL.

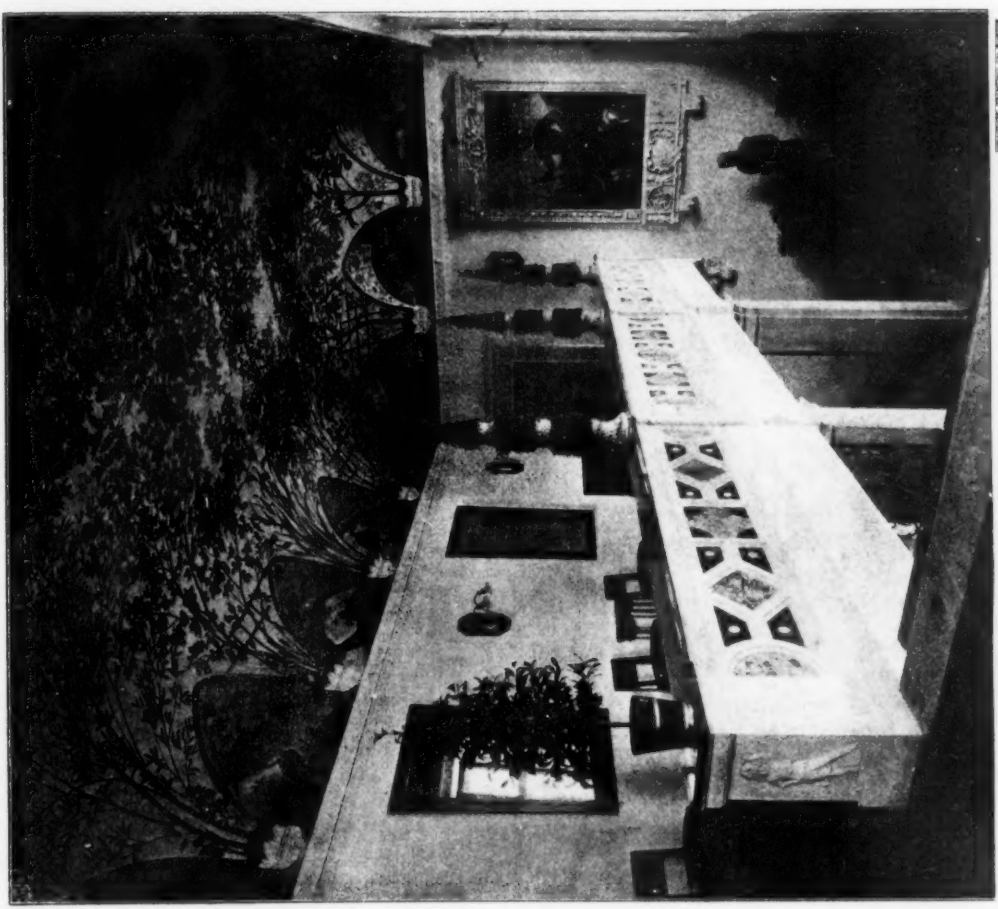
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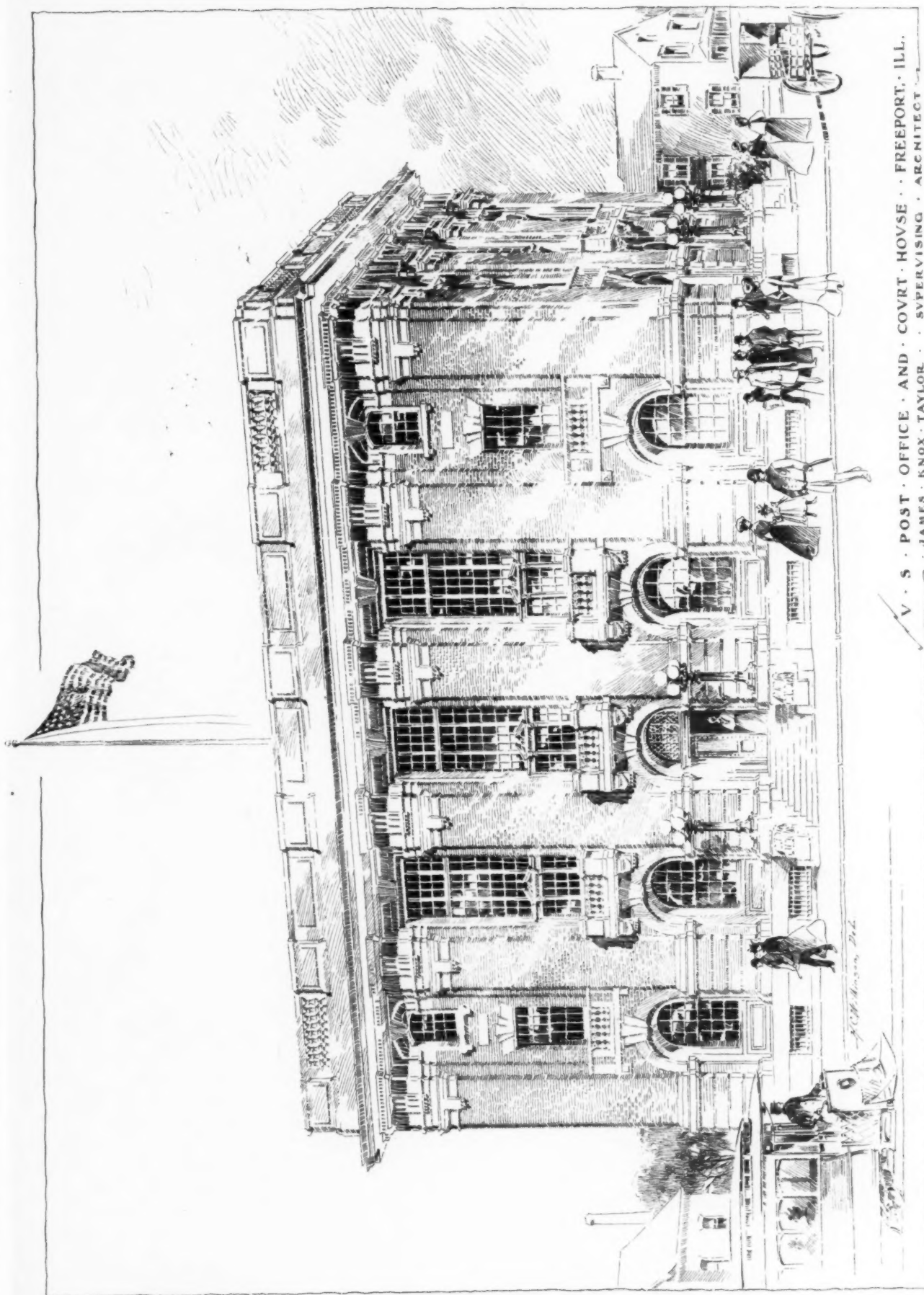
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INTERIOR VIEWS IN THE KUNSTLERHAUS, MUNICH, BAVARIA.

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The matter already illustrated may in small part be classified thus:

PUBLIC BUILDINGS

City Hall, New York, N. Y.	Date 1803-12
Old State House, Boston, Mass.	" 1748
Pennsylvania Hospital, Philadelphia, Pa.	" 1755
Carpenters' Hall, Philadelphia, Pa.	" 1770
Independence Hall, Philadelphia, Pa.	" 1729
Faneuil Hall, Boston, Mass.	" 1741
and others.	

CHURCHES

King's Chapel, Boston, Mass.	Date 1749
Seventh-day Baptist Church, Newport, R. I.	" 1729
Christ Church, Alexandria, Va.	" 1767
Christ Church, Philadelphia, Pa.	" 1727
St. Paul's Chapel, New York, N. Y.	" 1764
Old South Church, Boston, Mass.	" 1729
First Church, Hingham, Mass.	" 1681
St. John's Chapel, New York, N. Y.	" 1803
First Congregational Church, Canandaigua, N. Y.	" 1812
St. Peter's P. E. Church, Philadelphia, Pa.	" 1758
Gloria Dei Church, Philadelphia, Pa.	" 1700
and others.	

IMPORTANT HOUSES

Fairbanks House, Dedham, Mass.	Date 1636
Royall Mansion, Dedham, Mass.	" 1737
Philipse Manor House, Yonkers, N. Y.	" 1745
Tudor Place, Georgetown, D. C.	" 179-
Mappa House, Trenton, N. Y.	" 1809
Woodlawn, Va.	" 1799
Mount Vernon, Va.	" 1743
and others.	

Incidentally there are shown special measured drawings or large views of the following features and details:

Porches and Doorways	67 Subjects
Staircases	21 "
Mantelpieces	81 "
Pulpits	6 "
Fanlights	60 "

In addition to the subjects enumerated above there is a large quantity of measured and detailed drawings of Cornices, Ironwork, Gateposts, Windows, Interior Finish, Ceiling Decoration, Capitals, etc., together with elevational and sectional views of entire buildings.

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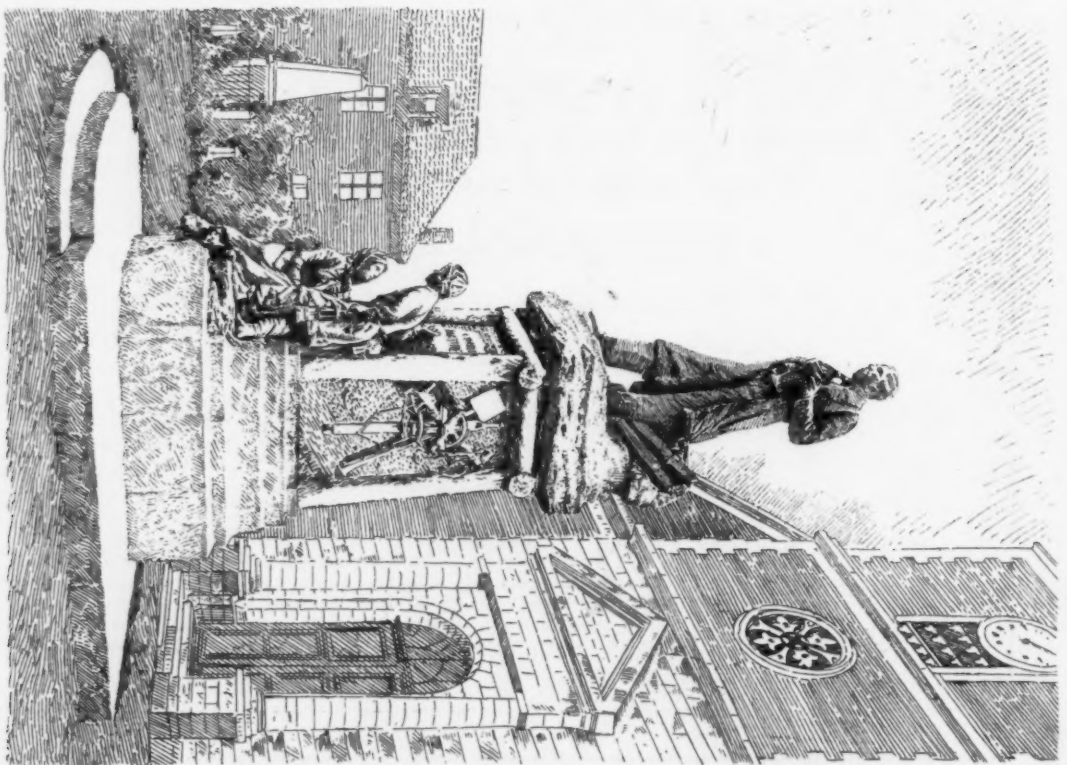
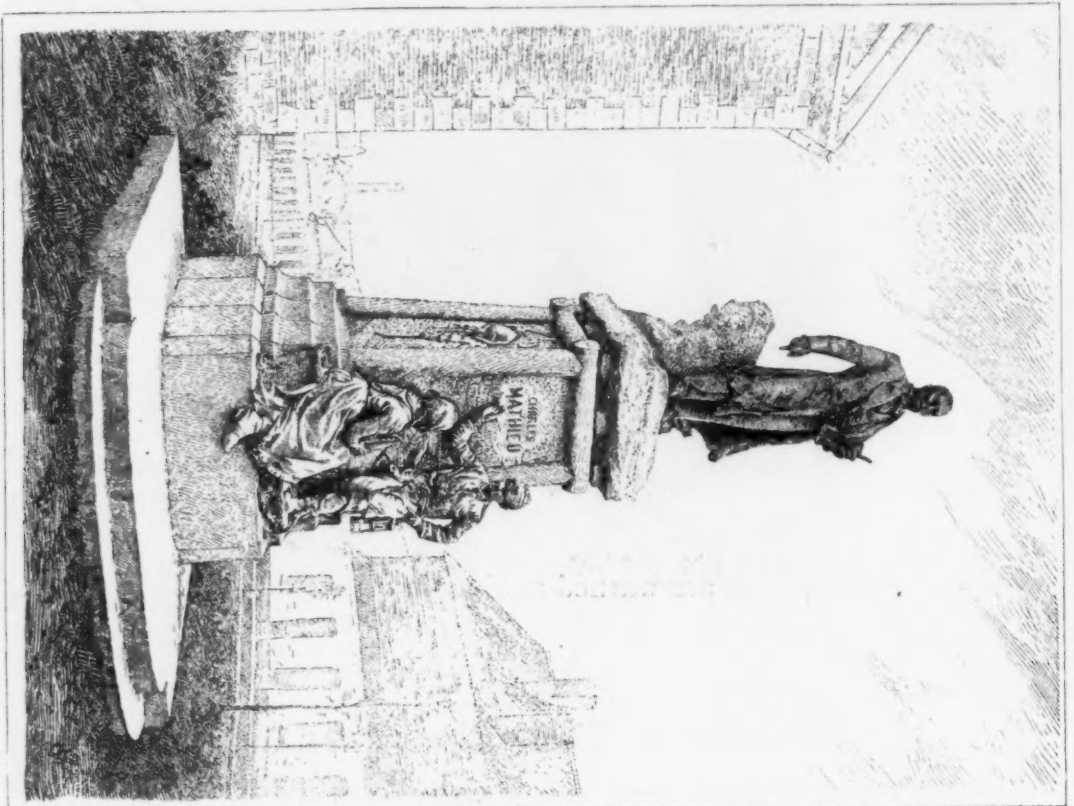
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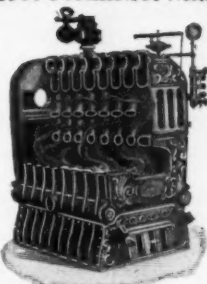
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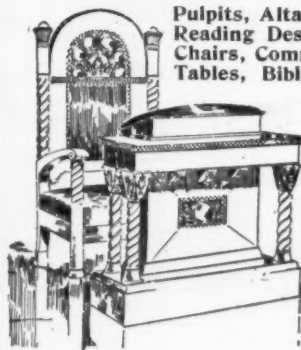
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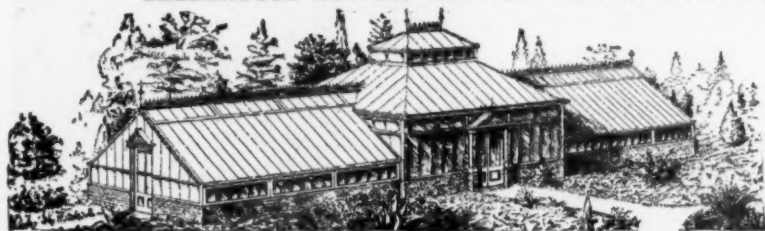
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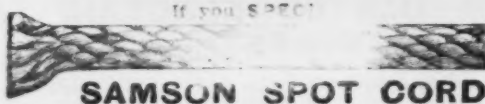


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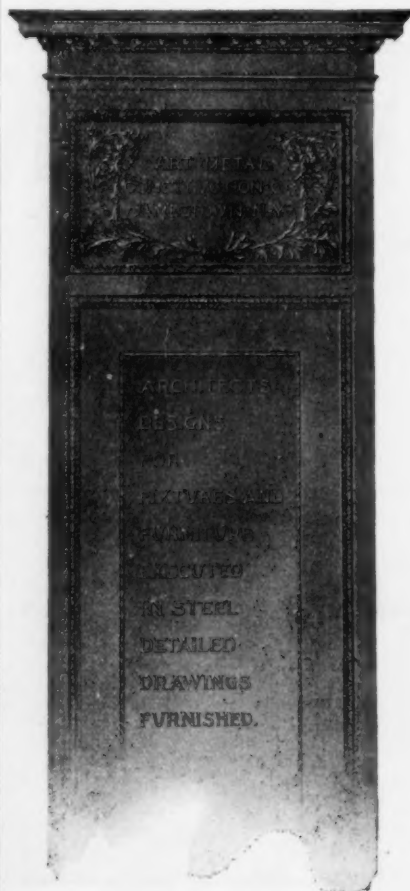
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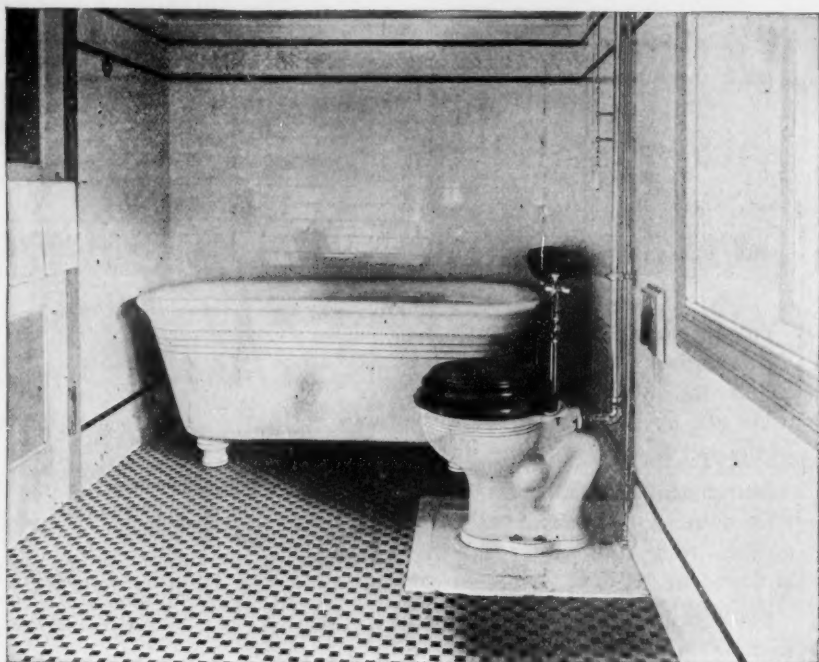
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BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Roxbury, Mass.—William Collett has prepared plans for a store and apartment block to be erected in Copeland St. for Rhodes Bros. It will be of brick with stone trimmings, 80' x 130'.

Russell, Kan.—George A. Berlinghof, of Beatrice, Neb., has prepared plans for the Russell County Court-house. Contracts will not be let until spring.

Salamanca, N. Y.—It is said that the Erie Railway Co. will erect a new passenger station and also that the company will remove its yards to this place. More than \$100,000 will be involved in the proposed improvement.

Salt Lake City, Utah.—John J. Daly will erect a new business building on W. 3d St., at a cost of \$25,000, after plans by Fred Hale.

San Francisco, Cal.—P. G. Soms has had plans prepared for a \$60,000 apartment-building at 22d and Mission Sts.

It is announced that Herbert E. Lay will erect a \$500,000 at New Montgomery and Mission Sts.

Kousseau & Son has prepared plans for a \$50,000 apartment building at O'Farrell and Laguna Sts.

Sault Ste. Marie, Mich.—J. W. Moffley and C. Chipley are having plans completed for a \$75,000 apartment-house.

Seattle, Wash.—Debb & Mendel, Washington Building, have made plans for an eight-story office-building, which will be fireproof and contain all modern improvements, to be erected here by eastern capitalists, at a cost of \$250,000.

Sioux City, Ia.—A stock company will be organized with a capital of \$200,000 for the purpose of putting up a fireproof hotel here. It is planned to erect a hotel six stories high, and modelled after the Planters' Hotel of St. Louis. William Gordon is interested.

South Bend, Ind.—Andrew Kunstman will erect a \$20,000 flat after plans by Charles A. Brehmer, 217 W. Jefferson St.

South Park, Wash.—The college of Our Lady of Lourdes will erect additional buildings on its grounds in the spring to cost \$50,000. The main building will be four-story, frame.

South Sharon, Pa.—W. E. Snaman, 515 Penn Ave., Pittsburgh, has made plans and will let contracts at once for 50 frame residences to be built here at a cost of \$100,000.

Spencer, Mass.—Rapp & Baker, Philadelphia, Pa., have selected a lot here for a knitting factory. It will be of brick, three stories, 30' x 90', to cost about \$20,000.

Springfield, O.—Plans have been drawn by Miller & Drach for a five-story brick and stone department store to be erected for Rob't Johnson at a cost of \$100,000.

It is reported that George S. Beek, manufacturer of proprietary medicines, will erect a \$20,000 residence on S. Fountain Ave.

Stanford University, Cal.—An engineering laboratory, 60' x 235', will be erected for the University; cost, \$50,000.

St. Joseph, Mo.—Report states that Senator Cockrell will introduce in the Senate a bill authorizing the construction of a \$1,000,000 bridge across the Missouri River. The structure is to be erected by the Chicago, Rock Island & Pacific Railroad Co.

St. Louis, Mo.—It is reported that the Westlake Construction Co., 701 Roe Building, have been awarded the contract for remodelling the Simmons Building, at Broadway and Washington Ave.; cost, about \$30,000.

BUILDING INTELLIGENCE.

(Advance Rumors Continued.)

Matthews & Clark, Union Trust Building, have prepared plans for a new church edifice for St. Paul's M. E. Society at 20th and St. Louis Ave. It will be two stories, of light grey brick and white terra-cotta; cost, \$25,000.

Stowe, Vt.—A fine two-story brick and granite structure, 48' x 88', is to be erected at a cost of \$25,000 as a memorial hall to be presented as a gift to the town.

Toledo, O.—A \$60,000 stone church will be erected for St. Mark's Episcopal Society.

Utica, N. Y.—It is stated that \$60,000 will be spent for remodelling and enlarging the court-house.

Vallejo, Cal.—Captain B. H. McCalla, now in command of the "Kearsarge," the flagship of the North Atlantic squadron, has in view the erection of a fine club-house at this place for the enlisted men of the navy. He has secured a site paying for it with the prize money awarded to him for his services in the Spanish War. Additional funds are to be secured by popular subscription. It will contain a library, gymnasium, billiard-rooms, a bowling-alley and sleeping-rooms, and be a home for the men at Mare Island when off duty.

West Chester, Pa.—Bids are being received by Baker & Dallett, 1420 Chestnut St., Philadelphia, for the three-story brick, stone and steel library building to be erected at the Normal School; cost, \$50,000.

Westport, Mo.—The Westminster Congregational Church is planning to erect a \$70,000 edifice.

Wheeling, W. Va.—Jos. Leiner has completed plans for the Register Building to be seven stories high, of iron and brick, with granite front; cost, \$50,000.

Wilkesbarre, Pa.—An appropriation of \$150,000 has been made for a government building.

Worcester, Mass.—An extensive brewery will be erected at corner of Canterbury and Hammond Sts., on lot recently purchased by Wm. J. Gindele; proposed cost, \$50,000.

Mayor Fletcher, in an address, has advised that steps be taken to bring about the erection of a new railroad station.

St. Paul's Lyceum is planning to build a new clubhouse on the site now occupied by its old building at 70 Chatham St. The new structure will be of brick, two stories in height, and will be strictly modern in every respect. There will be a reception and ball room on the first floor and a well equipped gymnasium will be a prominent feature.

COMPETITIONS.

SCHOOL.

(At Alton, Ill.)

Plans will be received by the Board of Education until January 31 for a high school, to have a stone basement and the two stories above to be of brick. Said plans are to include plumbing, ventilating and hot-water heating. GEO. EMERY, Sec'y Bd. Educ. 1360

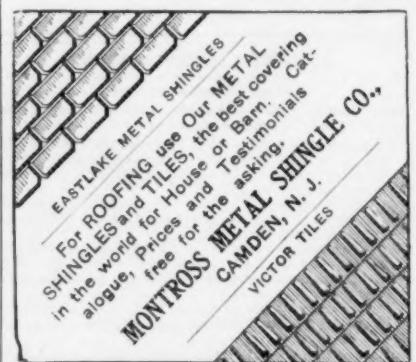
HOSPITAL.

(At Washington, D. C.)

Competitive plans will be received by the District Commissioners until February 8 for the municipal hospital to be erected on 13th St. and Arkansas Ave. The contemplated structures will cost several millions. 1360

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Department of the Interior, Office of Indian Affairs, Washington, D. C. Sealed proposals addressed to the Commissioner of Indian Affairs, Washington, D. C., will be received at the Indian Office until January 30, 1902, for furnishing the necessary materials and labor required to construct and complete at Pipestone, Minn., a barn, warehouse, baths and closets, in strict accordance with plans, specifications and instructions to bidders which may be examined at this office. For further information apply to Dewitt S. Harris, Superintendent Indian School, Pipestone, Minn. W. A. JONES, commissioner. 1360

SCHOOL.

(At Wabasha, Minn.)

Sealed bids will be received by the Church of St. Felix, Wabasha, Minn., up to January 27, 1902, for the construction of a new school-building according to plans and specifications drawn by Fr. Hear & Son, Dubuque, Ia. Building to be solid brick with cut-stone trimmings, two and one-half stories high, dimensions 76' x 86'. Plans are ready for inspection at the rectory of St. Felix Church. TRUSTEES OF ST. FELIX CHURCH, Wabasha, Minn. 1360

BUILDINGS.

(At Columbia, Mo.)

Sealed bids will be opened January 30 for a medical building, engineering laboratory, girls' dormitory, horticultural laboratory and horticultural residence

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PROPOSALS.

at the grounds of the State University. J. G. BABB, secretary of Board of Curators. Architects Cope & Stewardson, 800 Security Building, St. Louis, Mo., drew the plans. 1360

ELECTRIC WIRING, PLUMBING, ETC. [At Fort Terry, N. Y.] Sealed proposals for electric wiring and plumbing frame barrack building here, will be received here until January 28, 1902. Information on application. A. A. MAYBACH, Q. M. 1360

COURT-HOUSE. [At Cleveland, O.] Bids are wanted January 29 for \$1,000,000 county court-house bonds. JULIUS C. DORN, Clk. Bd. Co. Commrs. 1360

FACTORY. [At Philadelphia, Pa.] Bids are asked for Beiswanger Bros. factory buildings at 46th St. and Pennsylvania Railroad, Philadelphia, Pa. The cost of the building will be between \$50,000 and \$60,000. 1361

Treasury Department, Office Supervising Architect, Washington, D. C., January 14, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 18th day of February, 1902, and then opened, for the construction (except heating apparatus, electric

PROPOSALS.

wiring and conduits) of the U. S. Post-office at Janesville, Wisconsin, in accordance with the drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Janesville, Wisconsin, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1361

SCHOOL. [At Rollo, Mo.] Bids will be received February 3d for a \$50,000 school-building. 1361

COURT-HOUSE. [At Aberdeen, S. D.] Separate sealed proposals for the erection of a court-house and steam heating plant therefor for Brown County, South Dakota, at Aberdeen, including all labor and material, will be received by the Board of County Commissioners of said county until the 18th day of February, 1902. All bids must be in strict accordance with the plans and specifications, prepared by Kinney & Detweiler, of Austin, Minn., which may be seen on and after January 20, 1902, at the office of the county auditor at Aberdeen, S. D., and may also be seen on application to *Improvement Bulletin*, Minneapolis, Minn., Builders' Exchange, St. Paul, Minn., *The American Contractor*, Chicago, Ill., McLeod & Smith, Duluth, Minn., and Kinney & Detweiler, Austin, Minn. CHAS. EYGA-

PROPOSALS.

BROAD, county auditor, Brown County, S. D. By order of the Board of County Commissioners. 1362

COURT-HOUSE. [At Elk Point, S. D.] Sealed bids will be received until February 11, 1902, for the erection of a court-house for Union County, S. D., to be built at Elk Point, in said county. Plans and specifications are on file in the office of the county auditor at Elk Point, and at the office of G. W. Burkhead, Iowa Bank Building, Sioux City, Ia. P. HERRITY, Ch. Board of Co. Commissioners. 1362

COURT-HOUSE. [At Williamson, W. Va.] Sealed bids are wanted until January 28, 1902, for the erection of a court-house. JAMES DAMKON, clerk county commissioners. 1360

Treasury Department, Office Supervising Architect, Washington, D. C., January 6, 1902. Notice is hereby given that the time for opening the bids for the construction (except heating apparatus, electric wiring and conduits) of the U. S. Court-house, Post-office and Custom-house building at Tampa, Florida, has been extended from February 3, 1902 to February 15, 1902. JAMES KNOX TAYLOR, Supervising Architect. 1360

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PROPOSALS.

Treasury Department, Office of the Supervising Architect, Washington, D. C., January 7, 1902. Sealed proposals will be received at this office until 2 o'clock P. M. on the 1st day of March, 1902, and then opened, for the construction (except heating apparatus, electric wiring and conduits), of the U. S. Post-office at Creston, Iowa, in accordance with the drawings and specification, copies of which may be had at this office or at the office of the Postmaster at Creston, Iowa, at the discretion of the Supervising Architect. JAMES KNOX TAYLOR, Supervising Architect. 1360

U. S. Engineer Office, 735 N. Capitol St., Washington, D. C., January 3, 1902. Sealed proposals will be received here until noon, February 3, 1902, and then publicly opened, for furnishing ventilating fans, with direct connected motors, for new building for Government Printing Office. Information furnished on application. JOHN STEPHEN SEWELL, capt., engr. 1362

U. S. Engineer Office, 735 N. Capitol St., Washington, D. C., January 3, 1902. Sealed proposals will be received here until noon, February 3, 1902, and then publicly opened, for vault doors, mahogany doors and frames, fireproof doors and hardware, for new building for Government Printing Office. Information furnished on application. JOHN STEPHEN SEWELL, capt., engr. 1362

PROPOSALS.

U. S. Engineer Office, 735 N. Capitol St., Washington, D. C., January 3, 1902. Sealed proposals will be received here until noon, February 3, 1902, and then publicly opened, for tile and asphalt roof work, ventilators, copper guttering and asphalt floor work, for new building for Government Printing Office. Information furnished on application. JOHN STEPHEN SEWELL, capt., engr. 1362

LIBRARY.

[At Decatur, Ill.]

Sealed bids will be received until January 30, 1902, for erecting a public library. WILLIAM J. QUINLAN, president, library Board. 1360

SEWER.

[At Williamsport, Pa.]

Sealed proposals will be received by the Gradus Run Committee of Councils of the City of Williamsport, Pa., until January 29th, 1902, for the construction of a storm sewer from the intersection of the east line of Hepburn St. with the West Branch of the Susquehanna River to the intersection of Locust and 2d Sts., as authorized by Select Council Bill No. 50. Said sewer being 11 feet in diameter and about 2,000 feet long. Plans can be seen and specifications and blank forms of proposals obtained at

PROPOSALS.

the office of the City Engineer. GEO. D. SNYDER, city engineer. THEODORE CORNMANN, city clerk. 1360

CHURCH.

[At Alexandria, Minn.]

M. N. Koll, secretary, has plans and will receive bids until January 29 for the erection of a church for St. Mary's Catholic Society, on plans by Omeyer & Thorl, architects, of St. Paul. 1360

SCHOOL, ETC.

[At Iowa City, Ia.]

The School Board will receive sealed proposals until January 25 for furnishing material and erecting a two-story brick and stone high school for the independent school district. Bids will also be received for erecting a one-story heating station together with coal and ash vaults and brick smokestack; a brick steam tunnel connecting new and old high and grammar schools; a hot-blast steam-heating apparatus required to heat and ventilate the proposed new high school including the installation of three new steam boilers and all steam pipework and connection required to connect with the old apparatus in present high and grammar schools; also for sewer and plumbing work. A. J. HERTZ, secretary school Board. 1360