

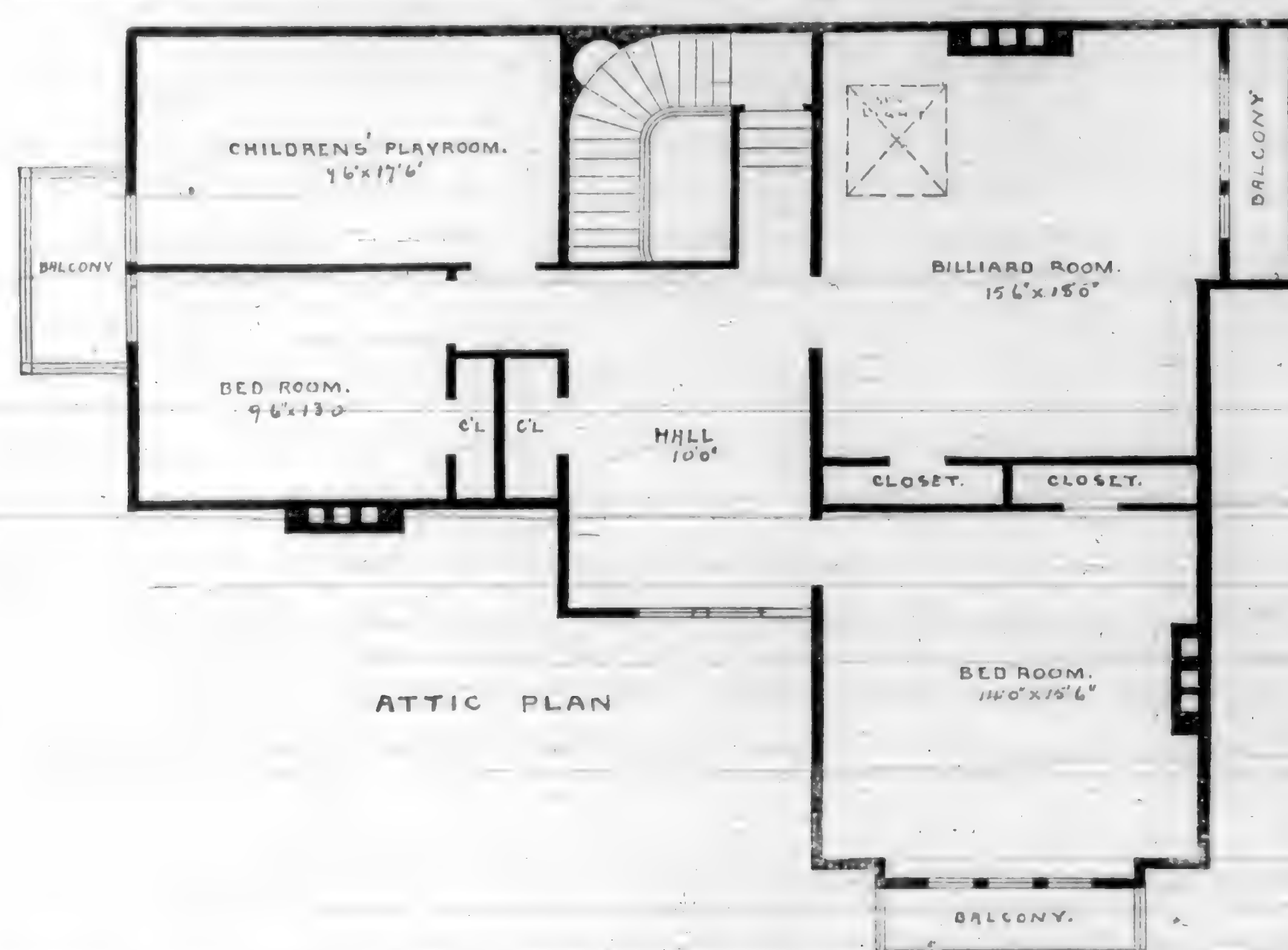


PLATE 7—ATTIC VIEW OF COUNTRY DWELLING.

The "Bulletin's" No. 1 of "New Series."

We regret that our contemporary has "deemed it advisable to present another series of similar designs by the same architect" as notwithstanding the statements of the *Bulletin*, to the contrary, the first series possessed no merit whatever entitling it to the respect of any one familiar with the science of architecture. We have yet to find the first architect or qualified builder who has not expressed himself unfavorably in reference to series No. 1. The few meritorious, copied-from-published-books-features that appeared were so unskillfully handled and were so manifestly the conception of others that the *Bulletin's* protégé received no credit from informed sources for originality; and the very stupid efforts at specification writing demonstrated the utter unfitness of the plagiarist to prepare an intelligent set of documents. In very many, if not in all of them, there were things written down in the "specifications" which have never been observed in the practical construction of the plans accompanying. We say this upon the broad principle that many of the requirements of the specifications were so thoroughly at variance with all consistent constructive practice, and so entirely unnecessary, that no competent builder ever gave them the least consideration beyond the smile induced by their ridiculousness.

The following, from the editor's remarks accompanying No. 1 of series second, has afforded much merriment to architects generally, seasoned with remarks not mentionable in a respectable journal, to wit: "It is apparent that they (the former series) have been instrumental, in a great measure, in introducing and popularizing a new style of architecture in San Francisco, as is evidenced by the

form of many of the dwellings which have been erected here within the past two years." The statement quoted is so supremely ridiculous and erroneous that it would puzzle even the *Bulletin's* man to invent another more thoroughly destitute of truthfulness. Series No. 1 had about as much to do with influencing a change in style of architecture in San Francisco as the explosion of Blossom rock in the Bay of San Francisco some years ago had to do with influencing the various dynamite plots in Russia, England, and other places across the ocean.

It is but little better than a studied insult to the architects in San Francisco to assert that a single one of them, of intelligence and standing, ever derived a single thought from anything that has heretofore appeared in the *Bulletin* or that may hereafter appear from the same source. The introduction of the Eastlake style, as it is wrongfully termed, in the Eastern States was known and understood by architects generally in this city, and examples of the style had been introduced in California before Series No. 1 made its appearance; and whatever inspirations were received leading to the change in style referred to, was from original sources, and not from the imperfect attempts of the copyist who has served the *Bulletin's* purposes of leading innocent owners, in many cases, into trouble, by inducing them to undertake—with mistaken ideas of building values—the erection of buildings at prices beyond possibilities. For, as we stated in our several reviews of the first series, not one of the plans published could, with the then ruling prices for materials and labor, and much less so at the present time, be built as required by the documents defining the materials to be used and the manner of construction, be erected any way near the cost stated.

We care nothing for the bolstering up, erroneous statements of the *Bulletin* or its protégé, that the figures of cost given have been confirmed by actual experiments. It is not true; and as we have at other times stated, we again repeat, that no one of the entire series could or can be erected for the amount published as the "total cost," making all proper allowance for the changes in price of materials and labor; more especially if all the *unusual* and *unnecessary* things called for were carried out according to the letter of the documents—a something never intended by him, if their author possessed mediocre intelligence as an architect. If not by the rules governing constructive architecture, the rule of common-sense would set aside as unwise and unmechanical many of the written requirements of the former series.

No. 1 of second series is no improvement upon those which have preceded it in the matter of "specification;" and the striking similarity of the plan to numbers of others in use removes all idea of originality. The unhandsome and disproportionate perspective elevation alone possessing features of originality in the attempts made to change appearances from scores of similar designs to be found in published books. As to the total of cost stated, no honest man competent to determine values would risk his reputation in making any such an assertion as that found in connection with No. 1 of series second, as a fair and reasonable estimate of cost. Thirty-three per cent. added will not pay the cost of erecting such a cottage in the manner required by the "specifications," and fifty per cent. more than the "total cost" would leave but little if any balance in the hands of the man who would undertake the work at that advance.

We have expressed ourselves thus plainly, not that we care a fig for our contemporary's departure from its legitimate line of publication, and seeking by unusual methods to increase its circulation, but because of the misleading and deceptive features of the case, in inducing people to anticipate results *entirely beyond possibilities*, and fixing standards of values at rates injurious to honest contractors, as no man living can carry out the requirements of the last nor either of the former issues for the "total cost" stated, without considerable loss to himself. And we hold that every attempt, of whatever character, calculated to lessen the opportunities of the working classes to receive fair remuneration for their services, is a wrong deserving the severest rebuke.

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Dr. Ayers on Sewer Gases.

THE doctor recently read a paper before the San Francisco Medical Society, giving utterance to theories upon sewer gases of a dangerous character. We had prepared a lengthy review of the practical fallacies advocated by him, but we are compelled for want of space

to lay it aside. There is nothing new in the theories advanced, as they have appeared in published works upon the subject, although the doctor's effort may have impressed those who do not pursue sanitary literature with the idea of originality.

If the doctor is correct in his assertion, that sewer gases are not promotive of "any special type of disease," then indeed is the whole fabric of sanitary science defective and false. For tens of thousands of the ablest physicians and scientific-sanitary engineers and learned men of all classes throughout Christendom have borne testimony to the fact that those gases are both dangerous and deadly in their effects upon human health; and if so, as ninety-seven per cent. of intelligent people believe, they are and should be rated as of "special type," aside with small-pox or any of the numerous malarial diseases which prostrate humanity on beds of illness, and in the order of their operations fill coffins daily. And it will require infinitely better and stronger proofs than the mere say so's of a San Francisco physician, or the author of a book, to dislodge the public mind from its reference to something which has, by the teachings of those fully competent with the doctor to judge of the nature and effects of sewer gases, and the practical experiences and observations of innumerable many intelligent people, become a settled and accepted fact.

The doctor's assault of the plumbing law passed by the late legislature of California, and his ridicule of the appointment of an "engineer" of plumbing work, simply betrays his ignorance of the subject ridiculed. The "engineer" is an imaginary personage of the doctor's invention, as the law provides for no such official. And as the learned gentleman appears not to have investigated the law sufficient to understand one of its simplest provisions, it would have been wiser on his part to have withheld assertions based upon personal, unintelligent notions. It is not only likely, but very certain, that many of those who have assisted in procuring the passage of the plumbing laws referred to are in every practical sense the peers of the learned doctor, in all matters pertaining to sewer gases, and from their practical experience in connection therewith would be able to give the doctor some good advice and information.

A Great Work.

HISTORY OF THE PACIFIC STATES.

It seems to be the fashion in this country, upon the commencement of any great enterprise, to call upon the government for aid that it might be successfully carried to completion. But in the "History of the Pacific States" by Hubert Bancroft, we have an example of what can be done by the genius of one man, unaided by any governmental aid.

For the past fifteen years Mr. Bancroft has kept constantly employed no less than a dozen secretaries, cataloguing, indexing, abstracting and arranging the material from

which he writes; and it is the great secret of Mr. Bancroft's success, that he has the faculty of utilizing labor in literary as in business pursuits—leaving to the author only the work of the artist; that of the artisan being performed by the secretaries.

We propose to notice each volume as it appears. We recommend it to our friends. We urge for it the serious consideration of good men; of all who have a family to rear, sons and daughters to educate; and we do so for the following reasons:

Firstly—Such work should be encouraged. The author, Mr. Hubert H. Bancroft, has performed this labor at an immense cost of time and money. Literary work of this kind does not pay pecuniarily. It is impossible that it should. Therefore, if the intelligent and prosperous members of the community withhold from it their sympathy and support, what encouragement is there for any one ever to sacrifice pleasure and gain to the public good?

Secondly—It is a history of our own country. Now, historical knowledge is the most valuable of all knowledge, for the reason that history is the recorded experiences of mankind. By knowing what others have done, we may profit by their successes while avoiding their mistakes. And of all histories, the history of our own country should be read and studied first, because it more nearly concerns us. Children should be educated not only to respect their parents and love their home, but to respect their country and tenderly to cherish its institutions. And how can they know about their country if books are not placed within their reach?

Thirdly—It will pay pecuniarily. The well-informed, intelligent man can make more money than the careless and unthinking. It is not necessary to talk of the benefits to society and to individuals of such a work as this; they are obvious. Therefore, we appeal, with all the strength and influence at our command, to every respectable member of this community, and say buy the works of Hubert H. Bancroft. Subscribe for them all at once, cheerfully, promptly; then read them, and speak of them to your friends, and thereby lend your support to a great and praiseworthy undertaking.

We will speak more fully hereafter of the scope of this great work. The full set will contain thirty-nine volumes. Two volumes are now ready for delivery, and it is proposed to have each successive issue finished so as to be delivered every fourth month.

In the hand-saws used in England the cutting stroke is a push outwards from the shoulder of the workman. This mode of using the tool has been perpetuated by the Anglo-Saxon race in the United States, Canada, and the British Colonies. The blade of the saw is thus thrown in *compression*, and in order that it may have sufficient stiffness to prevent it buckling, it requires to be made far thicker than if it had to transmit the same force in

tension only. The liability to buckle is illustrated by lads beginning to learn to saw, who not unfrequently injure a saw-blade by the unsteadiness of the thrust they give to it, which leads to the teeth catching on one side of the cut and a sharp bend or even a crack being caused in the blade. As it is almost impossible to remedy such an injury perfectly, the saw becomes permanently damaged. On this account chiefly, also, English saw-blades for hand-work are (and require to be) made of a much better quality of steel than would otherwise be necessary.

In Germany, Italy, and most of the European Continent, as well as throughout the chief peoples of Asia, handsaws are used in tension, the cutting stroke being a pull towards the chest of the worker. In consequence, the blades are made very much thinner than those of English saws, less material is converted into saw-dust and less exertion is required for given rate of cutting.

The English method, however, has this advantage, that a man standing upright can exert a considerably greater force in thrusting forward with his arms than he can in pulling inward. This is still more the case if he leans forward over his work because he can then throw a large portion of his weight on the saw-handle to drive it forward. The result is that if an English carpenter be pitched against an equally strong German carpenter, each armed with his own tool, the Englishman will saw through as great, or possibly a greater, length of the same thickness as the German will. But the Orientals sit to this sort of work, and planting the feet against the log being sawn, pull outwards by the contraction of all the muscles of the body. As is well known to us from our familiarity with the English style of rowing, this is by far the most powerful attitude into which the human muscular system can be thrown. Thus, unless the peculiar shape and position of his work compels, say, the Japanese carpenter, to assume an awkwardly cramped position, he is enabled, with his thin, broad, saw-blade, to get through his work with far less fatigue and with greater rapidity than an Englishman can.

Thin saws worked in tension, being extremely pliable, are more likely to make a cut that is not quite straight. The thick saw-blade of English or American make has superior stiffness, and, therefore, superior guiding power to keep the advance of the cut always in the same straight line, but this superiority in guiding power is again neutralized by the fact already mentioned of the thrust tending to bend the blade, while the pull on the thin saw tends to straighten its blade.—*Cutting Tools.*

If the Western Union Telegraph Co., as is stated, has purchased the right to use Baxter's long distance telephone, it will not be long before conversation can be carried on between San Francisco and New York with probably two breaks only.

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Architects Sometimes Wrongfully Blamed.

As a rule, in competitions on plans, where the bidding is not restricted to selected parties, there is generally some one of the number who is wild in his estimate, frequently falling fifteen, twenty-five, and even fifty per cent. below all others. The difference of from ten to twenty-five per cent. is of common occurrence; and when the bids are opened, and the low figure announced, those who have figured intelligently, very naturally feel a disgust for the low man, knowing that in the sum mentioned there is not a sufficient amount to enable him to carry out and complete the work proposed by the plans and specifications, in a workman-like manner, and pay the actual cost of materials and labor. That the more careful and correct bidders should feel aggrieved, is right and proper, as every undervaluation of work encourages owners in the belief that by a little manipulation, and unrestricted bidding, some simoleon may be found who will obligate to give a dollar and ten or twenty cents worth for every dollar received under the contract. And it being the common tendency of the human mind among all classes of people, to seek the cheapest, without regard to actualities—propositions which present a saving are generally accepted, leaving the contingencies to take care of themselves. Consequently those who name a fair and honest price for the thing proposed, are presumed to be unreasonably high in their figuring, and are rejected; while the mistaken or perchance designing low man is accepted, not upon the quantum merit of the case, but because of the offer to do for a certain sum that which others of better intelligence and more just and business-like purposes feel cannot be done for the amount proposed. If the responsibilities and involvements in such cases, fell exclusively upon those guilty of such business indiscretions, there would be no cause of complaint; for if men will deceive themselves by assuming competency in estimating, while practically ignorant of all correct rules of reaching values, a little of the sweetening of bitter experience is well deserved, and should operate as a corrective. But the fact that the bad influence of all such examples works an injury to others, makes the matter one of general interest, and brings it within the province of reasonable and justified complaint. The wrongful blame upon architects lies in the fact that many of the disappointed give vent to their feelings in disapproval of architects permitting "such fellows to figure in their offices." There may be grounds for such murmuring in some cases, but not as a rule; for every well-informed architect knows full well, and in some cases by bitter experiences, that very low figuring is premonitory of trouble; and architects of intelligence and standing are never anxious to surround themselves with making contract conditions which indicate storms and disagreeable occurrences in the future. Yet, being the managing men in preparing the papers and receiving the bids, they are generally held responsible for the blunders and mistakes

of all who are permitted to figure, although unable to know or control the figuring of any. In fact, those who are allowed to figure are generally guarded and careful not to extend any information to the architect, through fear of being "given away," and the webs of obscurity and secrecy are tightly woven around the figuring of those in the competition, so that no one may gain or use the advantages of knowing the figures of others. Consequently the architect should not be held responsible for the irregularities of bidders, inasmuch as he holds and exercises no control over the figuring, and it is a great injustice on the part of competitors to invent and express accusations reflecting upon the office in which they figure, because some one of their own class may have made enormous calculations of costs and values.

We intend no reference to those "architects" who impose upon the public by assumptions, presumptions, and artifices which never enter the minds of intelligent and educated men in the profession, who would scorn to be guilty of an unjust or unprofessional act. Nor are architects always responsible for the admission of all the parties joining in competitions, as owners very frequently of their own knowledge, or through friends, know some "good man," whose estimate is wanted, and who cannot be ruled out by the architect, except at the risk of being charged with special purposes in view, or with motives of a personal character. And further, the "low man" frequently proves to be one who has enjoyed the benefits of large experience, and whose "low figures" are wholly the result of oversight. As in one case within our own experience as architects, the contractor overlooked the entire item of labor, amounting to more than twelve hundred dollars, yet he failed to discover his error until long after the work was commenced. The building was satisfactorily completed, and the loss sustained without murmuring, but the effect was bad, inasmuch as through the error of a competent contractor a building was produced far below its value, and stands to be pointed at as a house costing only a certain sum—which is a fact as far as the owner is concerned, but not so as a whole, as the contractor sunk the amount stated, which does not appear in connection with the contract cost. Numerous illustrations might be cited, showing the absence of a fair, perfect system of figuring among the greater number of contractors operating in San Francisco and we think that complaints should be made in that direction rather than against competent architects, who understand fully that contracts let to good men at remunerative prices, are always attended with more pleasant and satisfactory results to all parties.

SPIRIT of turpentine is now made, says a contemporary, from sawdust and refuse of the saw mill. It is extracted by a sweating process, yields fourteen gallons of spirits, three to four gallons of resin, and a quantity of tar per cord.

Building Activities.

The transactions in real estate during the past thirty days indicate a healthful state of affairs generally, with a large amount of capital still seeking investment in desirable business property. The general talk favors the presumption that, before the fall months roll around, there will be a large increase in the erection of brick buildings for business purposes. At present there are but few of this class under way or in course of plan preparation. As will be seen by our monthly report, building operations are confined mainly to residence and tenement improvements, with no abatement in the number of contracts signed during the present as compared with previous months of the present, and for the same period of the past year. Contractors generally are busy, and all good workmen employed, notwithstanding the inauguration by the Carpenters and Joiners' Union, of nine hours as a day's labor.

A limited number of owners express a disposition to resist the nine-hour system, which went into effect on the first inst., but the opposition is feeble and with in a short time quiet down to an acceptance of the situation, provided the working classes continue the course thus far pursued, of making as little stir as possible in reference to the matter. It is only when movements of the kind are made unnecessarily conspicuous that material opposition is aroused and stimulated. But few owners of real estate will permit their property to remain unimproved, with the prospects of remunerative returns upon investments made in the erection of buildings, whether men work nine or ten hours per day. And past experiences prove that there is less ground for opposition to the new rule than many conjure up. For it is a well-established fact that contracts are let from time to time at nearly the same rates, even with an advance in price of materials and labor in prospect or in force. Ten per cent reduction in the hours of labor by no means increases total cost ten per cent., as the cost of labor on buildings is only about one eighth of the total value, and the increase cannot therefore apply to more than that proportion of the total sum; so that on buildings costing \$4,000 under the ten-hour regime, the extra cost figured out by the one-tenth reduction in the hours of labor would increase the total cost, under the nine-hour rule, less than \$100.

It is reasonable to presume that there will be a short lull in building improvements at this season of the year, when the greater number of those who can afford the time and expense are preparing for their usual summer vacation to, and sojourn at, the various springs and other places of resort—relaxation and pleasure. At the same time, architects generally have numerous orders in hand and plans in course of preparation, and brisk times are confidently relied upon during the remaining portion of the year.

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Value of Buildings—Results to Contractors.

THE prevailing sentiment in regard to the *Expense of building* is in many respects erroneous. Owners more generally, at the commencement of operations settle upon a sum to be expended, seldom equal to, and more frequently largely below the actual value of the thing contemplated. It is but seldom that an amount is stated, sufficient for the purposes contemplated. More is generally asked for than can possibly be obtained for the sum named, without loss to someone—if the attempt is made to comply with the demand made. Two prominent facts in this connection are worthy of notice, first that THOUSANDS of failures, ending in pro rata settlements, have occurred in San Francisco, not so much by the wastage and squandering of contract moneys as from absolute shortage in the contract amount, less than actual values. The bread-and-butter price at which the work is undertaken will not permit the slightest departure from rigid economy in every particular, nor permit less than slavish attention to the work in hand. The profit margins are as a rule inadequate to the slightest indulgence other than close application in time and personal labor, and attention on the part of the contractor; and it is only by the exercise of every saving possibility that a majority of buildings are completed, with money enough to pay the bills for material and labor.

The second fact that may be mentioned, is that of the financial condition of eight-tenths of those who undertake contracts for buildings. Aside from a few judicious, thoughtful, careful men, the contractors operating in San Francisco have comparatively nothing to show for their many years of application to building pursuits. Nor can it be charged that our master-builders are extravagant livers, for generally speaking there are but few of them who own a roof over their heads clear of encumbrances, while the greater number live in rented houses; all of which goes to sustain the statement, that the contracting business in San Francisco has hitherto been less profitable than it should have been, in view of the very large amount of money handled in building operations. All this is further sustained by the fact that but few indeed of our contractors are entrusted with contracts without bonds; a fact that would not exist, if the financial condition of contractors was such as to inspire confidence on the part of owners and materialmen. Nor is this so because they are generally considered dishonest men, for the integrity of many master-builders is not disputed; but honesty alone will not settle unpaid bills nor satisfy creditors; it requires coin to liquidate financial obligations and square accounts. Honesty in its purest sense may permeate every thought, and every intent and purpose may be pure, but if the ducats are lacking, bills cannot be paid.

It is therefore safe to say that owners, as a rule, have been largely financial gainers in

the improvement of their real estate in this city, as those who have done the work cannot make an average showing of reasonably fair financial results and profits.

We do not write this as a rebuke to owners, for if men professing competency to estimate building values, see fit to throw away their time and energies in erecting buildings for less than they are worth, owners would be less than wise not to avail themselves of the benefits thus offered.

The Plumber Movements.

SINCE the April issue of this journal we have received a copy of the code of by-laws adopted by the Master Plumber Association of the City of San Francisco, defining the organic laws and executive rules of the organization. If not as perfect as they might be, they sufficiently exhibit an honest purpose on the part of the members of the society to correct the abuses which have hitherto existed in the plumbing trade, and give clear denial to all the speculations dealt in by those who have raised or repeated the cry of a "political job" in the passage of the plumbing law by the late Legislature of California. Upon the theory that all men are corrupt, the law in question may, like thousands of others framed and passed for good purposes, be used by designing and mischievous men to work out selfish purposes. There are but few laws passed which do not in cases fail to accomplish the object for which they were made. But the law recently passed, through the earnest exertions of the principal plumbers in San Francisco, is not one likely to be allowed to fall into bad hands. Those who secured its passage have a common, general interest in its perfect efficiency; and we cannot believe that the leading men in so important a branch of mechanism as the plumbing business is universally acknowledged to be, will permit the matter to pass from their control as a body into the hands of political tricksters and schemers. The good men of the plumbing art have long felt and groaned under the profligate irregularities which have to a large extent brought more or less disgrace upon the entire craft. So many bad things have been done in the name of "practical plumbers," that a very large proportion of property owners and tenants have accepted the belief that honest and competent plumbers are as scarce as incorruptible legislators in a California state legislature. It has therefore become imperative for their own interest individually, and for the redemption of the trade, that the better class of plumbers should secure such aid and assistance in legal form—all mechanical and sanitary considerations failing—to correct the existing abuses. And now that the regulating and corrective means are under the control of the more intelligent and really practical men in the plumbing business, they will deserve all the bad things that can be said about them if in the future more perfect plumbing work is not done in this city, and a change in general sentiment in reference to plumbers brought about.

Cheap Piazzas.

PIAZZAS and porches are like parasols, they may be intended for comfort, for ornament, or for both. Probably they ought always to be both ornamental and useful, on general principles everything ought to be so, but the object of these suggestions is to indicate how the comfort of these pleasant adjuncts may be secured without the large outlay which is supposed to accompany the "good, broad piazzas and plenty of them," that form so essential a part of the air-castles of most house-builders. In its simplest form a piazza is an open shed resting against the outer wall of the house. If in the right place and of reasonably good proportion, the plain upright parts, with whatever braces are needed for strength, and the lean-to roof will not be unsightly in appearance—quite the contrary, indeed—and will afford precisely the same comfort as the more elaborate structures with turned bed-post columns, Queen Anne spindles, fantastic scroll-sawed brackets, grooves, beads, and decorations without number, and more striped paints than can be found on a dozen barber-poles. Multitudes of village and country houses are bare and comfortless both in appearance and in fact, that would be transformed into hospitable mansions by simple piazzas, which any man of common Yankee ingenuity could build for himself if he could not afford to pay for the labor. A floor of sound, narrow boards laid an eighth of an inch apart on rough joists resting upon boulders or brick piers, will last for many years, and a boy can make it. Plain, square pieces of timber, or small tree-trunks cut in the grove and stripped of their bark would serve for posts, and a roof made of sound, seasoned, matched boards, not more than four or five inches wide, the edges painted as they are laid, and both surfaces above and below well painted afterwards, will not even begin to leak till long after it has paid for itself a dozen times over in good solid comfort. Even if after a dozen years a few drops should come through in a driving rain, or from melting snow, it is not a serious matter. We don't keep our soluble groceries nor our best silk dresses on an open piazza, not as a rule, and the tightest roof in the world will not prevent the rain and snow from blowing in beneath it. Such a plain, simple piazza built where it can be pleasantly used and large enough to serve as a semi-out-door apartment is vastly preferable to the high, narrow, formal affairs that are evidently added to the main structure, not because the builder desired to increase the comfort and convenience of the occupants, but because he hoped to increase the external beauty of the building. To build a piazza when it is not needed and cannot be used, is like parading an open parasol in the shade, or hoisting an umbrella when there is no sign of a shower.—*The Builder.*

FROM a study of the maximum temperatures naturally occurring, Mr. L. Liebermann says that a mineral oil, the flashing point of which exceeds 60 deg., may be safely used in all parts of Europe.

Practical Suggestions.

ALL sorts of devices have been made and many patented to prevent the rain from beating in under the bottom edge of an outside door in a driving storm. Many have undoubtedly noticed a great heavy, unsightly piece of inch-and-a-half plank with one edge beveled off, and nailed on the bottom edge of a door to prevent the water from being blown by the force of the wind under the door and into the room. In severe storms these old-fashioned weatherstrips have not accomplished what they were made for.

A much better and more workmanlike way is to take the door from its hinges, then with a carpenter's plow, holding a $\frac{3}{8}$ -inch iron, make a groove about $\frac{3}{8}$ of an inch deep in the lower edge of the door—that is, across the lower ends of the door-stiles and the lower edge of the bottom rail, taking care to have the inward edge of the groove project when the door is in place—from $\frac{1}{8}$ to 3.16 inches beyond the rabbet of the doorsill. After you have made the groove, with a rabbet plane work off the outward edge of the groove until you bring it nearly to a point on the outward edge of the door. This finished, the door can be put in place.

This manner of fixing a door prevents any unsightly strips of wood on the bottom of your door, yet it works well in the case of severe storms.

Some may ask what is the reason. It can easily be explained. The rain beating against the face of the door runs down to the bottom edge, and when the wind is strong, and the space between the door and sill is considerable, the water is blown across the lower edge of the weather strip and door until it reaches the inside edge, where it drips down on to the floor.

With a door made as described the wind may be strong enough to blow the water up the incline on the bottom edge of the door, but if it abates, even only for a short time, the water will run back and drop off the front edge or be blown back again up the incline.

If the force of the wind is so great as to drive the water into and across the groove it will run down the inward edge of the groove and drip off into the rabbet of the door-sill.

Thus it will be seen that it is quite important that the inward edge of the groove should project beyond the edge of the rabbet in the door-sill.

Possibly in extra hard storms, where the door is in a very exposed position, a little water may be driven under a door made this way, but it will be small, and not sufficient to cause any annoyance.

I have often wondered why carpenters and builders always put down door-sills in rooms where all the floors are to be carpeted. In my own house I have taken up all the door-sills between my rooms, and have run my carpets from one room into the other. This is especially desirable when carpets are all one pattern and rooms are used in connection. Carpenters could leave the door short enough to swing over

an ordinary carpet, while the removal of the door-sills will aid many a housekeeper in sweeping.

When sills are used, odd bits of oilcloth must be got to cover the sill, and even then along either edge it leaves a good-sized crevice for the accumulation of dirt.—*Rivet, Mechanical News.*

Driven Wells.

Good drinking water is just as essential to health as pure air; but it is not always easy to determine if water is pure through the sense of taste or sight; water that contains considerable organic matter is sometimes offensive to the sense of smell; but this is not always the case. The best method of testing for organic impurities is to drop into a tumbler of the water just enough "permanganate of potash," or of "Condy's fluid," to give the water a pinkish color. Any organic matter contained in the water is precipitated after standing an hour, the water losing its color or becoming brownish. If, however, there are no impurities to be acted upon, the water remains of a pinkish color for hours. This is a very simple test, and a valuable one, and were it more frequently employed, and its indications heeded, there would be few cases of fever. The best plan to get pure drinking-water is by means of what is generally known as the "driven well" but which by our plan is nothing of the sort. We have seen an open well, the water of which was dangerous to health, within ten feet of a "driven well," in the water of which no impurities could be detected. It is almost impossible to find an open well of perfectly pure water, and it is hardly possible to find a driven well where the water contains impurities.

The easiest way to make a "driven well," is to get a piece of iron or steel pipe, six feet long and one and a quarter inches in diameter; make a cutting edge at one end by beveling off inside the end of pipe, with a half round file, drive this pipe down a foot or two and then draw it up, and the earth from the hole will be found inside the pipe, and can be pushed out with an iron rod. Repeat this operation until you have gone six feet; then couple an inch pipe, six feet long, to your cutting pipe; continue this till water is reached, then attach a short piece of pipe having small holes in it, and a plug in the lower end, to your inch pipe, and drop it into the little well you have dug; screw on a pump and you have a well complete at about the price Mr. Green charges for the right to drive a pipe into the ground. In the decision of the Court in regard to the Green patent, the judge said, that where the earth was raised up and taken out of the well, it did not infringe Green's patent, which holds good only where a pipe is driven down so as to push the earth aside. But everybody knew that.

It has always seemed remarkable that any one should have bothered with Green's patent, when the plan above described is in all respects preferable and is hampered by no patent.

Though small it is just as much an open well as if it were six feet in diameter, and any one has the undoubted right to construct such wells. If stones are encountered they may be broken and penetrated by attaching a piece of round steel, one inch in diameter and two feet long, to the end of the inch pipe. The lower end should be drawn down to a blunt point. We constructed a well on the above plan, using an inch galvanized pipe, and the supply of water is abundant for twenty families.—*Hall's Journal of Health.*

Draughtsmen and Our Draughtsmen's Registry.

DURING the past two years or more numerous applications have been made at the office of this journal by practicing architects in San Francisco, and others from Portland, Seattle, Los Angeles, and various other portions of this State and Coast, for competent draughtsmen; the very reasonable conclusion prevailing that as the representative and official organ of the profession, its management should possess special information in reference to those desiring employment as draughtsmen, and those needing help. These conclusions were and are correct, and with the view of perfecting a system which would place us in communication with the entire draughtsmen's forces in this city and elsewhere, we prepared a registry in which to enter the names of all draughtsmen, charging the sum of \$2.50 to each party registering, which amount was intended to operate as a perpetual fee for all time, without increase or renewal. Under this arrangement we have been able to secure engagements to many who might otherwise have remained idle, and suffered a loss in time and wages many times greater than the cost of registration, and some who have availed themselves of the advantages offered have formed advantageous co-partnerships and are doing well. But our motives have been by some misjudged, misrepresented, and theorized and magnified into an attempt on our part to perpetrate a wrong, accompanied with the illiberal idea that our interest in the matter was stimulated by the petty and insignificant sum charged, rather than the truthful, honest purpose to assist and place in ready communication both employers and employes. There is so little of reason or veracity, and so much of absurdity in the insinuation, that we should not refer to it were it not that the majority of human minds are ever ready to receive and accept as true any and every statement listened to which affords the opportunity for enlargement and furnishes the basis for gossip and slander. As beasts of prey become more savage by the taste of blood, so do most of human kind give more heed to false representations intended to hurt and defame others. There is a relish and flavor in untruths which satisfy and please the unrefined moral taste of multitudes, who prefer to feed upon the false and untruthful rather than seek the sweet sustinements of honest fact, and who are ever ready to magnify mole-hills into lofty mountains and attempt to reduce the silvery

orb of night into a map of moldering "green cheese," by exaggerated representations.

The fact that more or less time is consumed in all cases, and sometimes inconveniently so, in respectful courtesies to those calling for information in this connection; that letters are received and answered, postages and sometimes telegraphic expenses involved, are not considered by those who would have us serve their interests at our own cost and expense. We are willing at all times to expend both time and money in matters of a general character by which our patrons may be informed, instructed, and benefited; but those of the side personal interest assume a different aspect, and it seems to us strange that any intelligent young man should permit himself to reach or accept conclusions so foreign to actual facts as those involved in the subject-matter of this article.

As further proof of our disinterestedness as far as the fee is concerned, we state the fact that we have found situations for a number of draughtsmen who have been short of funds without exacting the fee, but have not entered their names upon the registry. And we shall continue to aid any and all who may call on us, giving preference to those who comply with registry requirements when the supply is in excess of the demand.

Cisterns.

A WRITER in the *Lumber World* presents some facts with reference to cisterns that may prove of interest to the readers of this Journal.

Cisterns of various sorts and sizes may be very cheaply and speedily made. The largest sizes should be made oblong, not more than twelve feet across, to turn brick arch over conveniently, and as long as needed. Round cisterns are best when not more than twelve feet in diameter, and as deep as necessary, though the draft of water is rather hard when more than twenty feet deep, when pumped by hand. To build a cistern, if circular, the earth should be excavated in the shape of an egg, longest down, and rounding at the bottom, making the surface of the excavations as smooth and neat as possible. Three feet from the top dig out a shelf the width of a brick, laying the brick for the arch in cement or hydraulic lime-mortar of as good quality as can be procured. Lay a course of bricks in the mortar all round the shelf, pointing the spaces well between the bricks and behind them. When this is completed, all the spaces being filled up, begin another course about one and one-half inches out from the other, filling in all pointing as before, so that the cement, when set hard, will bind and hold the course of bricks firmly. This will draw in the cistern three inches. Continue in this way, until the hole is about the size of a flour-barrel, filling in the soil around the arch and above it, and building a neck about two feet high to finish off. The earth around ought to be fully a foot higher than the level, to turn off drainage and keep out surface-water. When this is done the interior of the cistern may be

plastered on the earth, when it is firm and solid, placing a large stone or platform of bricks immediately under where the water will fall, in the bottom, and to support the pump-tube, if one is used. When an earth-wall is not used, bricks should be laid in courses from the bottom, in cement, with much care, and backing each course well behind with dry sand, that the pressure of the water may not cause leaking, which is very often the case if not properly done.

Cement-mortar is usually made of two parts dry mortar-sand and one part of hydraulic cement. The bottom and walls of the cistern must be well plastered and completely covered with this mortar, without any breaks in it anywhere, at least one-half inch thick. It is best not to get it on too thick, or it may slide down to the bottom. This will dry enough in twenty-four hours to be well covered with a wash of hydraulic cement as thin as it can be laid on with a whitewash-brush. The whole should be carefully gone over with this wash, that all porosities or cracks in the plaster may be thoroughly filled and covered up. Two or three coats of this wash are better than one, as they will render the cistern as tight as a bottle. The more coats of the wash that are put on the less water will soak away through the pores of the plaster, and the tighter it will be. This is a point of considerable importance, and should always be carefully attended to.

It is, of course, convenient, when you decide how large a cistern is wanted, to know how large it ought to be made to hold the required quantity of water. For every foot of depth of the following diameters the cistern will hold:—

For 6 ft. diameter	7.	barrels of 30 gallons.
" 7 "	9.598	" "
" 8 "	12.598	" "
" 9 "	14.42	" "
" 10 "	19.58	" "

A cistern 10 feet deep and 6 feet in diameter holds 2,100 gallons, or 70 barrels of 30 gallons each. The rule for finding the contents of any cistern is to multiply half the diameter in feet by itself. Then multiply the product by 3.1416, which gives the area of the excavation near enough for practical purposes. Multiply this by the depth in feet, which gives the cubic contents in feet. Multiply the last product by 1,728 to get the number of cubic inches. Divide the whole result by 231, the number of cubic inches in a wine gallon, and the product will be the number of gallons in the cistern. This, divided by 30, gives the number of barrels of 30 gallons each.

In conducting water from a roof to a cistern, arrangements ought to always be made for turning it off when full, as the weight of the water is apt to burst the walls if it is allowed to overflow. This should always be carefully looked after, and the conductors ought always to be turned off until the rain has fallen for some time and washed the roofs clean and clear of leaves and other trash. A small wire-screen ought also to be placed over the spout-holes in the roof. Professional cistern-builders are apt to slight their work, using too little cement, or

too little mortar, or not backing the walls well, or not washing them enough afterward to be tight. Any intelligent workman can make a good cistern after being shown how, and these often do the best work. It is always best to mix small quantities of mortar at a time, using it as rapidly as possible. A round cistern is much more economical of space, and holds more in proportion to depth of wall than a square one. But it is often thought best, in constructing very large reservoirs, to build them square. The following tables of both show the difference in wall and in area:—

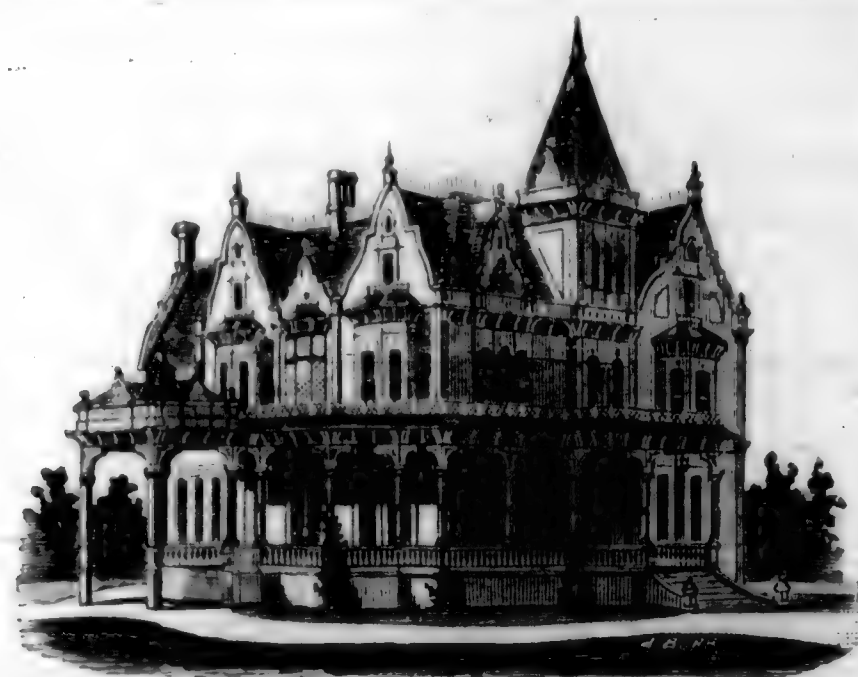
SQUARE CISTERN.			
8 feet square have 64 feet area and 32 feet of wall.			
10 " " " 100 " " 40 " "			
12 " " " 144 " " 48 " "			
ROUND CISTERN.			
8 feet diameter have 50 feet area and 24 feet of wall.			
10 " " " 78 " " 31 " "			
12 " " " 113 " " 37 " "			

A 10-foot round cistern, it will be seen, has less wall than an 8-foot square one, and has 14 square feet more surface. Consequently, round cisterns are cheaper and larger than square ones, as well as stronger. In estimating the cost of a cistern the following details are useful. A brick is 8 inches long, 4 inches wide, and $\frac{2\frac{1}{4}}$ thick. A wall need not be more than a brick thick, if carefully laid in cement and well backed with dry sand, so the pressure of water, when brought against it, can not force it out of its place to cause a crack or a leak. When laid flat and lengthwise, seven bricks will make a square foot of wall. A 10-foot round cistern, 12 feet deep, will have 372 square feet of wall, and will require 2,600 bricks for a 4-inch flat wall, if the entire surface is laid upon bricks. But if only an arch is turned of bricks, and the cement-mortar is plastered on sound, solid, clay earth, not more than 1,000 bricks will be needed. Sometimes a wall is laid up with bricks placed on edge, when about 1,700 will cover the entire area, walls, bottom, arch, and all, but this is not a safe method unless a skillful workman attends to the job.

Mix the cement and sand dry before making mortar, as thoroughly as possible, placing the sand on planks, using it about an inch thick, then an inch of cement, and another inch of sand. Then mix and work thoroughly while dry. It is better to pass the whole through a screen, even if the sand has been already sifted. In wetting down, it is best not to mix more than a bucket-full at a time. In plastering the walls always begin at the bottom, allowing each course to set and get hard before putting on another, or the whole may slide down in a lumpy mass.

EDS. ARCHITECT.: "Please settle a difference of opinion by stating the proportion between the load a given floor will bear when the joists are not bridged, and the same floor thoroughly bridged, with two rows of herring-bone bridging."

A floor will not bear any more weight by being bridged. The advantage to be gained by bridging lies in the fact that an individual joist is strengthened thereby, thus increasing its power to resist a concentrated load upon it, such as a heavy book case, safe, etc.



Improvements at Portland, Oregon.

W. S. Strahan is erecting a one-story, double house on D Street between Twentieth and Twenty-first.

W. B. Todd is building a house on Eleventh Street, between H and I, for A. Nollke. The cost is about \$2,000.

James Hyland is having erected four cottages on Eleventh Street, between Stark and B, for Hugh Gearin of Oregon City. They will cost about \$4,000.

E. M. Burton has made plans for three double residences, to be constructed on Seventh street near the Trinity church. They are for J. M. Kenworthy, of East Portland, and will cost \$12,000.

James Cumming has about finished a new store building on Eighteenth and B streets, for A. T. Smith. It is two-story, 20 x 50, and cost \$2,000.

M. S. Rosenblatt is having built a dwelling-house on the corner of Eighth and Alder streets. Sedge & Jenkins are the contractors. The cost will be about \$5,000.

There are the frames of three houses on the half block bounded by H, Twelfth and Thirteenth streets. One will be for Mr. Owen, and one of the smaller ones is for Mr. Sheath.

The foundations for J. A. Strowbridge's new block, on Second and Yamhill streets, are well under way. It will be three story, and will cost as much as \$50,000.

R. Weeks is building a dwelling, corner Lowndale and Alder streets. A. C. Townsend is the contractor and Neer & La Romer, architects. The cost is about \$2,500.

S. Blumauer is having a house built on Morrison and Fifteenth streets. It is a three-story residence, and will cost over \$10,000.

The work of moving the two buildings on the lot owned by John Wilson at the northeast corner of Fourth and Alder streets, has been completed. Mr. Wilson has already contracted with R. Porter for the erection on the lot of a three-story brick building, with basement, which is to contain one single and two double stores. The cost of the structure will be about \$40,000.

Mr. Roach is building a \$5,000 dwelling-house on the corner of Tenth and Market streets.

Mrs. Mary Dooling is building a cottage on the corner of Market and Fourteenth streets, to cost \$1,200.

W. W. Spaulding's new three-story brick

building on First, between Clay and Columbia, will cost about \$20,000.

A two-story dwelling for Frank Hacheney is being built on Hall between Third and Fourth streets, to cost \$2,500.

Charles. Cardinell is building a residence to cost between \$4,000 and \$5,000.

A large two-story double house is being constructed on Third Street between Harrison and Hall, to cost \$6,000. M. J. Geist is the owner.

Frank Hacheney is filling two lots on the corner of Clay and Lowndale streets and will build three two-story frame dwellings, to cost about \$4,000.

The northeast corner of First and Main streets has been cleared, and workmen are busily engaged preparing the foundation for a three-story brick, edifice for Watson and Smith. The building will cost about \$30,000.

The Catholic school, building in the Dalles will be built of brick, and cost about \$30,000.

Plans have been made for a dwelling-house to be built by J. H. Lyon, on the corner of Pacific and Morrison streets, to cost \$6,000.

The contracts for the foundations and iron-work of the new building to be erected on the northeast corner of Third and Washington streets by Frank Dekum, have been let respectively to McCarthy & McMahon and John Honeyman & Co.

The work of cleaning out the debris from J. C. Ainsworth's burned building, has been finished and the rebuilding is well under way. Mr. Krumbein, the architect, has let the contract to F. W. Lewis, to be completed June 1st. The improvement will cost \$30,000.

The main contract for Labbe Bros.' building has been let to John Robertson. This contract includes all but the foundations and the cast iron work. It is reported that the building will exceed the announced cost—\$100,000.

S. Farrell is having built a small cottage on East Park street, between Stark and Washington to cost \$1500.

F. B. Winters is building a one-story house on the southwest corner of Pacific and Taylor streets to cost \$1,500.

Mrs. E. F. Albright, on Taylor, between Tenth and Eleventh streets, has a two-story dwelling under way, to cost \$5,000.

George Cohn is building a dwelling house on the corner of Morrison and Fourteenth streets. It is a two-story, double house, and will cost \$6,000.

Mr. Cochrane is building a two-story frame building on First Street, between Clay and Market, to cost about \$2,000.

The bids advertised for by the Board of School Directors for finishing up the lower stories of the Failing and Couch schools, were opened at the office of Justus Krumbein, Saturday, and bids for finishing each building were as follows: W. B. Todd, \$4,000; W. L. Goodwin, \$5,388; Merchant & Bridges, \$6,100; Campbell & McDonald, \$6,270; Sharno & Davison, \$6,272; P. O. Lundin, \$6,280; N. O. Anderson, \$6,325. In case it is concluded to finish only the south half of the Couch build-

ing, it will be done for half the prices named.

We are indebted for the above list to the Commercial Herald. Our material men would do well to subscribe for the Herald as it contains a full account of building operations in the great North west. Terms \$3.00 per year.

Absorption of Moisture by Building Materials.

EVERY one connected with buildings of brick and stone knows the absorbent nature of those materials under the most favorable circumstances. It would astonish most people, adds the London Building News to be told what a large quantity of water is stored in the brick walls of an ordinary house after a heavy rainfall, the drying or evaporation of which must take place inside in cold weather, unless proper precautions are taken to render the walls impenetrable. The plea for hollow walls has been raised again and again, and though the system is coming to be adopted more generally less, the idea of solidity of wall structure seems to have taken too deep a hold on the ordinary building mind to be given up. Some time ago a suggestion was made that coillery owners and others who have large quantities of slag, might with profit utilize this material for building cottages and other purposes. We are not sure whether the hint was taken, but in some parts of the country the material furnishes an admirable aggregate for concrete. Where good aggregates exist, like slag, broken brick, sand-stone or furnace ashes, concrete building ought to be much cheaper than brick, as no skilled labor is required.

There is another consideration besides cost which tells in favor of concrete, and that is the non-porosity of walls so constructed. Not only does brick absorb moisture in wet weather, but it is now known to absorb animal gases as well; and here we have a condition which builders of our hospitals and infirmaries ought to be reminded of. We are not sure if concrete has been applied to any buildings in England of this kind on a large scale, but as absorbent walls are known to be injurious in harboring the germs of infection, the value of walls constructed of concrete made of burnt aggregates cannot be overrated. Slag made concrete has the great advantage of being fire-resisting, the material in its rough state having been subjected to intense heat. There is nothing in it to "kill" the cement, and the rough surface of walls built with it becomes an excellent "key" for the plastering. In the construction of walls of this material, three sizes of the slag may be used, the larger lumps being packed in layers in the middle of the wall, and the other two sizes, the larger the size of walnuts, run in with cement on each face in the proportion of eight to one.—*Manufacturer and Builder.*

THE trustees of the great suspension bridge over the East River, between New York and Brooklyn, have announced that the structure will be thrown open to the public on the 24th day of May, 1883.

The Effect of the Nine-Hour Movement.

SINCE writing another article appearing in this issue, touching upon the same subject, we have been interviewed by a considerable number of owners in regard to the nine-hour rule adopted by the carpenters' and joiners' union, and we find that a very considerable number of them are disposed not to build at present. We have repeated the arguments elsewhere appearing, that the ten per cent. reduction in the hours of labor increases the cost of buildings ten per cent. only in the cost of that one item; or in buildings where the carpenter's work is worth under the ten-hour rule—\$1,000, which indicates in frame buildings a total cost of \$7,000 to \$8,000, the increase would be only about \$100—being one-tenth added to the item of labor. But the further objection is urged, that if the nine hours is recognized by owners, it will soon be followed by a demand for eight hours as a day's labor. We hope not, as such a course will beyond question check present and promised prosperities, not so much because of the actual additional cost of building, as that public sentiment is adverse to such reduction on general principles. Consequently, it will be wise on the part of the laboring classes to be content with what they have gained in the present reduction, and not seek to prostrate building activities by attempting now, what has heretofore been tried and proved a failure. If nine hours had been accepted as a compromise at the time the eight-hour contest was waged years ago, there would have been a yielding on the part of owners, and the ground so gained might have proved permanent, instead of being a partial success, lasting but a short time.

Prescott's Patent Hangers.

THESE new hangers are fast superseding the old styles. No track is necessary where they are used, thus doing away with one of the common petty annoyances experienced by all housekeepers; when parlors are thrown open for a social dance, there is no track to come in contact with one's feet. Another great advantage lies in the fact that the action of these hangers is such upon opening a door, that the latter rises a little, and thus all wear and tear on carpets is entirely done away with. They are very easily applied, and are not visible with the door open or shut. Another great advantage is that they are not affected by shrinkage of either the door or studs. In case they get out of order, they are very easily got at to be fixed. They are made of all sizes and the price is no greater than the old-fashioned sheaves. Many of our architects are adopting them, and they can be found in the residences of many of our wealthy citizens. For full information apply to the agents, Dunham, Carrigan & Co., 110 Front Street.

SHORE up carefully if you would pull down safely.

Women as Architects.

WHY should not American women become architects? They push into all the polite and impolite professions, and architecture with its branch of "house decoration" seems an easy and fitting employment for one who has taste and a head for business. A lady who has recently died in London was a shining example of what can be accomplished by her sex in this department of art. Miss Rhoda Garrett, says the London Times, was the daughter of a country clergyman of small means, and one of a large family. She broke through the restrictions of home life, which are much stronger in England than here, and determined to carve an honest independence for herself. She entered the office of an architect, and having learned the trade, so to speak, set up for herself as a "house decorator," taking another lady into partnership. She soon rose to eminence in spite of delicate health, and found time to be the author of a little volume on "House Decoration" which has passed through six editions. Her social and professional life is a strong argument in support of the belief that women—ladies—may quietly succeed in "business," and attain not only money for their own needs, but fame of a high order.—*The Builder.*

About Chimneys.

THE following suggestions from the *American Artizan* for the cure of a troublesome fault of chimneys, raises the point whether it is not better to omit the inside plastering of smoke flues, relying for safety upon good bricks, good mortar, well filled joints, and, if need be, thorough plastering of the outside of the shaft, after it has been carefully inspected. We have several inquiries from subscribers as to the remedy for the formation of creosote in chimneys, which often runs down the walls of rooms, staining carpets and walls and causing much damage. The cause of this state of things, we venture to say, is owing to defective draft, and this often arises from the mason not smoothing the plaster on the inside of the chimney, which causes it to protrude and arrest the progress of the smoke, causing the consequent condensation into a liquid deposit. This may be remedied by attaching a brick to a rope and smoothing off the inside of the chimney. The trouble may arise also from a crooked chimney, in which case the remedy is plain, but the cause we have first assigned will be found to be a common one, and it would be well for those troubled with liquid oozing from chimneys, to look to the state of the inside mortar.

No matter how well arranged, water-closets immediately within a dwelling are objectionable. The minimizing of the evil partly lies in keeping them as far as possible from the sleeping-rooms.

SET out your work with accuracy, and the time you will save will bring profit as well as credit to your employer and yourself.

The Draft of Chimneys.

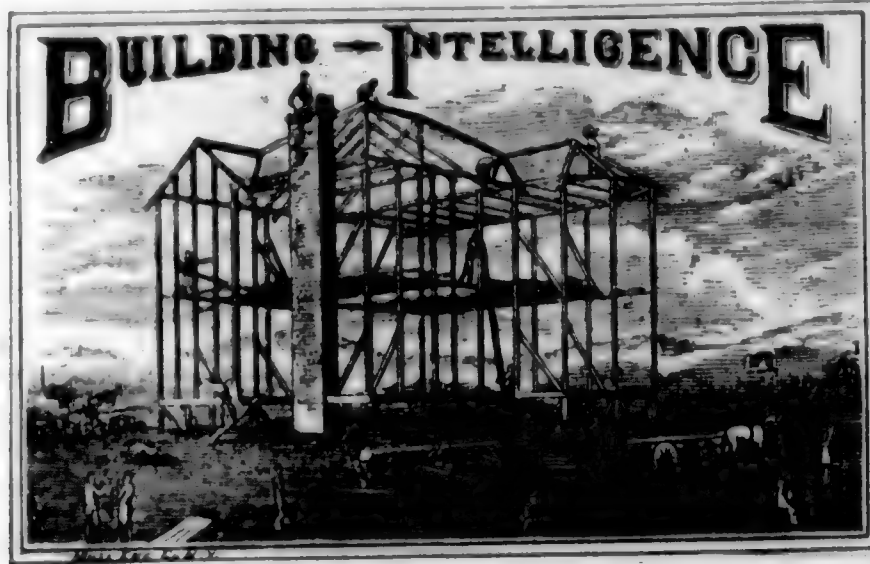
AT the closing meeting of the British Association Lord Rayleigh read a paper before the mechanical section on the effect of wind on the draft of chimneys, based upon experiments made with tubes and a fan driven by hydraulic power. He stated that a horizontal wind would usually promote a draft, except in cases where the chimney opened out upon a large expanse of wall, and so was indirectly affected. The cure in this case was to carry the chimney higher. When the wind was inclined downward to the chimney at an angle of thirty degrees and upward, there was a down-draft, and the maximum up-draft was produced by wind inclined upward at about the same angle. The simplest thing to prevent wind blowing down a chimney was to erect a T-piece on the top. In that case a vertical or inclined wind favored the draft, and the effect of a wind blowing through the T-tube was practically nothing. Mr. Park Harrison suggested as the only real remedy an increase of draft. If all the chimneys in a house could be made to open into a common cloaca, a down-draft would hardly ever occur.—*The Builder.*

Action of Open Fires.

THE way in which an ordinary open fire-place acts to create circulation of air in a room with closed doors and windows is as follows: The air is drawn along the floor towards the grate; it is then warmed by the heat which pervades all objects near the fire, and part is carried up the chimney with the smoke, whilst the remainder, partly in consequence of the warmth it has acquired from the fire, and partly owing to the impetus created in its movement towards the fire, flows upward towards the ceiling near the chimney-breast. It passes along the ceiling and, as it cools in its progress towards the opposite wall, descends to the floor, to be again drawn towards the fire-place. It follows from this that with an open fire-place in a room the best position in which to deliver the fresh air required to take the place of that which has passed up the chimney is above the projecting chimney-piece and at any convenient point in the chimney-breast between the chimney-piece and the top of the room, for the air thus falls into the warmer upward current, and mixes with the air of the room without perceptible disturbance.—*Furniture Gazette.*

TO REMOVE bolts that have rusted, without breaking them, the most effectual remedy known is the liberal application of petroleum. Care must be taken that the rusted parts are reached by it, and some time must be allowed to give it a chance to soften the layer of rust before any attempts are made to remove the bolt.

TO CLEAN MARBLE.—Chalk, powdered, and pumice stone, each one part; soda, two parts. Mix with water. Wash spots, then clean and wash off with soap and water.



SAN FRANCISCO.

Bush nr Webster. Two-story frame. O.—J. Goodrich. A.—W. E. & S. O.—J. F. Farness. \$8,500.

Market x Fremont & Beale. Four-story and base, brick. O.—Mrs. M. Coleman. A.—A. Laver. C.—C. H. Jackson. \$10,000.

Geary x Jones and Leavenworth. Three-story frame. O.—Mrs. Merrill. A.—Moser. C.—Binet. \$7,500.

Natoma x Sixth and Seventh. Three-story frame. O.—N. C. Doyle. A.—Moser. C.—P. Liberty. \$7,500.

Sacramento cor. Powell. Three-story frame. O.—N. Gray. A.—McDougal & Son. C.—A. Jackson. \$20,000.

Guerrero x Twenty-fourth and Twenty-fifth. Two-story and basement. O.—Dominican Sisters. A.—B. E. Henriksen. C.—J. Klein. \$20,000.

Bush x Kearny and Montgomery. Three-story brick. O.—A. W. Bowman. A.—Percy & Hamilton. C.—J. Cox. \$8,800.

Mason x Union and Filbert. Three-story frame. O.—C. Richert. A.—Moss. C.—C. C. Classen. \$5,000.

Taylor cor. Bush. Alterations. O.—T. L. Lyons. A.—Moser. C.—R. P. Sanchez. \$2,000.

Franklin cor. McAllister. Three-story frame. O.—B. Windhaus. A.—Geiffuss. C.—E. Dryer. \$18,300.

Quincy Place near Pine. Four-story brick. O.—Champion. A.—W. P. Moore. C.—G. Richardson. \$10,000.

Fourth near Bryant. Two-story frame. O.—J. O'Neill. A.—Townsend & Wyneken. C.—Plummer. \$6,500.

Grove x Fillmore & Steiner. Two-story frame. O.—C. B. Spivale. C.—R. P. Traxler. \$7,000.

Valencia cor. Twenty-third. Three-story frame. O.—A. B. F. Crowley. \$18,000.

Harriett x Folsom and Howard. Two-story frame. O.—C. B. Folsom. A.—Townsend & Co. C.—J. J. Scott. \$2,200.

Fifteenth corner Church. Two-story frame. O.—A. B. C. Johnson. \$2,500.

Henry x Castro and Noe. One-story and basement frame. O.—J. H. Schell. C.—E. B. Spangle. \$1,400.

Twentieth x Dolores. Two-story frame.

O.—A. Miller. C.—A. Klahn. \$2,000.

Battery cor. Sacramento. Alterations. O.—Campbell. A.—Geddes. C.—J. J. McCready. \$16,000.

Shotwell near Eighteenth. Two-story frame. O.—J. G. James. A.—G. A. Bordwell. C.—Gray & Stover. \$4,500.

Turk corner Hyde. Three-story frame. O.—J. Van Ness. A.—Geiffuss. C.—Kipp. \$22,000.

Harrison x Seventh and Eighth. One-story brick. O.—J. F. Smith. A.—J. F. Grant. C.—J. P. Crichton. \$30,000.

Guerrero cor. Eighteenth. Two-story frame. O.—F. A. Hornblower. C.—S. C. Thompson. \$8,000.

Twenty-first x Guerrero & Dolores. Two-story frame. O.—G. Brown. A.—O. G. Moore. C.—Kinsaid & Baldwin. \$5,500.

Guerrero near Twenty-fifth. One and one-half-story frame. O.—Harding. C.—F. W. Kern. \$1,500.

Buchanan near Oak. One-story frame. O.—H. T. Wenzell. A.—Schmidt & Havens. C.—Terrill & Slaven. \$3,000.

Seventeenth near Church. Alterations. O.—B. J. Patterson. \$2,000.

Fifth nr Berry. One-story brick. O.—Standard Oil Co. C.—Quinn. \$2,000.

Geary near Van Ness. Alterations. O.—L. Westerfield. A.—Schneider. C.—W. Waterbury & Maxwell. \$2,500.

Polk cor. Grove. One-story frame. O.—W. B. Dolan. A.—Bester. C.—C. M. Mason. \$10,000.

Eighteenth corner Jessie. Two-story frame. O.—Mrs. Dowdell. C.—J. Blake. \$3,000.

Church x Sixteenth and 17th. One-story frame. O.—F. Horning. \$1,100.

Sanchez x Sixteenth and Seventeenth. One-story and basement frame. O.—Quast. C.—J. Williamson. \$1,000.

Folsom near Beale. Two-story frame. O.—J. Pendergast. C.—J. Fitzpatrick. \$15,000.

Stevenson nr First. Three-story brick. O.—Pacific Power Co. A.—W. F. Smith. C.—W. M. Fletcher. \$18,000.

Mason cor. Chestnut. Seven-story frame. O.—A. B. J. Fay.

\$11,000.

Piercer nr Ellis. Tank frame. O.—J. McGinn. C.—Sanchez. \$1,000.

Polk cor. Clay. Three-story frame. O.—W. Wilkinson. A.—Wright & Sanders. C.—Robinson. \$10,000.

Shotwell x Nineteenth and Twentieth. Two-story frame. O.—A. B. W. Lewis. \$2,000.

Valencia nr Twenty-second. Alterations. O.—O. Brand. C.—T. W. Hansbrough. \$1,200.

Twenty-eighth x Sanchez and Noe. One-story frame. O.—Mrs. M. Gillen. C.—A. Flood. \$700.

Tenth x Market and Mission. Alterations. O.—Thomas & Co. C.—Leonard. \$600.

California x Fillmore and Steiner. Alterations. O.—C. Nobmann. A.—G. E. Voelkel. C.—Cook & Johnston. \$5,500.

Stockton cor. Union. One-story frame. O.—Mrs. C. Dunn. A.—J. Devlin. C.—J. J. McCready. \$27,000.

Clay corner Hyde. Frame dwelling. O.—Mrs. A. M. Conroy. A.—Wm. Curlett. C.—P. Crichton. \$9,000.

Devisadero nr Sacramento. Frame dwelling. O.—L. W. McGlauffin. C.—C. Adams. \$4,000.

Masonic Cemetery. Tomb. O.—Mrs. Jane Brickwedel. A.—Wm. Curlett. C.—Geo. Griffith. \$2,100.

Sacramento cor. Octavia. Alterations. O.—Judge Sanderson. A.—Wm. Curlett. C.—Wm. work. \$7,500 (about).

Eighteenth corner Jessie. Alterations. O.—H. E. Underwood. A.—Schmidt & Havens. C.—Vnn. Pluns. \$1,000.

McAllister cor. Fillmore. Two-story and attic frame with stable. O.—L. Hentrich. A.—Schmidt & Havens. C.—Wm. Pluns. \$2,100.

Van Ness x 11th and Eddy. Two-story frame. O.—A. Anspercher. A.—Schmidt & Havens. C.—T. C. Riddell. \$15,000.

Vallejo cor. Larkin. Alterations. O.—J. H. Bremer. A.—Schmidt & Havens. C.—H. Inwood. \$8,000.

Jones x O'Farrell and Geary. Three-story frame. O.—J. B. Payard. A.—Schmidt & Havens. C.—W. Langstaff. \$7,000.

Sixth near Harrison. Two-story frame. O.—H. Russ. C.—Conrad & Miller.

\$20,000.

Frame building. O.—H. Luse. A.—Theo. Lenzen. C.—J. Lenzen. \$1,000.

Frame building. O.—Hartman & Norman. A.—Theo. Lenzen. C.—J. Lenzen. \$900.

Meridian Road. One-story frame. O.—F. A. Taylor. A.—J. O. McKee. C.—G. E. McDougall. \$2,175.

Finest frame. O.—T. S. Montgomery. A.—J. O. McKee. C.—Mrs. M. Stewart. \$8,900.

University Grounds. Two-story and one-half-story frame. O.—J. E. Richards. A.—J. O. McKee. C.—W. S. Boyles. \$6,800.

Fifteenth corner Empire. Frame dwelling. O.—A. Landy. A.—J. O. McKee. C.—Days work. \$1,800.

SACRAMENTO.

Seventh and Q. Two-story and basement frame. O.—Mrs. E. B. Crocker. A.—Goodell & Dillman. C.—Madden & McGinnis. \$10,000.

J. Seventh and Eighth. Pitting up store. O.—C. H. Gillman. A.—N. D. Goodell. C.—J. White. \$2,87.

Ninth x I and J. One-story basement brick. O.—A. Meister. A.—N. D. Goodell. C.—E. A. Boyer. \$1,500.

910 J. Two-story brick. O.—Chas. Barnes. A.—A. A. Cook. C.—J. White. \$2,253.

1700 K. One-story frame. O.—H. G. Cook. A.—A. A. Cook. C.—J. White. \$8,350.

LOS ANGELES.

Three-story brick building. O.—St. Vincent Society. C.—Kysor & Morgan. \$28,000.

Ship Mill. Rough. O.—M. Fitzguala. \$28,000.

Brick building. O.—C. Duenmoran. A.—Kysor & Morgan. C.—Bell & Haskell. \$7,000.

Frame Residence. O.—O. W. Childs. A.—Kysor & Morgan. \$5,000.

Two-story brick building. A.—Kysor & Morgan. C.—C. Andrews. \$14,500.

Brick building. O.—San Francisco Estate. A.—Kysor & Morgan. C.—C. Willard. \$15,000.

Frame residence. O.—J. Walker. A.—Kysor & Morgan. C.—J. E. Wood. \$7,500.

Agricultural College. Ontario. Three-story brick building. A.—Kysor & Morgan. C.—Days work. \$15,000.

OAKLAND.

Vernal Heights. Two-story frame. O.—G. E. DeGolia. A.—Clinton Day. C.—E. Child. \$4,000.

Union x Eighth and Ninth. One-story frame. O.—J. F. Woods.

C.—C. S. Martin. \$2,000.

Tenth near Center. One-story frame. O.—A. Heland. Day's work. \$1,500.

Emery Station. Two-story frame. O.—C. Diederichsen. C.—W. R. Lord. \$2,100.

ALAMEDA.

Pacific Avenue. One-story frame. O.—H. Koppitz. C.—A. Denke. \$2,200.

Pacific Avenue nr Oak. Two-story frame. O.—Mrs. Stahl. C.—W. R. Vogt. \$3,000.

Pacific Avenue nr Willow. Alterations. O.—Westfall. C.—C. F. Carlson. \$500.

Faru and Santa Clara Aves. Two-story frame. O.—D. Straub. C.—Cellarius. \$4,000.

BERKELEY.

University Avenue cor. Sixth. One-story frame. O.—J. B. Henley. A.—Meeker & Banks. C.—G. A. Embury. \$1,700.

Center. Two one-story frame. O.—C. Band. C.—A. H. Broad. \$3,400.

Berkeley Way. One-story frame. O.—C. Band. C.—A. H. Broad. \$1,400.

University Avenue. Two-story frame. O.—Dr. F. H. Payne. C.—C. R. Lord. \$1,300.

Ellsworth. One and one-half-story frame.

O.—Wood. A.—Spencer. C.—G. A. Embury. \$1,550.

Frame church. O.—Catholic Society. A.—B. J. Clinch. C.—G. Embury. \$7,500.

One-story frame. O.—Capt. Henley. C.—G. Embury. \$1,700.

MISCELLANEOUS.

ountville. Veteran's Home. A.—McDougal & Son. C.—Ingerson & Gore. \$15,700.

Chico. Two-story frame. O.—F. C. Lusk. C.—Swain & Hudson. \$20,000.

Riverside. Two-story brick block. O.—J. R. Newberry & Co. A.—Seymour & Stevens. C.—Davis & Porter. \$5,000.

Walla Walla. Frame dwelling. O.—E. Buchanan. A.—Allen & Whittemore. C.—A. B. Waterman. \$4,155.

Benicia. Planing mill. O.—J. B. McKenzie. C.—F. C. Eggers. A.—Geiffuss. C.—Kipp. \$22,000.

Bolinas Bay. Two-story frame. O.—Capt. Handerson. A.—H. D. Mitchell. Day's work. \$2,000.

San Rafael. Two-story frame. O.—Mr. Butler. A.—Wright & Sanders. C.—Robinson. \$10,000.

Colusa. One-story frame. O.—C. Rimer. C.—J. S. Steward. \$1,200.

MARKET REPORTS.

LUMBER.	
Common Rough, up to 40 feet, per M feet.	Price.
" 41 to 50 "	\$22 50
" 51 to 60 "	" 23 50
" 61 to 70 "	" 24 50
" 71 to 80 "	" 25 50
Refuse Rough.	14 50
Common Rough, sized with planer \$2 additional on above rates, per M feet.	25 50
No. 1 Flooring, 6 inches and over, " 4 " and under, and 1 1/4 x 8	32 50
Flooring and Stepping	37 50
Rough Clear for Flooring, \$1 less than above rates.	37 50
Second Quality Flooring and Stepping	28 50
Ship Plank, Rough	32 50
" Planed 1 side	35 00
" 2 sides	35 50
Deck Plank, Rough	33 50
" Dressed	37 50
Laths	per M 3 75
Wool Slats	12 00
Shakes	12 00
Redwood Posts	per piece 17 50
Redwood.	
Rough Merchandisable	per M feet \$22 50
Refuse	18 50
Surface No. 1	37 50
" 1x6	35 00
" No. 2	37 50
Rustic, No. 1, 1x8	37 50
" No. 2	32 50
T. & G., 1 1/4 x 4 and 1 1/2 x 6	37 50
" 6 in. 12 ft. and over	35 00
" 7 to 11 feet	32 50
" under 7 feet	32 50
" No. 2	35 00
T. & G., Beaded, 12 feet and over	30 00
" 7 to 11 feet	27 50
" under 7 feet	30 00
Half-inch Surface	27 50
Pickets, fancy	20 00
" Rough, Pointed	17 50
" Square	15 00
Siding, 1/2 inch	per M 2 50
Shingles	12 00
Pattens, 1/2 inch, lineal feet	1c
NAILS.	
10 to 60 pennies, are quoted at.	\$4 70
" 6 "	5 50
" 5 and 4 "	5 50
4 and 5 " brad-heads at.	6 00
" 6 "	6 25
" "	6 50

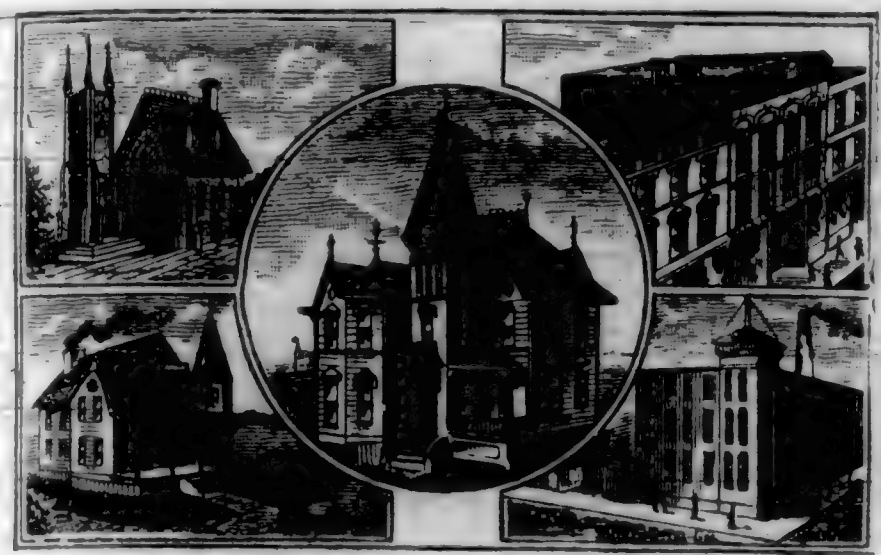
The California Architect and Building News.

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Bound volumes of 1879, 1880, 1881, and 1882 (in one book) complete, with all ads. and covers removed, will be sent to any address upon receipt of \$8.00.

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In 1880 the subscription price of this journal was only \$1.50, and we have put the price of bound volumes accordingly.

Volumes of 1882 and those containing all the numbers from the first issue, bound in one volume, are supplied with a full index.

Any one failing to receive a complete index will be supplied by sending a postal card to this office with their address.

A Building Boom.

COMPARISON OF THE FIRST SIX MONTHS OF 1883 WITH THOSE OF OTHER YEARS.

THE present outlook of building operations is such as to gladden the hearts of every material man and property owner on the coast. At the beginning of the year we remarked that the building interests were alive to the grand future of this city, and that this year would be one of the most prosperous known in its history. We do not wish to be known as prophets. The very hackneyed phrase—too common in newspaper literature—"we prophesy an increased activity" &c., has never appeared in our building reports.

All the deductions and intimations of future business in building circles have been given after very careful inquiry among our business men and architects. To the latter class especially are we indebted in a great measure for so successfully placing before our readers, almost a complete record of buildings as they have been erected. And we take this means of publicly thanking the architects for their kindness in giving us the various items to enable us to present such results as we do in this issue.

We repeat again what we have said before, that we will not report a building until the contract is let. Our relations with architects are such that we hear, and in fact know of many buildings that "are in the market" long before the contract is signed. It would be manifestly unjust to the architect to report such items until everything is settled.

We find that in the first six months of 1882, there were reported of building improvements—brick, frame and alterations—

281 BUILDINGS, OF THE VALUE OF \$1,238,910.

For the first six months of 1883, we find the total number to be

424 BUILDINGS, OF THE VALUE OF \$2,464,898.

This is truly a good showing, and the result appears more remarkable when we take into consideration the fact that, so far, this year, there have been but few large single buildings erected. We have had no Phelan Blocks, Sugar refineries, Eagle Blocks, etc., to swell the grand total. From the first of the year there has been a steady demand for good dwellings, and as yet it is unabated.

Some of our cotemporaries—daily papers—a short time ago laid great stress upon the fact that the erection of so many buildings for "flats" would cause a great many to desert the old-fashioned buildings for the more modern dwellings. This, they argued, would result in

a great many idle non-rentable houses on account of their lack of modern conveniences. These after being idle awhile would be rented for much lower figures, and thus cause parties to move from the "flats" to their old residences again.

The journals indicated did not give the property owners the credit to which they were entitled. In numerous instances, as soon as a tenant left one of the old-fashioned dwellings, the landlords immediately went to work renovating and re-modeling, and introducing the "modern conveniences" necessary. And to-day there are but comparatively few vacant houses to be had.

The amounts given for this year so far, are almost 50 per cent greater than for the whole year of 1880.

Architects generally are busily employed on sketches, plans, etc., for these patrons, many of whom are at the springs. After the 4th of July we may look for a steadily increasing business. Good workmen are now scarce, and the "boom" may receive a set back by the high price of labor and the disposition shown by the material men to add on every cent possible to their goods, whenever they think the public will submit to the imposition.

Still Onward and Upward.

We are compelled to again enlarge this journal to meet the requirements of those who are gathering in the golden shekels by giving to the general public a full description of their wares through our advertising columns. Several ads. have been sent to us from the East during the past month, which we were compelled to decline. We do not insert any except those that relate strictly to the building interests and the furnishing of houses after completion.

We would also notify parties sending us ads. that unless their order is accompanied by a deposit, or suitable references given, we cannot insert the same. This rule is imperative.

During the past month we have enlarged our editorial corps, and it will be our aim, in each issue, to present a journal, the peer of any now printed. Further improvements are in contemplation, and we will use our best endeavors to merit the confidence reposed in us, by establishing an architectural and mechanical journal that will of necessity be found in the offices and dwellings of every property owner, architect, contractor and the trades generally.

A PORTABLE ice-freezing house is the subject of a patent granted to Mr. A. Von Krause, of West New Brighton, N. Y.

Our Original Table of Steel Square Mitres.

WE prepared, arranged, and published in the June No., 1882, of this Journal an original article, accompanied with an illustration plate, giving the figures on the steel square by which the various mitre cuts from a triangle to a 16-side polygon could be made. This table we found reproduced in a late number of the *Carpenters and Builders Journal* without credit, and afterward in the *Builder and Wood Worker* with credit given to the first-named journal. That the table in question was *extracted* from our columns admits of no question as it cannot be found in the same form and with the same figures in any book extant. We claimed no new discovery in mechanical science, but did and do claim the tables as worked out by us to be original and certainly convenient to the mechanical portion of the readers of this journal, as well as the journals which have copied us.

We challenge the editor of the paper mentioned to refer us to a page in Nicholson, Hatfield, Bell, Hodgson, OR ANY OTHER AUTHOR, which contains the information we claim as being the first to produce in the manner we did.

In our April issue we noticed the plagiarism provoked by the fact stated that the *Builder and Wood Worker*—a journal edited by competent and intelligent gentlemen, who, realizing the value of the table, and knowing it to be of recent originality, having never before seen it in print—gave credit to the journal from which they copied—hardly an excusable error, as the *Wood Worker* received the article in question about the same time as the other journal did through the columns of this journal, and might have given credit where credit is due.

In our April No. we noticed the facts in issue, and charged unfairness on the part of the *Builders Journal*, at which the editor takes exception, and by vagaries seeks to make it appear that we are not entitled to special credit in the preparation of an article, which simply uniforms certain valuable and familiar facts, which for long years seems to have remained stowed away in the great store-house of our contemporary's unrevealed intelligence and knowledge—unpossessed of interest or importance sufficient to justify their publication, until we arranged and produced them in form rendering them worthy of reproduction.

If our table of "MITRE CUTS" were old and familiar, how is it they have never appeared in print, prior to publication of this journal? And how happens it that they were so speedily reproduced in the journals named, after we published them? The attempt of our contemporary at sarcasm is very vague and feeble, and by no means disposes of the fact that the article in question was *extracted* from the columns of this journal without proper credit.

Our worthy brother editor has placed himself in a peculiar position. He intimates that the mitres in question were made according to the figures given TWENTY YEARS AGO. And

yet in a book published by him only FIVE YEARS AGO he does not give the information in question.

Again, in his own book, he gives the figures on the square necessary to use to form an octagon as 7 to 17. Passing strange indeed it seems to us, that an editor TWENTY years ago should know the figures as WE published them, then writes a book only FIVE years ago, giving the figures as above, then in 1883 copies our figures and gives them as they ought to have appeared in his own work—7½ to 18. There is not a mechanic worthy of the name, that does not know that 7 to 17 will NOT give the octagon mitre. And the deduction is fair that if the editor mentioned does not know what figures will produce the octagon mitre, he may not know what will produce the more simple mitres and certainly cannot be expected to understand those for the more difficult cuts. However, he may have learned, since the publication of his book in 1878, the proper figures on the square for an octagon cut, which he will find correctly given in our table, together with a number of other cuts, to which he may not have given the necessary "labor and study" to become familiar with. Other examples may be quoted from the book mentioned to illustrate the danger of living in glass houses and attempting to throw stones.

The concluding paragraph from our contemporary's article deserves no notice from us as it does not state facts as far as either that journal or ourselves are concerned.

Mechanics' Lien Law.

THE following letter was received in time for the May number of this journal, but was overlooked until too late for publication:—

SAN FRANCISCO, April 11, 1883.

EDITORS OF THE CALIFORNIA ARCHITECT—*Dear Sirs:* It would be very useful to many of your readers if you would give in the ARCHITECT a statement of the law at present in operation in California in the matter of mechanics' liens on buildings. These laws have been recently changed, and there seems to be at present much doubt among persons interested in the subject as to how the law stands. Yours truly, A SUBSCRIBER.

"A Subscriber" is in error about any change in the lien law by recent legislation. It stands now just as it did in 1880. In the July number of this journal for that year there will be found, page 64, a full digest of the law as it then stood, and as it now stands, making owners liable for all claims and demands for material furnished and labor performed, without regard to the sum of contract. There is at present a case before the Supreme Court of this State, involving the question of owners' liabilities beyond the contract amount. Should a decision be rendered upon that point before our July number is issued, we will give it in this connection.

It should always be carefully borne in mind that in bare wires, out of doors, erected for the purpose of conveying electricity, there is always more or less danger to person or property.

The Mysteries of Metals.

NOTWITHSTANDING the wonderful progress, says an exchange, that has been made during the last half-century in the construction and working of the useful metals, there is yet a vast deal to be learned. The metals when pure are commonly supposed to be simple elements, yet there are some reasons for supposing that it may be proved that at least some of them are compounds. Even the great Faraday gave utterance to the thought that the dreams of the alchemist might yet be realized—that gold and other metals might be found to be compounds, and that means might be devised whereby those compounds might be separated and afterwards so differently reunited that the baser metals might be converted into precious. The changes which are wrought in iron and steel by converting, annealing, and hardening processes are far from being understood by the most advanced metallurgists of the present day. The mysteries of hydrogen gas and its intimate relations with iron are as much a puzzle as they were fifty years ago, and the theory advanced by Graham, that hydrogen is a metal, is still maintained by many chemists. It is only a few years ago that absolutely pure iron became known to scientists, and it is now shown to be a metal almost as "unstable as water," and still found in the laboratory as a great curiosity. What had previously been known as a pure iron was shown by Jacobi to be a compound of iron and hydrogen. He first separated the two so-called elements. During the process the iron increased in volume, changed from a dark to a silver-white substance, very ductile, and so soft as to be nearly as readily cut as lead. The experiment proved that hydrogen played an important part in hardening and tempering—as much so as carbon—but how or why none know to this day. It is found that much more difficulty is experienced in rolling and otherwise manipulating gold in a factory where much electricity is generated by the action of machinery than in a room where no machinery is in operation, and where, consequently, frictional electricity is absent. The trouble is manifested in a disposition of the edges of the plates of thin bars to crack. Many other peculiarities, already known, might be mentioned, and there is no doubt that closer observation will largely increase the number of curious and yet inexplicable phenomena connected with the working and general characteristics of the metals, both useful and precious.

GREASY COLOR.—The painter is frequently annoyed by having his paint or varnish crawl, or draw up leaving bare spots, when applying it over a painted surface. The cause is what is known as "greasy color," that is, if the paint was not mixed with oil it is a greasy pigment, such as lamp-black—but the most common trouble is too much oil. To overcome the difficulty wash the surface, or simply rub a damp shammy over it, or if it be only a small spot that appears "greasy" blow the breath upon it and the crawling will be overcome.—*Painter's Magazine.*

USES OF THE STEEL SQUARE.**Application of the Steel Square in the Construction of Roofs.**

"Construction is the Anatomy of Architecture."

WHEN the term ROOF first became to be used to denote its present significance, we have no means of determining. In the Bible we find the word "housetops" used in many places, and from the description given we infer that the roofs or coverings used were nearly flat, just sufficient pitch being given to shed water. Among some of the oldest ruins now found—those in Bashan particularly—the roofs are almost flat; they were made of large flat stones, laid in a species of cement, and to this day, such was the quality of materials used, that water will run off the parts of the roofs remaining standing, with no leaking between the various stones used.

Other roofs were made of boughs of trees laid close together and covered with earth, the top being of a kind of clay cement, that was impervious to water. These roofs were well adapted also to protect the inhabitants of that part of the country from the excessively hot rays of the sun.

In the building of Solomon's Temple, the small part that was roofed was covered with boards and these with gold and silver. This may be said to have been the first metal roof ever constructed.



FIG. 1

In pictures of "ye olden times" we find the roofs to be of similar shape to our engraving, simply boughs and branches of trees covered with leaves and earth. This perhaps answered for small gatherings. When large parties congregated, the difficulty of getting

branches of trees long enough to form a roof of only one pitch, suggested to some one the idea of adding on an addition similar to that shown in Fig. 2.

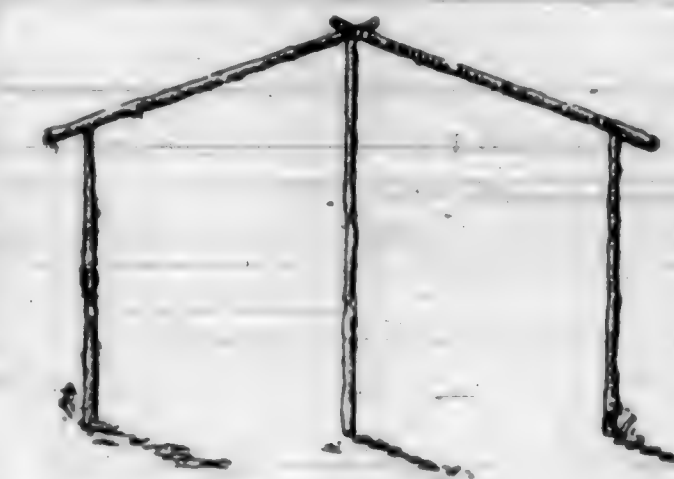


FIG. 2

In this simple manner was founded the grand principles of the construction of roofs. The supports to the ridge necessarily occupied much space, and, being in the way of the throngs that visited the great fairs held in ancient times, no doubt some thoughtful mind conceived the idea of so binding the ends of the boughs together that the roofs were almost self-supporting.

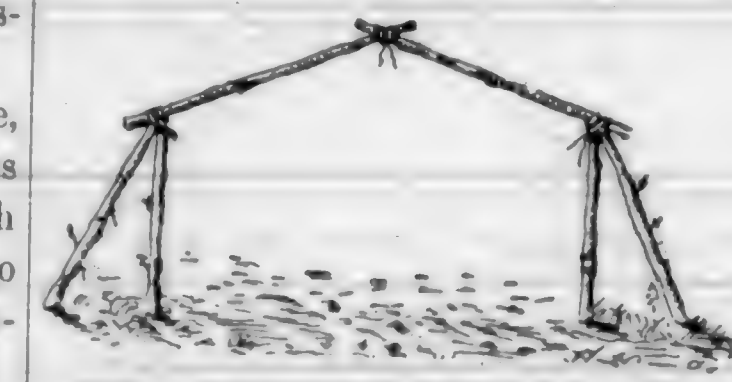


FIG. 3

In an old work we find an illustration similar to Fig. 3. The boughs were crossed and tied together with some material then in use, and a wooden pin being used to further strengthen. Braces were used as shown, and thus a considerable span could be made. This theory of the gradual development of the construction of roofs seems natural. We cannot give the date of this improvement, as the chronicles in reference thereto are very indefinite.

When hewn timber was introduced in the various parts of buildings, the natural genius of the people then in existence, led them to give their roofs

all kinds of fantastic shapes, and these crude efforts were seized upon by some of the master minds, and a uniform and distinctive style of architecture was accorded to each. We in our day but imitate our predecessors in the art of improving and excelling the ideas of the generations immediately before us.

Going back to the time of the ancient Greeks, we find the roofs nearly flat, composed of large marble slabs, neatly grooved together so as to be impervious to water. They did not have the same idea of architecture that was possessed by the stately Romans. An observer justly remarks in regard to the latter, that "I have not seen the remains of any Roman buildings that have not been roofed with vaults and arches."

We also find that in the construction of roofs in the Norman and Gothic periods, the tie beam is wholly lacking. In lieu of these we find the necessity of using immense buttresses to withstand the immense outward pressure of the roofs upon the walls. Owing to the manner in which buildings are now erected, the tie beam is one of the principal factors in a well constructed roof.

The exact period in this world's history when the use of timber for framing roofs became general, is not exactly known. The first authentic accounts place it about the year 1325. From this period we find the roof taking more prominence in the architecture of buildings.

We do not pretend in these articles to give a full and accurate description of the history of the architecture of roofs. We only show how the gradual development of the principles of their construction may have been formed, and the remarks made are only incidental to a discussion of the principles of the scientific framing of roofs.

WE are sole agents on the Pacific Coast for the works published by the Industrial Publication Co. of New York. We also keep a full supply of works issued by W. T. Comstock.

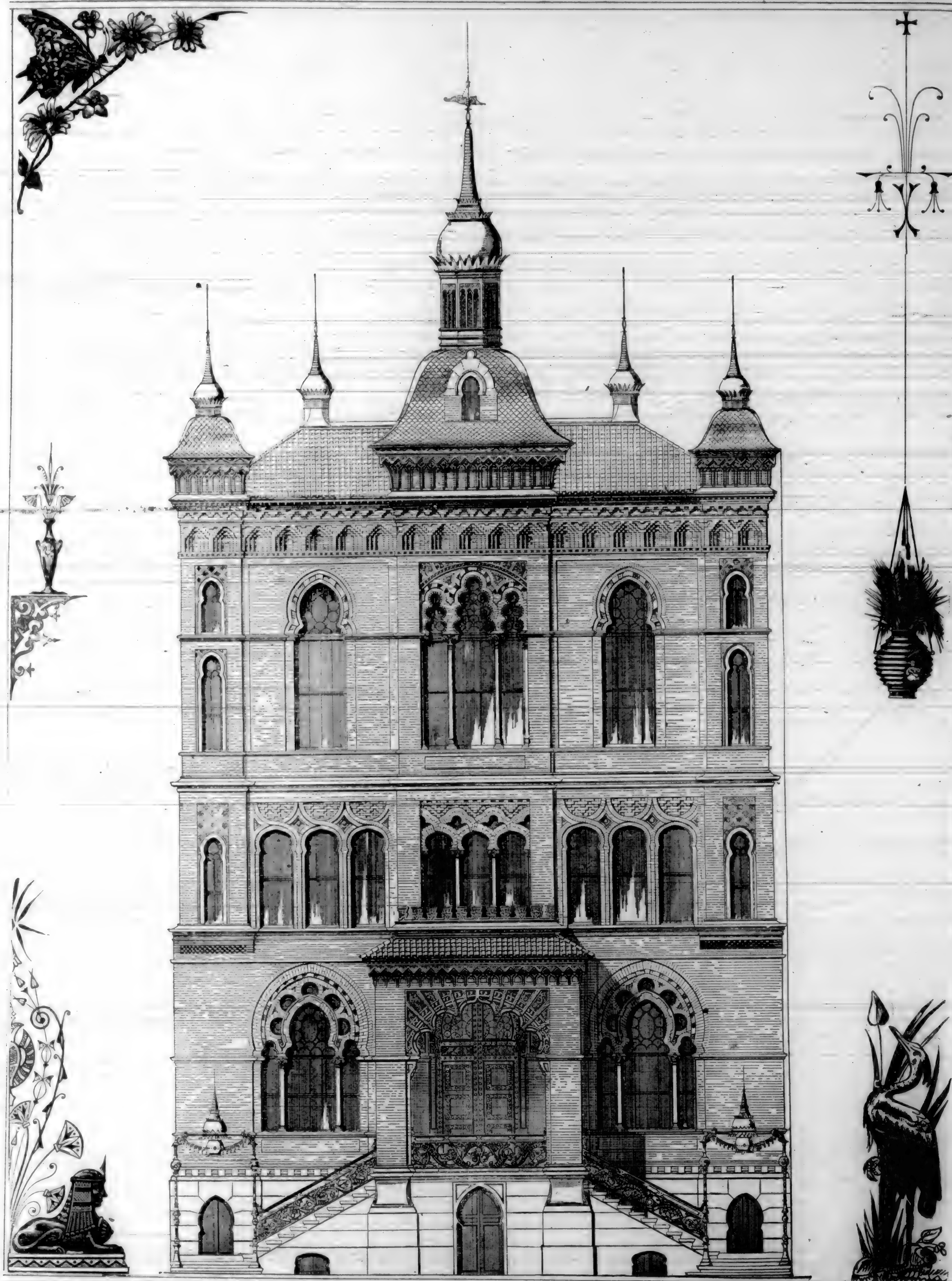


PLATE 1.—FRONT ELEVATION OF THE BUILDING FOR THE PROGRESS CLUB OF NEW YORK. Guastavino & Gruvé, Architects.

New York Street Architecture.*

THE MORESQUE.

NEW YORK streets have never recommended themselves for their architectural beauty, and it is comparatively recent that any material advances have been made in the construction and reconstruction of city fronts. The fault has been, I think, with all American cities, that buildings have been put up running about the same size and general appearance throughout an entire block, and each succeeding street a counterpart of its predecessor, the cornice extending along the same sky line, and the brick or brownstone showing no ornament other than the prescribed number of iron sills and keystones, properly painted and sanded. It is true, to some extent, that the cities of Europe construct their buildings with very much this sameness of effect, but it must be allowed that the monotony of the Parisian residence is entirely different to that of the New York dwelling, inasmuch as the French exterior is broken with frequent balconies, with misplaced windows, with a pretentious *porte cochère*, with a profusion of decoration in the stonework, all tending to divert the attention from the point that they are so frequently repeated, and weariness to mind and eye is avoided by the repetition of agreeable details.

The disposition appears to have been aroused now, however, to beautify exteriors, and some of the efforts in this city are noticeable; the universal revival of the Moresque forms in decorating and furnishing has finally affected architecture and that style at present prevails more generally, I think, than any one other. Many of the façades have been constructed of iron, though iron is but little in favor with us. It has its advantages, of course; it may be moulded into a great variety of forms and shapes, restricted only in the feeling that those figures are not to be so clean cut, sharp, decisive in outline, as would be demanded of the same pattern in stone; it is admirable for those large, indefinite-appearing patterns where the details are not expected to be studied, and a little clumsiness is looked for in the figures; yet it is capable of beautiful effects. Nothing is finer than the sweep of a delicate, airy arch, apparently so fragile and weak, whilst capable of bearing the most substantial sort of a roof or supporting thousands of glass sashes. All these merits and most desirable qualities are recognized by our architects, though, notwithstanding them, they have emphatically and unmistakably discouraged the further or increased employment of iron, and its pretensions as a constructive element are ruthlessly and eternally doomed. To many its purposes seem to be so entirely distinct from architectural ends, that they are persuaded against its use as an architectural adjunct. Certainly in its natural condition as a metal, it would never be exposed in the façade of a building; it is, therefore, painted, and grained, and sanded, until it looks like absolutely nothing upon the face of the earth that is supplied by nature.

* This article and the illustrations were prepared expressly for this journal by A. Curtis Bond.

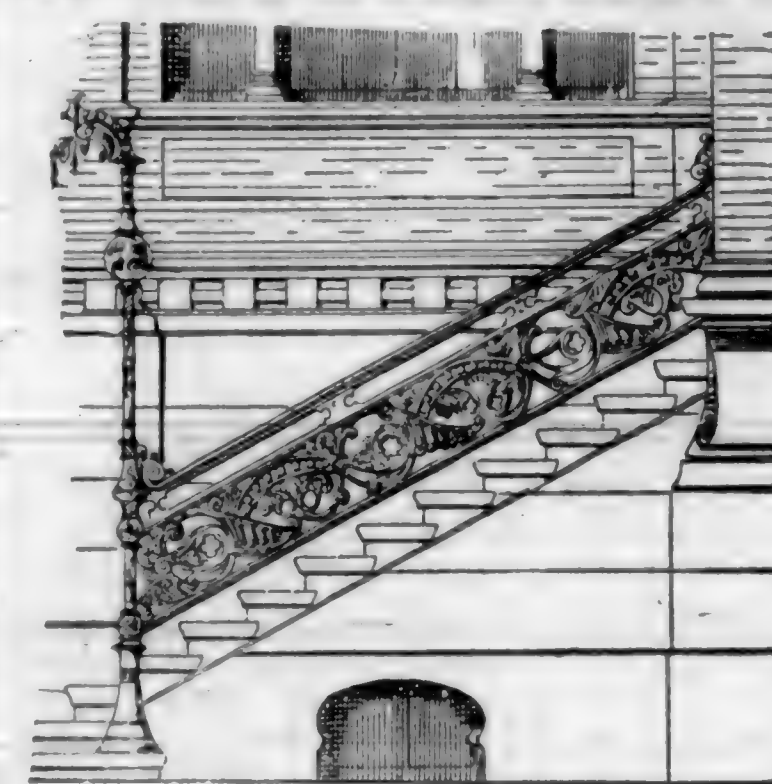
One great merit of iron is its entire freedom from the restrictions of style or form. Stone and brick have been used in every conceivable manner; if one seeks a renaissance home, and intends building of stone, the model for that stone renaissance dwelling is forthcoming at once; if a Moresque residence is desired in brick, the most elaborate example of brick Moorish construction is at hand. But the wildest architect of the crazy epochs of the renaissance never thought of iron; the suspicion of using any metal, excepting for decorative purposes, never occurred to the designers of the Alhambra. Thus our young architects have now an entirely new material, from which they can make entirely new styles; they run no risk of inconsistency or anachronism; so far as precedent goes, or is concerned, a twelfth century gargoyle would set admirably upon the volute of a Corinthian capital, or the corner of a Tuscan roof—provided it be of iron. Nevertheless it is not popular, and while we have a number of buildings with iron fronts, I doubt very seriously whether they will ever attain popularity or even general approval.

In the Moorish style much scope is given to the use of iron, and the majority of buildings of this order put up of late, are made from this material. Some of those upon Broadway are certainly rich in their effect, and altogether more gorgeous than they could possibly have been made had their construction been of brick or stone. One large Moresque structure is particularly noticeable, having its front divided into the three sections of an inside wall space, dado, center and frieze; the line of the bottom of the second story windows marks the termination of the dado, the center space or wall proper extends to the fourth story where the frieze commences. The colors are of an elaborate and showy character, but well arranged; the lower portion is darker than that above; the wall space shows a flat color with a light frieze.

It is a question whether these buildings can be said to reflect the Moorish design; the principles of the order are not followed out, and the coloring, as now done, is at variance with good taste; such buildings are rather the combination of a variety of styles, a feature that is very often indulged in when one wishes to revive an ancient form and feels it should have some of the modern improvements incorporated with it. This disposition is sometimes an unfortunate one, inasmuch as it is seldom qualified, or rather allowed, to develop an improvement, but more often detracts from the appearance, and by combining differences, frequently serves to depreciate their beauties. There is no objection that should stand in the way of our artists or draughtsmen making use of all the features that have been utilized heretofore; but by all means let those features be the best attainable, and if it is desirable to enter a Romanesque building through a Grecian portal, let it be done in fact and in spirit, and have that portal purely Greek, not a mongrel admixture of nothing in particular.

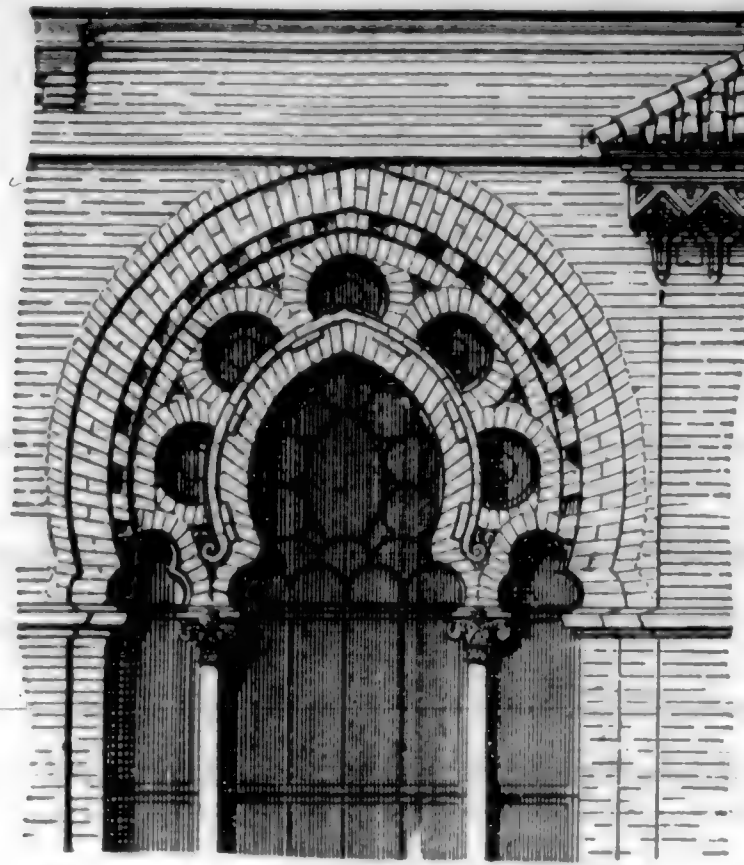
The best example of recent Moorish construction shown in New York, I make the subject of my illustration, giving the entire front, and small detail reproductions of windows and balustrade. It is Moorish in every line and every detail; the architect has followed his model to the letter, and avoided everything in the shape of modern innovations, from the balls upon the minarets, which are just of that rotundity peculiar to this order, and slightly smaller than the swell which distinguishes Jewish architecture, to the pattern of the bronze railing upon the stoop, all things are moresque. There is but one divergence from the antique, and that is the use of iron roofing and terra cotta trimmings. This fault, however, is so slight that we might overlook it.

The illustration, plate one, page 88, shows the façade of the Progress Club building, now in course of construction on 59th Street; the architects are Mr. Rafael Guastavino, a Spaniard, who has made New York his home, and Mr. F. Gruvé, who have had the good fortune to design several interesting and characteristic buildings. Plans for the Progress Club were submitted in an advertised competition, and was participated in by some of the very best of our local architects. The building is entirely of brick, fifty feet front, one hundred and two feet deep, eighty-eight feet to the top of the center tower, and will cost, when completed, \$90,000. The curiously designed rail to the stoop is of bronze in its



STAIR BANNISTER IN BRONZE.

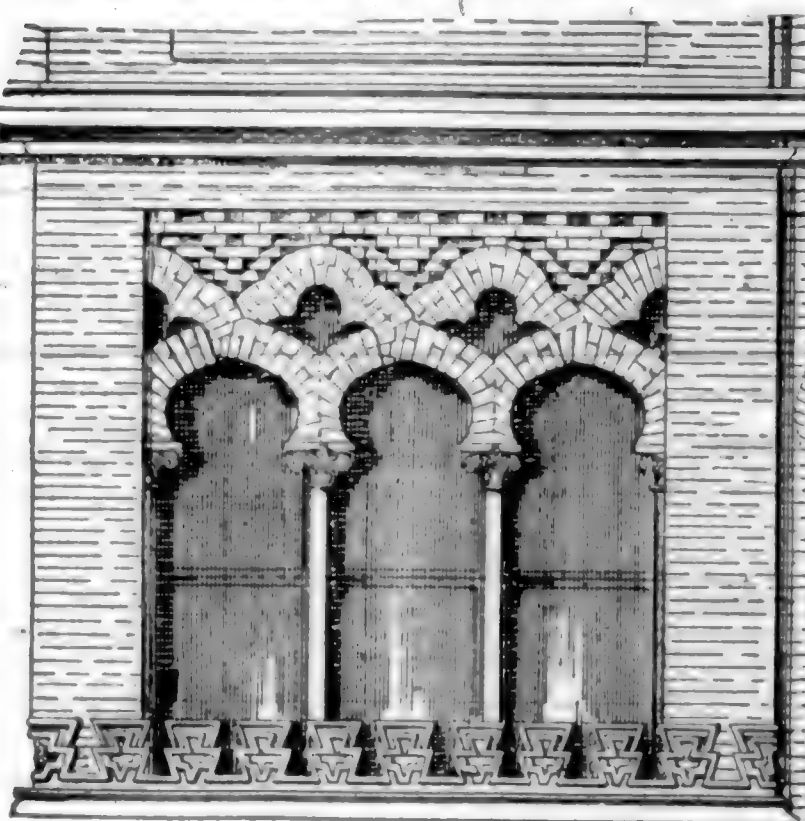
natural color, with a profusion of detail that may be more clearly traced in the individual illustration given of it. The entrance door is heavy oak, studded with bronze nails, and having a fanlight of colored glass; above the balcony-like vestibule at the entrance is a projecting cornice formed of tiles or clay pipes. The intertwining band over the windows, it will be noticed, is arranged so as to run around, over and under itself, in a true Moorish fashion. The roof and the spires are covered with iron shingles and tiles, painted being in imitation of cotta, the appearance the same, with the advantages that iron is much cheaper and of course more durable, if the difference in this latter quality was thought worthy of consideration. The balls are to be gilded, and the leaf-like ornaments about their base and crown to be bronzed.



WINDOW OF LADIES' RECEPTION ROOM.

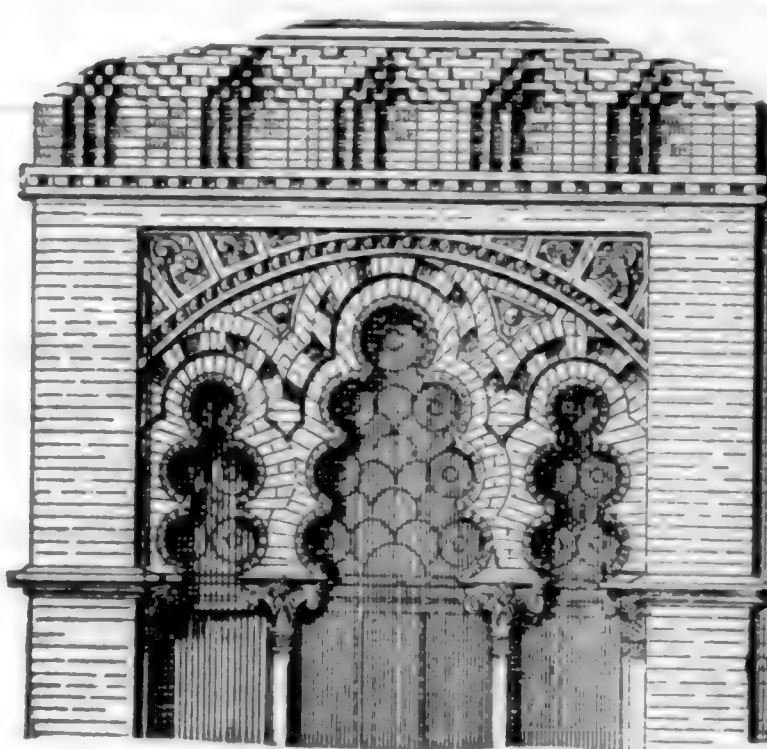
All the decorative work over the various windows is done in glazed bricks.

The contours of the arch as a principal outline is peculiarly distinctive of the true Moorish, though in one of its phases it is more or less familiar to us in the Gothic; the combi-



CENTRAL WINDOW OF BILLIARD ROOM.

nation of square and arch is another characteristic that is calculated to add the semblance of weight to a construction otherwise fragile in its appearance. The horse-shoe arch was popular with the Moorish architects in Spain, and it may be seen



CENTRAL WINDOW OF CONCERT ROOM.

in the great majority of their buildings. This arch was later broken into an infinity of smaller curves or horse-shoes, and made to intersect the sides or spring from the center of

other smaller arches, and thus was shown a succession of scollings such as may be noted in the upper central window of our building.

While I admire the Moorish designs, and delight in its appeal to my imagination, I am tempted to ask whether it is adapted to our customs and this locality; it is emphatically the style of romance and of pleasure; it enlivens the mind and inspires the thoughts; it is picturesque and striking; its interior especially encourages the dreamer and the imaginative; and how at variance is this with our dull, prosaic wintry East, where we are having snow-storms in May, have always had rectangular blocks of cheerless dwellings, all of them monotonously alike, streets solidly paved with stones that even John Ruskin would despair to make esthetic or artistic, and our amusements, entirely of an artificial character, graduating from an Academy of Music down to a beer saloon; Central Park, hedged about with "regulations that keep visitors upon the stone-paved walks and forbid any incursion upon the grass; no zoological garden, no Louvre, no art gallery, where one may instruct as well as amuse oneself; nothing, in fact, that will offer an hour's enjoyment without the imaginative-destroying element of an entrance fee, and the pleasure-killing surveillance of one of our interesting Puritanical laws. In this community, with such accompaniments, an architecture or a sentiment that breathes of the poetry or the romance of life, seems very much out of place.

S. F. Chapter. American Institute of Architects.

THE regular monthly meeting of this Chapter was held on Friday evening, June 1, John Wright presiding. Reports on the classes established by this Chapter were received as follows:—

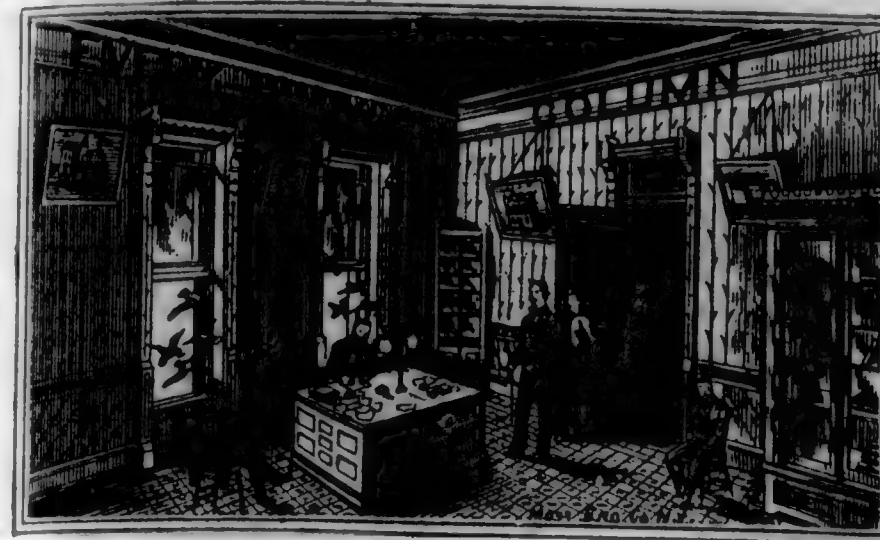
F. Marion Wells reported that his pupils were doing finely. Each one was possessed of an ambition to excel and stand at the head of the class. This was proven by the fact that the pupils were always on time to commence their work at the appointed hour and endeavored to carry out the instruction given them to fully meet the views of their teacher. Strict discipline was maintained; one of the pupils had shown neglect to his duties and was promptly dismissed. G. H. Sanders reported the progress of his class was better and better. After consultation with the members of his class, it had been decided, next season to institute classes in *Practical* instruction in carpenter yplumbing, etc. It was the aim to make the students thoroughly conversant with the *practical* work of every branch of the profession. Mr. Pissis' class was also improving. It was decided that owing to the regular time of the meeting of this Chapter next month, coming so near the 4th of July, that the meeting be postponed until the regular night in August, thus giving the members a chance to go in the country if so disposed.

A New Fashion that is also an Improvement.

ALTHOUGH it is sometimes difficult to draw the line sharply between a modern improvement and a modern fashion and to distinguish readily one from the other, there is still a great difference between the two; a distinction and a difference which a true philosophy would doubtless enable us to discover at all times. Unfortunately we cannot always stop to philosophize hence the mortification and defeat that are sure to follow when we find our dearly bought "improvements" turning into the ashes of a by-gone fashion. As a rule we must learn by an experience both painful and expensive, whether our condition is really improved by the new styles that are constantly intruding themselves in the countless details of building and furnishing our houses.

Certainly one of the most pleasant and attractive of the later fashions is that of arranging the plan of a house so that the entrance "hall" shall be something more than a long narrow passage into which the stairs obtrusively crowd and which contains of movable furniture at most one or two straight backed chairs and a "hat tree," a passage which is never dreamed of as valuable for any other purpose than a means of access to the inhabitable regions beyond. This fashion is something more than a fashion, it is a genuine improvement. Even so slight a change as to increase the width of the narrow way, making a little reception hall no more than a dozen feet square, is a great gain since the space so taken is just as valuable for entrance purposes and is also available for social use, either by itself or in connection with some adjoining apartment. The hall of our sketch is not merely a reception room, but with its fire-place, its broad light at either end, its raised gallery for music in case of a dance or a private musical entertainment—the gallery being a part of the staircase that climbs by easy stages to the second floor—with the wide entrance to the dining-room at the left, and to the parlor and library on the right. With all these conspicuous and comfortable features, it is the very center and heart of the home. The sense of cordial hospitality and welcome which one experiences on entering such a hall as this can never be imparted by one of the straight-and-narrow, formal and impossible-to-be-pleasantly-furnished halls that belong to the old-fashioned houses. —*The Builder.*

HEAVY damages have been awarded by a Chicago jury to a tenant against a landlord for misrepresenting the condition of the plumbing and sewerage of a residence. The tenant took it intending to keep a boarding-house, on representations that it was all right, but after moving in the furniture, found the sewerage in bad condition, and the hot and cold water faucets without pipes to supply them with water. The house was not fit to live in; the tenant removed his furniture and brought suit against the landlord for expenses incurred and other damages, and recovered \$3,500.



Architects, Contractors, Carpenters, and Mechanics generally are respectfully requested to furnish us items of interest for this column. We will gladly answer any and all questions pertaining to the architectural and building interests. If illustrations are necessary to explain your ideas, send us a sketch of them and we will make the cuts.

AFTER the dust has been thoroughly beaten out of carpets, and they are tacked down again, they can be brightened very much by scattering corn meal mixed with coarse salt over them, and then sweeping it all off. Mix the salt and meal in equal proportions.

WHEN you have the wood-work in a room painted, it is a good plan to have about two inches of the floor painted also; have the paint the same color as that of the base board; then if, when changing carpets, the carpet will not come close to the wall, the little space left will not be so unsightly.

AN improved automatic guard for protecting the hatchway of elevators has been patented by Messrs. Joseph Byers of Newtonville, and George Taylor, of Everett, Mass. This guard is pivoted to a post, and it is raised or lowered automatically by the movement of the platform when lowered. The free end of the rod rests in a receiving jaw or loop, one part of which is free is actuated by a spring while the other part is fixed. Both parts are provided with elastic cushions which receive and prevent the guard from rebounding.

New Publications Received.

Cottage Homes.

A NEW work, W. T. Comstock, publisher, has made its appearance. It consists of 44 large quarto plates in the styles of architecture now prevalent in the Eastern States. There are many illustrations of low-priced cottages, and this fact should cause a good sale among the interior towns. Most of the designs given are for country cottages, varying in cost from \$800 to \$5000. We have received a large number of this new work, and will forward them to any address upon receipt of the publisher's price, \$5.00.

Street, Store, and Bank Fronts.

This book contains 34 designs for street fronts for dwellings, stores, and banks. Details are also given. All the designs, etc., are drawn to scale. Price, \$4.00.

Stables, Outbuildings, and Fences.

24 plates, wooden and brick buildings, with details, showing sixteen plates, elevations and views of stables, outbuildings, and fences, and over one hundred miscellaneous details. Price, \$4.00.

Cottage and Villa Architecture.

This large work contains plans, elevations, views, sections, and details of low priced, medium and first-class cottages, villas, farm houses, and county seats, with specifications. All drawings to scale. Will be sent to any address upon receipt of \$8.00.

Artistic Homes.

44 full-page illustrations, by A. W. Fuller, Price \$4.00.

Modern House Painting.

By Rossiter & Wright. This is a very useful work as it exemplifies the Eastern ideas as to how a house should look after being finished. 20 large colored lithographic plates. Price, \$5.00.

Mechanics' Institute Exhibition—1883.

THE preliminary announcement is made by the managers of the Institute that the "Eighteenth Industrial Exhibition" will be opened on the 11th of September next, to close October 13th. The exceptionally promising condition of things in general, in this city and throughout the State, are in themselves sufficient to justify the course adopted by the management of the Institute. The grain fields of California never promised a grander return from the seed sown than that which this year cheers and gladdens the hearts and brightens the hopes and prospects of those who plough and sow that they may reap, while those who buy and sell or grind the golden grain, are made happy in anticipation of the splendid results which are assured by the harvest of 1883. Nor is this happy feature the only hope and boast of our favored State and coast, for the yield from millions of trees and vines was never better, nor ever did the golden rays of prosperity shine more brightly and universally than at the present time. None need be sad, nor any feel that their lot is hard, except those who fail to comprehend and grasp the splendid possibilities within the reach of all who strive to profit by the abundant advantages this year so profusely distributed everywhere. And if the management were all pious and devout men, they would scarcely perform their duties well, did they not add another feature to their programme, and suggest, if not ordain some method by which, amid the general rejoicing, themselves and their patrons might be led to acknowledge the goodness of that hand which has so bountifully poured its blessings upon us as a people. Ingratitude becomes not those who receive good things, and if forgetfulness of heaven's bounties by all classes be returned for the beneficence bestowed, need it be wondered at should future years bring us dry and parched lands, and stunted and desolating harvests?

In addition to all this, thousands of worthy and honorable men from abroad are expected to visit our city as Knights Templars, and it is well that nothing should be left undone to enlist their good opinion of us as a people, and make it possible that they return to their homes with kindly remembrance of the good times enjoyed by them in San Francisco, and with the fixed conviction that San Francisco as a city, and California as a State, are entitled to a high rank among the cities and States of our glorious Union.

As encouragements to exhibitors, gold, silver and bronze medals, diplomas, etc., will be awarded. Power will be provided for driving machinery, and all usual facilities afforded to give motion to the numerous inventions, and demonstrate the practical working of devices requiring motive power.

Natural products—cereals, fruits, vegetables, etc., will be allotted their proper share, and for the first time in several years, a Mineralogical Department will be instituted, showing samples of the most important ores and minerals found on the Pacific Coast. The

Art Gallery, Horticultural Department, and all others that will add interest to the exhibition, will be provided for, and the management will aim to make the exhibition of 1883 equal, and as far as possible, superior to those of all preceding years.

Improved Process of Making White Lead.

IN the United States the manufacture of white lead is conducted according to the Dutch method. Plates or gratings of lead are exposed to the fumes of vinegar, in vessels set in tan, or stable manure, which acts as a hot-bed to warm and volatilize the vinegar. As the lead is corroded, it becomes covered with the carbonate, which is removed with hammers and ground. The process is tedious, slovenly and unhealthy, and many attempts have been made to improve it, but none of them have yielded a product equal to that which results from corrosion. Microscopically examined, the carbonate of lead formed upon the metal, is found to consist chiefly of minute crystals which are hydrated, laminated and transparent. These are mingled with a smaller quantity of exfoliated particles of the carbonate, which are opaque. These particles, it is claimed, impart to the white lead its remarkable power of resinifying oils, as well as what the trade calls its body, i. e., its property of completely covering objects painted with it. By the new process workmen are not required to detach by hand the carbonate from metal which remains uncorroded, and the product is said to consist almost exclusively of the valuable opaque particles. To effect this, the lead is first brought to the porous or spongy form, by which the surface, exposed to the slow carbonating process, is enormously enlarged, the thin mass being seemingly composed of open inter-laced fibres. This is put in a close chamber, and there exposed to a mixture of atmospheric air, carbonic acid, and the vapor of acetic acid. The carbonic acid, generated by combustion, is cooled and purified before it is driven into the chamber. The air passes in warm, and care is required to maintain the proper degree of moisture. The carbonate is the shape of the metal upon which it is formed, and the material is not removed until the corrosion is complete.—*Mining and Scientific Press.*

THE bee has long been a type of the industrious worker, but there are few people who know how much labor the sweet hoard of the hive represents. Each head of clover contains about sixty distinct flower tubes, each of which contains a portion of sugar not exceeding the five-hundredth part of a grain. Some patient apiarian enthusiast, who has watched their movements, concludes that the proboscis of the bee must, therefore, be inserted into 500 clover tubes before one grain of sugar can be obtained. There are 7,000 grains in a pound, and as honey contains three-fourths of its weight of dry sugar, each pound of honey represents 2,500,000 clover tubes sucked by bees.

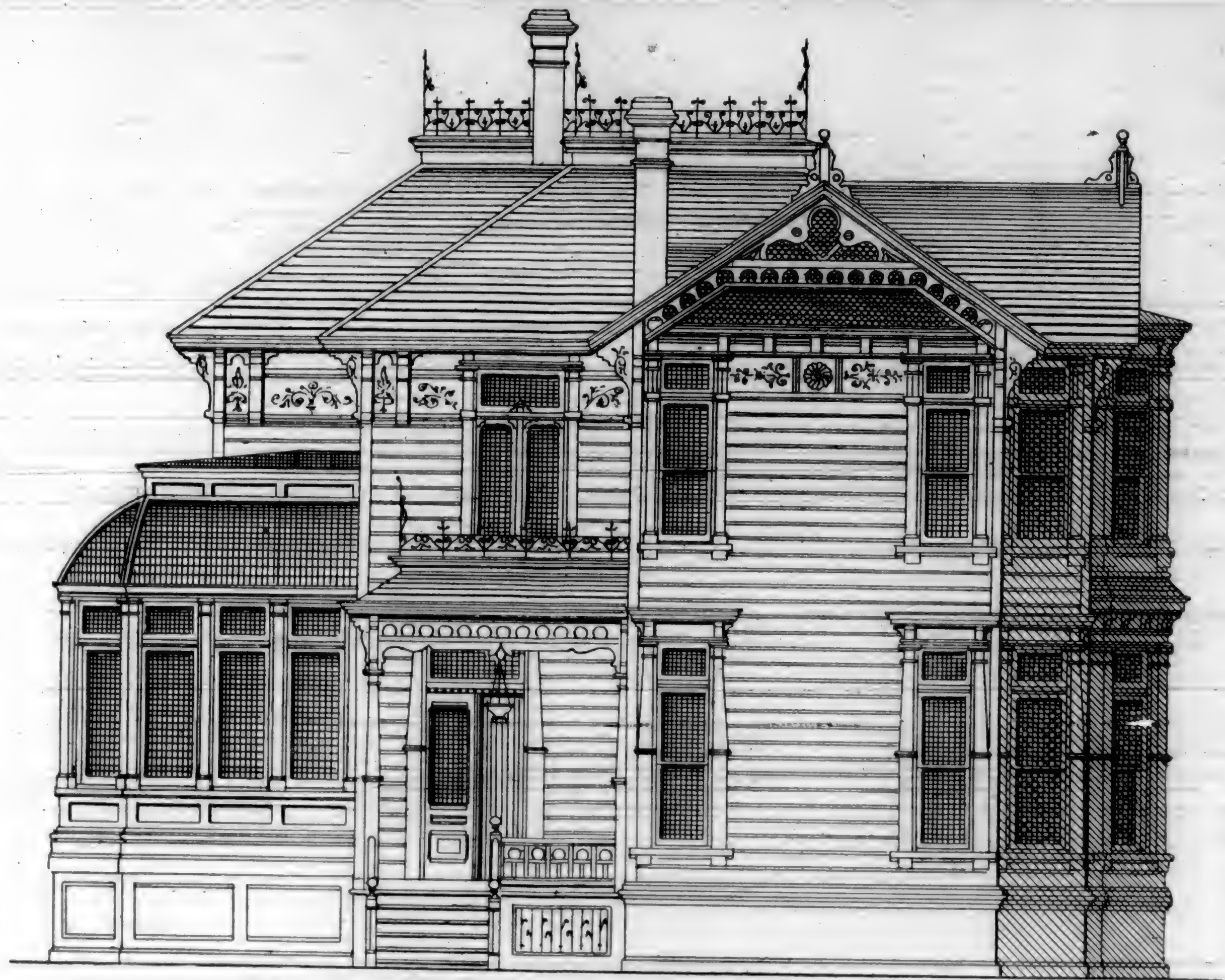


PLATE 2—FRONT ELEVATION OF A SUBURBAN DWELLING.

Will be Back in a Few Minutes.

MECHANICS should remember that "time is money." We have been very forcibly reminded of this old maxim many times since the beginning of the year. Our business relations with contractors, tradesmen, etc., are such that we have been compelled to call or send to them in regard to many things, owing to the great activity now prevailing in building circles.

The sign at the heading of this article has met our vision many times, and we earnestly request all those who of necessity have to be running in and out in order to attend to their business, to change the character of the words so as to read, "9:30. will be back in—minutes," filling the blank with the number they honestly think they will be away. A person calling will then readily understand about the time to expect to meet one at his business. Or the sign may read, "Will be back at—o'clock," filling the blank with the hour. This may seem a trivial subject to some, but to any one whose time is valuable, it is very important to know just when to meet one with whom you may have business relations.

A short time ago we wanted a carpenter to attend to some work. Our boy was sent to his

shop, and in half an hour came back with the information that on the slate was, "Back in five minutes." He waited three times that length of time and then returned to the office for instructions, having first written on the slate, "Call at—office." Two hours rolled away and still no carpenter. Being in a hurry we obtained a man at another shop, and after agreeing upon terms, we were startled by the first man sent for rushing breathless into the office. He was, however, too late, and upon conversation with him, we found that he had lost another job the same week by his sign disappointing those who would willingly have waited a day to secure his services, but felt aggrieved at calling twice for nothing, with a sign staring them in the face. "Back in five minutes." Let all remember that although your own time may belong to yourself, you have no right to cause any one to lose his time, misleading him by a wrongfully written sign. Have the time definitely stated when you will return, and use your best endeavors to be punctual at the time of your own choosing.

The article on "The Care of Fixtures" (p. 102) should have been credited to the *American Engineer*.

Floors Weakened by Gas Pipes.

A SHORT article in the *Building and Engineering Times*, on the subject of weakened floors, deals very intelligently with the harm that may be done in this direction by careless gas fitters. It is common enough, in cases where a pipe has to be led under flooring and across joists to serve a pendant, for the pipe to be taken straight across the center of the room, and the joists notched about an inch deep all the way. Workmen who do this never reflect on the harm they are doing to the floor, nor do they know that a notch cut out of the top of a joist will seriously weaken it. This at once becomes evident when it is known that the strength of a joist, which is a rectangular beam, is proportional to the depth squared. If, therefore, a groove 1 inch deep is cut across a 7 inch deal, the reduction of strength is not only one-seventh, but a great deal more, in the proportion of 36 to 49, or a loss of rather more than one-quarter of the original strength of the beam. This somewhat startling result is due to the self-evident fact that the upper part of the joist is required to be solid, in order to resist compression, just as much as the lower portion must be capable of bearing tension; and to cut a notch in the

top of it is equivalent to removing the substance along the whole length of the joist to the full depth of the groove. This observation only applies to cases where the notch is cut out of the center of the span, which is the commoner practice. There is much less objection to cutting joists close to the end, and thus allowing the pipe to be laid round the room to a point where it can be run to the center between two joists. Or, if this course cannot be followed, the pipe may be safely passed through a hole bored in the middle of the joists. If this is not feasible, the indispensable notch may be cut right down to the middle of the joist, and the pipe thus laid across the neutral line; the space above being afterward filled with a tight wedge which will safely transmit the compressive stress.

Improvement in Bricklaying.

THE recent suggestion of a correspondent, that instruction should be given at our technical schools in the art of bricklaying is worthy of careful attention. The whole number of brick laid year by year in our large cities is simply enormous, and they go into every class of structure, from the piers of a 9x12 cottage to the walls of a warehouse or factory which in itself may consume millions. In none of these works are the builders likely to put any excess of brickwork, but the workmanship displayed in laying very many of these walls is so extremely imperfect that the question may very justly be raised whether it would not pay better to employ better workmen, provided they could be had, even at higher prices, and cause them to lay thoroughly sound, solid work. If this were done, it becomes a question whether the thickness of the walls in some of these works could not be safely reduced, thus affecting a saving even at the higher cost assumed for the labor of laying.

A serious but common defect in the laying of straight work, especially in long party walls between buildings, is the tendency to put the bricks into the interior of the wall almost wholly dry—that is, with practically no mortar either above, below, or around them. The face-work of such walls is apt to be bad enough, too, for the bed of mortar is usually spread with the point of the trowel, so that the face brick rests only on two narrow ridges, one along each edge. In a large part of such work the end joints are laid with a mere dab of mortar, taken up in the wiping off with the trowel of the bed joint, but this is apt to be not one-third enough to fill this end joint really full.

It would seem an easy thing to secure the proper bedding in the mortar of the interior filling of such a wall, and the filling of all the cross joints, but experience shows that this is a very troublesome thing to secure with most bricklayers. So hard is it to secure this that very many of the walls in stores, or even in warehouses that carry heavy weights, are in a very just sense mere dry walls, possessing little more strength than that due to an absolutely dry piling of the brick between the

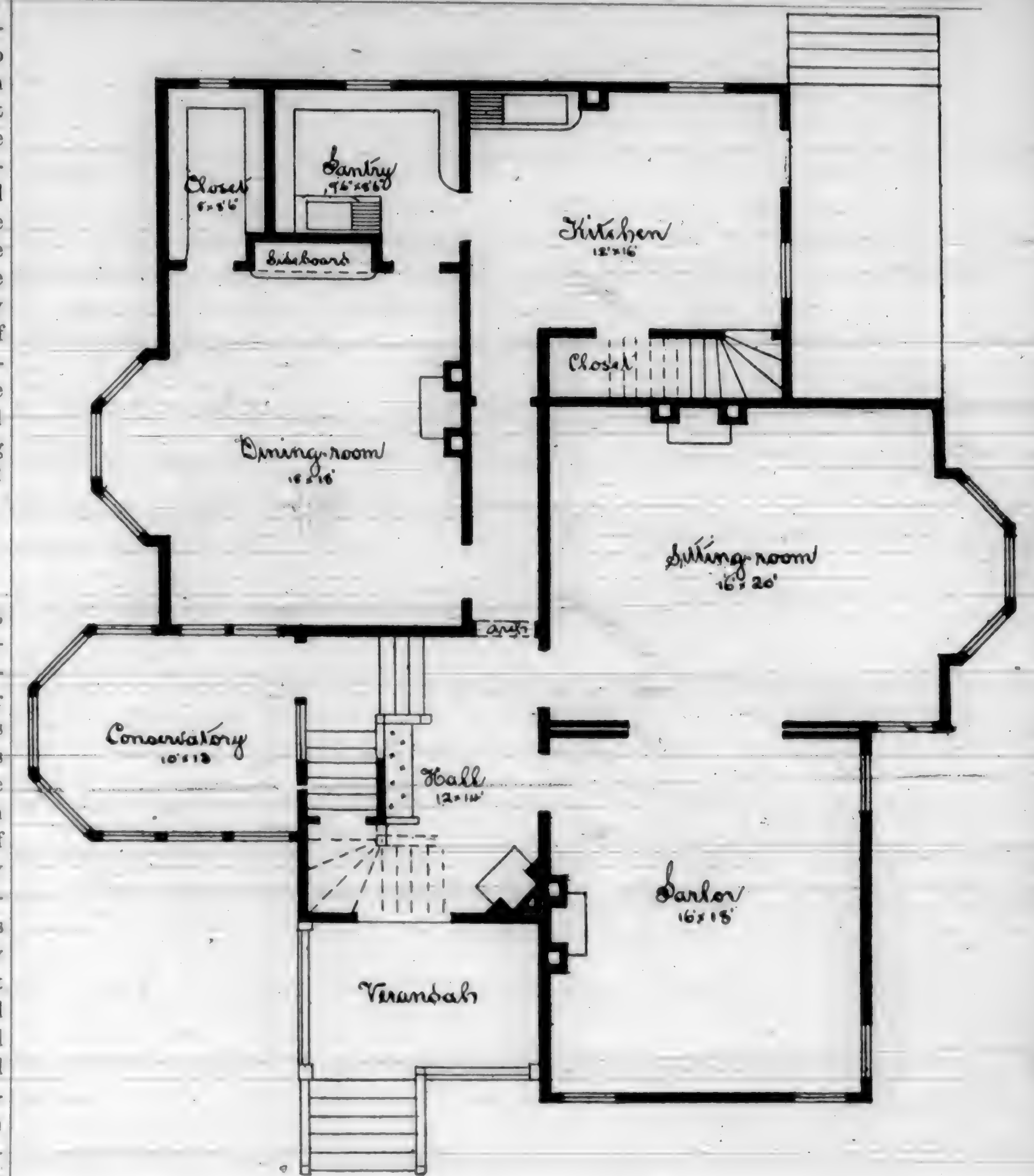


PLATE 3—FIRST FLOOR PLAN OF SUBURBAN DWELLING.

two face-shells which serve to keep the interior of the wall in place.

It is literally true of a host of these walls, which have the appearance of being solid, that they are thoroughly honey-combed with vacant crevices, and the natural consequence follows that the real strength of the wall is thereby reduced. The strength of a wall of this general character depends upon two things among others, one the absolute weight of the wall, and the other the completeness with which each brick is bedded against its neighbor. Unless this last requirement of perfectly solid work is met, the wall must be clearly more likely to yield when any stress comes upon it from any cause.

Of the need of the best workmanship in special kinds of bricklaying, nothing need be said in this connection, for the call for improvement in plain work is clearly enough marked, and will alone require all the attention and help it is likely to receive in the great crowding of instructing duties that press upon our school officers. It may be said that other

things are more needful to be attended to by our young men in schools, and this may be true. At the same time it is true, so far as practice or shop work is concerned, that subjects may justly claim attention which bear most directly upon work which is most largely in request, either in quantities done or in number of places where, if done ill, it needs amendment or correction. If 10 schools should join in sending out next year an average of 10 graduates each trained in bricklaying, even in the limited way proposed, there would be 100 centers of useful influence at once established for securing better work in this respect.—*Mechanics*.

A CROSS-CUT saw invented by an Ohio man has cutting and cleaving teeth of different altitudes, and is provided with longitudinal lines, or indentations, which are parallel with the points of the teeth, and are separated from each other by a space equal to the difference in the altitudes of the cutting and cleaving teeth.

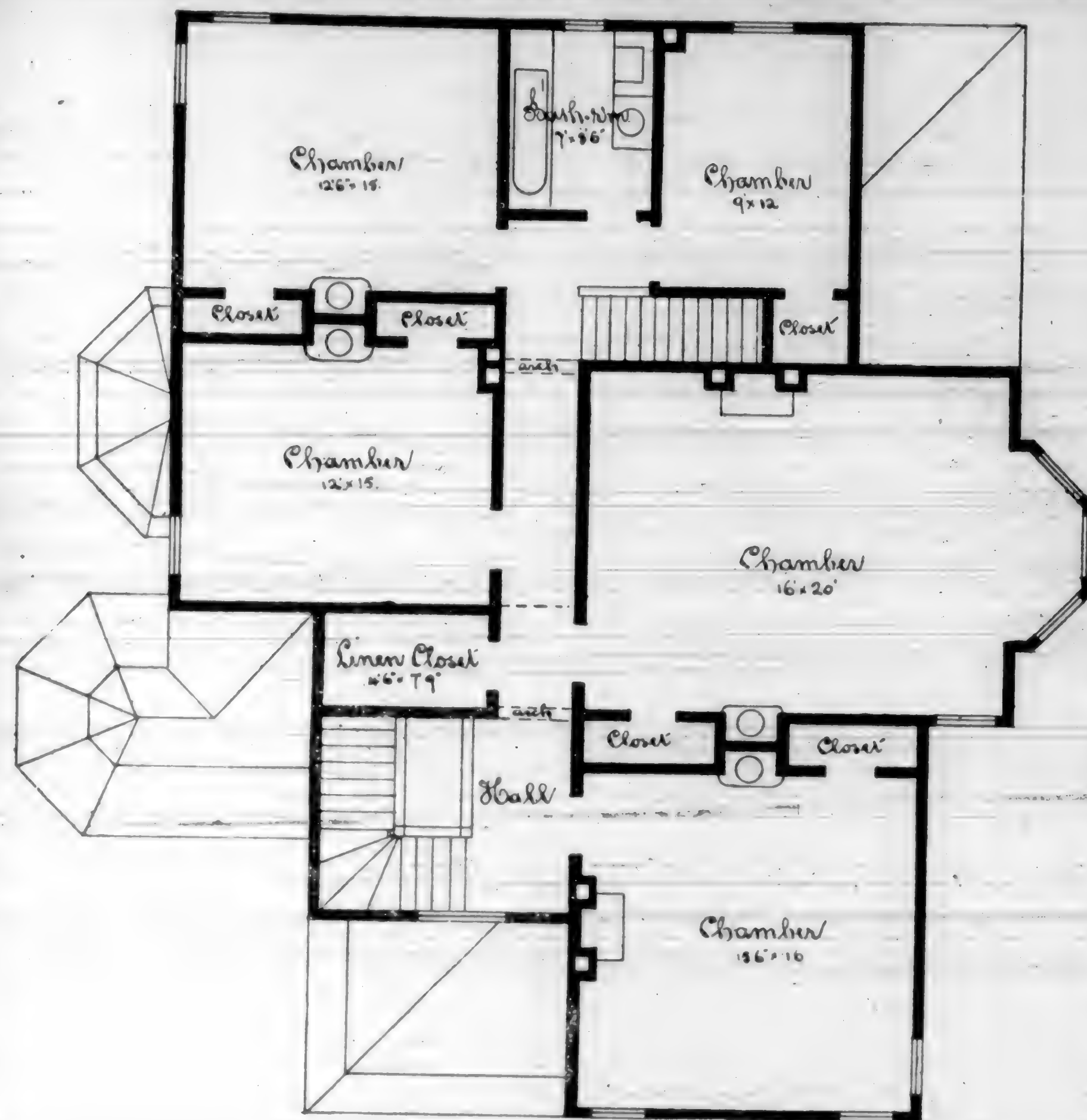


PLATE 4—SECOND FLOOR PLAN OF SUBURBAN DWELLING.

Our Illustrations.

PLATE 1, and the small detail cuts in connection therewith, were prepared expressly for this journal by A. Curtis Bond, from designs of the architects, Messrs. Guastavino & Gruvé. The article was also written by him, and we are pleased to inform our readers that hereafter he will be a regular correspondent, presenting to our readers the latest forms of architecture adopted in the East.

Plates 2, 3, and 4 are the elevation and plans of a neat suburban residence. The plans shown are very explicit and need no description. It can be built for any amount over \$5,500, depending altogether upon the styles of finishes used.

Plate 5 is taken from an old work printed 125 years ago. We do not remember to have ever seen the illustration given in any other work than the one from which we have taken it. We have endeavored to give the latest information in regard to the lessons taught by these grand piles of masonry.

Plates 6 to 10 are views and plans of a cheap country cottage. Its cost can be varied from \$2,500 to \$3,500.

The Decay of Building Stones.

THE practical scientific study of building stones, their comparative merits and their durability when subjected to peculiar local or atmospheric influences, has yet to be made. The failure of some stones to resist fire, discolorations, and the disintegrating effects of the emanations from manufacturing centers, has resulted in their decreased use and the substitution of brick. On the 30th ult., Dr. A. A. Julian, of Columbia College, read the second part of a paper on the "Decay of Building Stones," before the New York Academy of Science. His remarks were based on observations made in this city and adjacent places.

The principle that stones are more lasting when laid on bed is clearly demonstrated in the case of all the building stones. After a structure has been erected a few years, there is no difficulty in dividing the stones laid on bed from those laid on edge, as the laminations in the latter become distinctly marked; and in some kinds this can be discovered immediately after completion, as the more porous layers dry first, thereby giving the stone a striped appearance.

In brownstone a deep decomposition was noted even when laid on bed; when exposed to the heat of the sun, the change is more rapid. The attack of the destroying agents is favored by imperfect jointing, which opens a back entrance. The discoloration in Nova Scotia sandstone might be prevented if the surfaces were vertical and placed out of reach of dripping. It is too soft for lower portions of buildings, and receives and retains the street dust. Ohio sandstone resists our climate well, and when used in Western cities is discolored but not disintegrated. There are but few limestones in the city, and the decay of Westminster Abbey, London, should warn us of the danger of using fine grained limestone until we are satisfied of its durability in this climate. The decay of marble is first shown by its becoming pitted; those set on edge show the more rapid decay. Granite shows pitting, the hornblende being first attacked. The south and west side of the Tombs show decay, while the other sides are intact. The sides affected are exposed to the sun's rays.

Dr. Julien came to the following conclusions in regard to the life of stones, defining life as the period during which the stone presented a decent appearance. Coarse brownstone, best used out of the sun, from five to fifteen years. Laminated fine brownstone, from twenty-five to fifty years. Compact fine brownstone, from one to two centuries. Nova Scotia stone will probably last from fifty to one hundred years. Ohio sandstone, the best of the sandstones, one hundred years. Caen stone, from thirty-five to forty years. Coarse dolomite marble, forty years; fine marble, sixty years; pure calcareous marble, from fifty to one hundred years. Granite from seventy-five to two hundred years, according to variety.

Bluestone is as yet untried, but will prove a good building material. Some of the best building stones in this country have not yet been brought to this city.

Some of the causes that produce decay in stones are, first, solutions and hydrations of the stone and the heat of the sun.—*Scientific American.*

Chinese Customs.

THE Chinamen seem to be our antipodes in customs as well as geographically. In matters of dress they finish where the rest of mankind begin. His waistcoat is outside his coat, and his drawers outside his pants. We blacken our shoes; he whitens them. Our ladies compress the waist, theirs the feet. Our women wear long dresses, theirs long sleeves. In China the men carry the fans, and the women wear the trousers. In eatings, their customs are in striking contrast with ours. We have a soup as a first course and dessert at last; they have dessert at first and soup at last. They ignore knife and fork and spoon, and eat with two "chopsticks," both held in the right hand. They abominate beef, milk, butter, and cheese; but eat puppies, cats, rats, birds' nests, sharks' fins and snails.

With us the right hand is the place of

honor; with them it is the left hand. In dating letters we place the year last; they write the year first. Instead of saying "northeast" or "southwest," they say "east-north" and "west-south." They always speak of the mariner's compass (their own invention) as pointing to the south. Here, a mother shows her affection for her child by kissing it; a Chinese mother smells of it. We locate the intellect in the brain; they in the stomach. We pay our physicians when we are sick; they pay the doctor while they are well, but as soon as they get sick the pay stops. Here, men kill their enemies in revenge; a Chinaman gets "sweet revenge" by killing himself. They mount a horse from the right side, and when they want him to go they say "Whoa!" The men ride sidewise and the women astride. We use lanterns on a dark night, they carry more lanterns at full moon than at any other time. We place a candle in a candlestick; they put the candlestick in the candle. Their detectives sound a "tom-tom" at night to give thieves and rogues notice of their coming. We ride in railroad cars, they in wheelbarrows. We draw canal boats with horses; they with men. We sell wood by measure; they by weight. We vaccinate in the arm; they in the nose. We use a soft pillow, they a block of wood. Our store signs are horizontal; theirs are perpendicular. They launch ships sidewise, ring bells from the outside, and actually turn their screws in the opposite direction from ours.—*Christian Advocate.*

To construct a well-built and convenient house, no material should be spared in places bearing the strain of the structure; do not save material in these places, as it will almost certainly be ruinous to the building in course of time; see that those rooms which are used mostly during the day-time be clustered together as much as possible; that there is not too much hall room; still, enough to insure a pleasing entrance to the house; the stairs should be comfortable and not cramped, all entrances well perfected, and the windows so disposed that they will admit sun and light in ample allowances, and, at the same time, be protected from the storms; that is, are on the opposite side from which the heavy storms are usually to be expected.

A goodly allowance of porches on the pleasant side and at all entrances will add greatly to the comfort of your home. Chimneys should be so placed as to ensure a good draft, no matter in which direction the wind may be. Concerning the exterior, the house should be in harmony with its surroundings; do not make the mistake of placing a low, flat-roofed building in a high country, or a sharp, steep-gabled structure on a flat plain.—*The Builder and Wood-worker.*

WHEN you have determined to build, the first thing to be done is to go to the best architect within your reach and consult him as to the most expeditious method of reaching the result desired. Do this before consulting any

builder or contractor, and you will invariably find it to your advantage. The reason is plain. The architect stands as a disinterested third party between you and your mechanic, he having made a special study of the arrangement and convenience of modern structures, and being constantly employed in designing such, is better versed than any one else you could find. In selecting your plan, give the architect a short synopsis of what you consider best adapted to your wants, and the amount you desire to expend; then let him work the design up and submit it to you for inspection, which will enable you to see and correct all which does not suit you, and your house, when completed, will come up to your expectations.—*The Builder and Wood-worker.*

Consideration For Old Employees.

PHYSICAL vigor and mental activity are necessary in all kinds of employment and all sorts of business. Lacking either, the man is, in some degree, incompetent. The cases are exceptional where profitable employment is fitted to the infirm, whether physically weak or mentally slow. And yet there are cases where employment and occupation should be given to such persons, not alone as a matter of policy—to prevent mental and bodily injury—but as a duty. An employé who has spent the vigor of his best years in the service of an employer deserves something more in his last years than cold neglect. Even the turning out of an old horse to die is a subject for attention by the officers of humane societies.

If an employé is of any value whatever, he ought to earn for his employer something above his stipend; in fact, the labor of employé, combined with the judicious use of capital, should accumulate for the employer a competency, if not actual wealth. The wealth thus gathered represents in part, the excess of the value of the labor performed above the amount that has been paid to the laborers. Although the employé has no legal right to demand more than the agreed sum as wages, or salary, which he receives, the fact remains that the wages, or salary, may not represent the proceeds of his work in full.

This fact may not constitute even a moral claim by the employé for anything beyond his regular compensation, under any circumstances. It may be that the compensation was sufficient to have placed the employé, in his old age of feebleness, in a condition of comparative independence, but he may have neglected to provide for the inevitable rainy day. Employers have no special supererogatory duties towards employé of this class. Nor is it, perhaps, incumbent on them to pension off old employé, as governments sometimes do public servants. The circumstances will alter the cases. It is not to be expected that employing establishments or individuals are to become insurers against the decrepitude of old age and its attendant incompetency. But the dictates of humanity and the demands of business policy may so far go harmoniously together as to prevent the too common specta-

cle of an old, faithful employé deprived not only of a position of profit because of inability, but of occupation adapted to his failing powers. There are few sadder sights than this, and pity for the unfortunate man and detestation for his though less or perhaps avaricious employer is felt by every spectator.

As men grow old in any particular service their business ways and work habits become fixed, and all the surroundings of their secular days' employments become more familiar to them than their home life. It is like casting them adrift without rudder, oars, or chart to turn out old employé under such circumstances. Who has not felt a pity for some superannuated employé thus set adrift, as he has noticed him returning occasionally to his old haunts, and looking about wistfully on scenes of which he once formed a necessary part, but in which he is now only an incubrance and a disturbing element. Too old to start anew in another line, and possessing none of the hopefulness of youth and the ambition of mid-age, he becomes disheartened, melancholy, and perhaps imbecile, until death steps in to his relief.

There is a large manufactory in a New England State that for more than thirty years has been running with pecuniary success, employing young and old, male and female, in its various departments. When business has been dull, and the markets unstable, work has been reduced, and wages shortened, as was necessary to prevent financial disaster. But good employé were kept, if possible, even in the dullest times. There never was a strike, nor a threat of one, in this establishment. Among other humane practices and considerate measures for the comfort and well-being of their employé, this company keeps their hands even when old and unprofitable. There is one old man, now more than eighty, who has worked faithfully, for the best part of his vigorous manhood, for the company. He still works—not, however, full hours—and his employment is of so trifling a character that but for the circumstances it would be ludicrous. But the old man is proud of his employers and that he is still able to work, and is living a happy, contented life, believing that he is independent of charity and that he is still useful, if not necessary, to his employers. This is an example that might properly be followed by others.—*Scientific American.*

Genesis of a New World.

ON a beautiful summer's night, August 22, 1794, Jerome and Lefrançois de Lelande noticed a star in Aquarius, which they estimated of the seven and one-half magnitude. Six years later they thought it of the eighth magnitude. In appearance it resembles a star which is not exactly in the focus of the telescope. Herschel had observed it in September, 1782, and recorded it as an admirable planetary nebula, very brilliant, small, and elliptical. Lord Rose and Lassell perceived that it was surrounded by a ring, which gives it somewhat the appearance of Saturn.

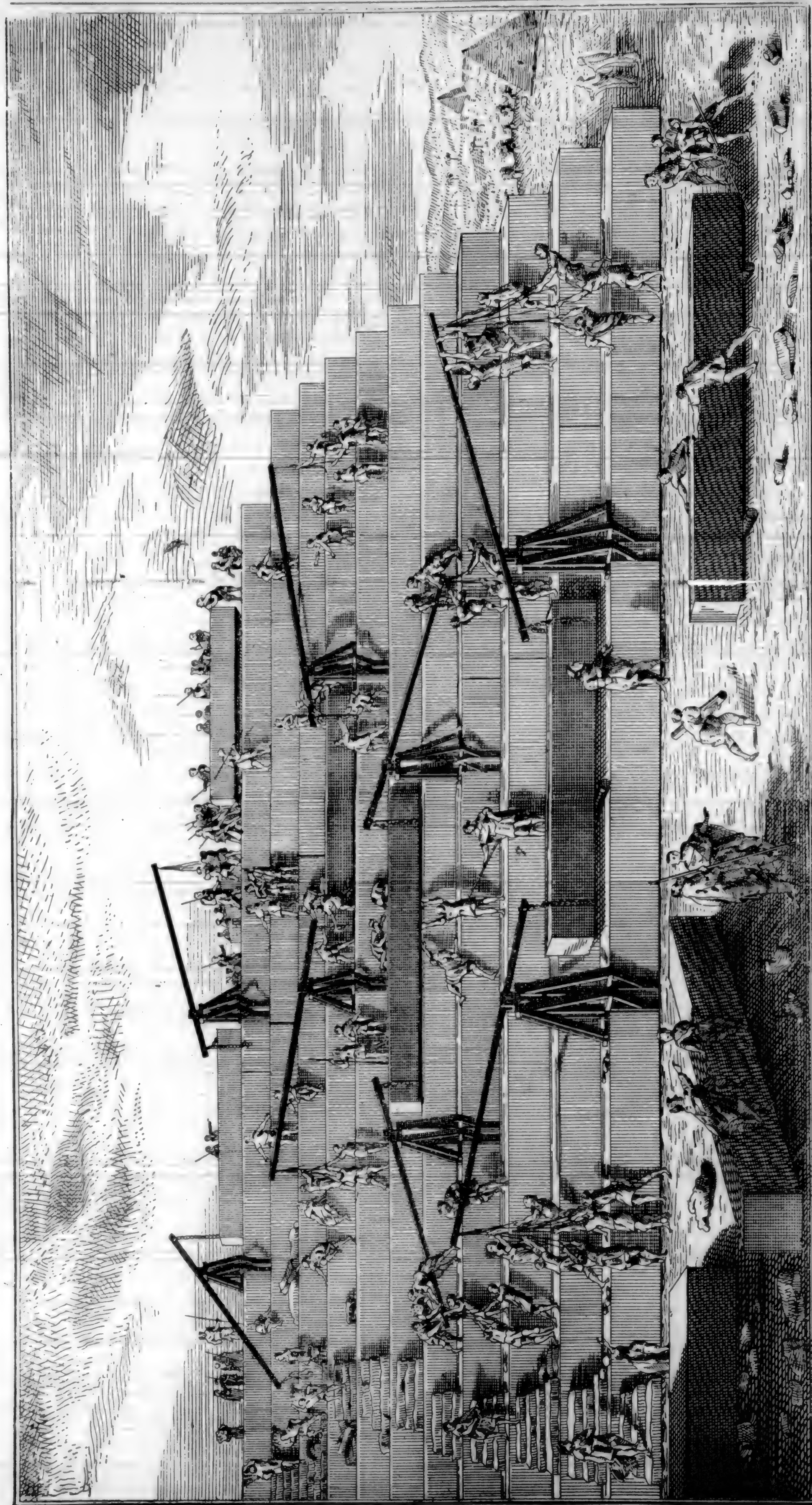


PLATE 6—BUILDING OF THE PYRAMIDS, ACCORDING TO HERODOTUS.

The Pyramids.

THE topic of the pyramids can never cease to be interesting to the intelligent and inquisitive mind. *When* were they built? *Who* built them? *How* were they built? *Why* were they built?—are queries to-day as they have been since authentic history began. Twenty-three centuries ago, the Greek Herodotus—father of history—stood before the great pyramid studying the same puzzles. He got no very clear answer to his questioning. The thousand scholars that since his day have struggled with the same problems have satisfied only, or chiefly, themselves. They have received no answer that the world accepts as final. The great pyramid at Ghizeh seems to antedate all others, and if its riddle could be solved, the mystery would be cleared. But when the architect of that monument closed its chambers to the world he buried the key in its dark bosom. The secret has been well kept. Like the inscrutable Sphinx—its companion in the grand solitude, whose lips are sealed—the great stone is silent. They have stood there and seen all History file by and said nothing. When the First Emperor drew up his French legions in the valley of the Nile, and pointing to the solemn structure by the desert, said, “forty centuries look down upon you from that pile” he spoke but the simple fact; for, indeed, like the everlasting hills it has stood there for ages. In truth we can hardly say when it was not there. The testimony of almost all authors shows that it was there nearly or quite 4,000 years ago. There are no monuments in Egypt older than this one. Some old writer speaks of it as the “terrible crystal of a former unknown time.” Its age goes back, then, beyond Moses—beyond Abraham—beyond even the birth of the Hebrew or the Sanscrit languages. It is so old, indeed, that no contemporary writing relating to it exists. No book treats of it within 1,500 years of its foundation. There is, therefore, no clear history of it in existence. Almost its only record is itself. The story

of its real purpose is lost. We stand and gaze upon it and wonder what people lived there before its day long enough to develop a civilization that could produce such a structure as the great Ghizeh pyramid. Where did they originate? In whose brain grew that design? Who was the architect? We can only wonder. It seems to have been the first specimen of stone architecture known in the world—and Piazzi Smyth thinks “it came at once as a perfect specimen—an astounding, and, humanly speaking, an unexplainable mystery.” If it was a gradual development, what centuries of slow growth lay between the first rude hut and such a building! He says again: “The grandeur and stability, as well as the minute perfection of its parts, are a marvel.” Ferguson says: “It is the most perfect and gigantic specimen of masonry the world has yet seen.” He says this with full knowledge of what Greece and her colonies, Rome and her colonies, have done in this line since this was built.

Greece was not born when this giant was being fashioned; and when we think of the long line of her famous sculptors and geniuses in the mechanic arts—of the Parthenon—and her temples on a hundred hills—we are dumb with wonder. Smyth, and Taylor before him, were so at a loss to conceive how such a structure could be produced with no previous model, that they concluded that the design was supernatural—God-given directly, and to an architect who was not an Egyptian. Smyth says “the original plans were based upon a knowledge of astronomy, geography and physics, so vastly beyond the unaided powers of man in that day that there is scientifically no resource for us but to allow that the designer *must* have been assisted by divine inspiration.”

Prof. H. L. Smith, of Geneva, N. Y., speaking of the measurements of the queen's chamber in this pyramid, says: “Either there is proof here of a supernatural inspiration in the architect, or he possessed, in an age of absolute scientific ignorance, a knowledge of science equal to the most advanced of modern times.”

It has always been a wonder how the Egyptians raised the great stones with which they built their temples and the pyramids. In many cases these were thirty to forty feet long, and three to four feet on the end. There has been much speculation in regard to their methods, but it is safe to say we do not know. Diodorus, a Greek writer, living about 100 B. C., says they used terraces upon inclined planes. Pliny, a Roman, 60 A. D., makes a similar statement, simply repeating it. Herodotus, a Greek, 484 B. C., says they used levers. He had visited Egypt, and got his information from the Egyptian priests, who ought to have known something about it. We will accept his story until we know better. He gives this simple description: “The stones were laid in courses, regularly diminishing in size. Each course was so much within that just below it that each front of the pyramid

formed a stair. These courses can still be counted. Such being the case, it is easy to see that only time and patience were needed to raise the largest stones to any height. A very simple machine, very easy to manage (see p. 96), was placed upon the first course, by means of which the stones were lifted upon that for the second course, and when that was done, by a similar machine, stones were raised upon it to form a third, and soon to the top. “The plate shows that this machine was a simple lever, upon a pivot, turning in any direction, and worked by a great number of men.” He says also that “100,000 men were employed on the great pyramid 20 years. They were ten years in getting the stones ready. Every three months they were relieved by an equal number.”

The great pyramid at Ghizeh is the one to which attention has been most directed. Mr. Smyth says, “There seems to be a series of features in this pyramid which have no counterpart in any other.” Without adopting the theories of Taylor or Smyth in all their fanciful details, we must admit that these indicate something more than a mere tomb in this wonderful structure. Let us notice some of these remarkable features.

First—the base is a perfect square; *Second*—the four sides incline toward the central vertical axis at equal angles. The angle is $51^{\circ} 51' 14''$, and this is significant for it has been found that using this angle, and finding the vertical height of the pyramid by it, we obtain a very remarkable relation of lines. The height is not now what it was originally; for the top has been destroyed—cut down.

The theoretical height was found by triangulation to be 486+ British feet. One side of the square base was found to be 763+ British feet. Now the ratio of this height to twice the length of one side of this base was found to be exactly the ratio of that of the diameter of a circle to the circumference, viz., 1 to 3.14159—a quantity much used in modern mathematics and of inestimable value. But there is no testimony in all history, no tradition or any other form of record whatever to show that this ratio was known to the human intellect for ages after this pyramid was built. How then came it to be expressed in this structure? Smyth claims that it completely solves the standing puzzle of the ages, viz., the squaring of the circle, for the height of this pyramid may be made the radius of a circle, whose circumference is exactly equal to the sum of the four sides of the square base. No other pyramid has this feature. How did the architect happen to hit it so exactly? Was it an accident or was it by design? If an accident, it is the most marvelous accident in history. If by design, how did the builder know the mathematical truth thousands of years before it became known to any other human mind?

Another wonderful accident is the angle of inclination of the passage into the pyramid on the north side. Setting aside all theories again, the measurements are there and may

be accepted as mainly correct. Taking these as they are, and skillfully manipulating them, legitimately, as one may do the number 9 of the Arabic numerals, and many singular results follow as with that magical number. Did the builder play at puzzles as he built? For example, if certain measurements in the King's Chamber be taken and certain operations upon them be performed, the number $365\frac{1}{4}$ is obtained, the exact number of solar days in the year. This result has been reached in several independent ways.

Again taking certain other measurements, and performing similar operations upon them, the angle $23^{\circ} 51' 50''$ is obtained. But this angle *happens* to be exactly the angle of the obliquity of the ecliptic for the year 2170 B. C., which is the date of the building of the pyramids, as believed.

But a resulting number of far greater importance than either of these has been disclosed. The cycle of the precession of the equinoxes has been computed by modern astronomers to be 25,827 years. Now exactly that number has been found in numerous instances by operations, like the above, upon the architectural lines of the great pyramid. Yet no such astronomical truth as this was known among men, historically, for nearly 2,000 years after the pyramid was built. How happens this number, then, to be built into the whole structure as it seems to be? Is it an accident?

An English engineer had seen that the square base of the pyramid might typify a circle of which the vertical height of the pyramid was the radius, because there was found to exist that remarkable relation between the vertical height and twice one side of the base. Then he said, “his circle may symbolize the earth's orbit, and the year may be evolved from it. And this height may also represent the radius of the earth's orbit, which will be the distance of the sun from us. So he took this vertical height in pyramid inches, changed them to British inches, then miles, and worked out the problem, and the result was 92,500,000 miles, nearly—a number almost identical with our very latest computations upon the transit of Venus, with all our refined methods.

Another striking feature, one of the curious problems of the great pyramid, is the fact of what is called its orientation—that is, its base being so fixed that its four sides face the four cardinal points exactly—due north and south, due east and west. Now, to place a structure built of layers of stone as large as those in this pyramid, and covering, as Proctor says, thirteen acres of ground, so as to be exactly in line with the cardinal points, is a work of no small difficulty to-day, even. Proctor says: “The only way it *could* be done was to cut a slant passage through the solid bed rock, directed to the pole star of that day, when crossing the meridian below the pole.” This passage is toward the north. Toward the south, within the pyramid, how could a passage be cut on a true north and south line with no star to guide them? A beam of light from the north star down that north passage was re-

flected from a surface of water at the same angle as the entrance beam, and was their guide in cutting that passage. And all this was so exact that to-day astronomers can detect no error greater than about five minutes of space. This gives us some idea of the genius that directed the building of that structure.

Another interesting fact is, that this pyramid is placed almost exactly upon the parallel of 30° of N. Latitude, whatever significance this fact may have. Then a vertical plane north and south through the pyramid marks the zero meridian for Egypt; and that entrance passage to the pyramid is in the plane of this meridian. Some other curious facts are these: This entrance passage has an angle of altitude of 26° 18' about; and its direction is not to the exact pole of the heavens, but to a point 3° 42' below that pole. Now it has been ascertained astronomically, that about 2170 B. C. the star called Alpha Draconis—or the brightest star in the Dragon—was just 30° 42' below the pole, and its light would therefore shine down that passage, so that it was their north star. Showing that our north star was not their north star. At the same time Alcyone, brightest of the Pleiades, or seven stars, was on the meridian south, in the vertical plane of direction of Grand Gallery of the pyramid. At the same time also the celestial meridian of the Vernal Equinox coincided with this same Alcyone. It is supposed by those who think this pyramid is an astronomical building, that the Egyptian year began at the time thus indicated, viz., in the autumn, when the Pleiades crossed the meridian. Judge Haliburton of Halifax, by a remarkably patient research, has shown that many primitive nations and also uncivilized tribes have always begun their year at this time. But a profounder problem than the beginning of an Egyptian year lies in the fact that this remarkable conjunction of stars shows also that it was the beginning of a cycle of the precession of the equinoxes, a period as before said of over 25,000 years. If, as Smyth says, this problem is recorded in the architecture of this pyramid—it is an astounding fact. Such are some of the wonders of the measurements of the great pyramid. If the conclusions are correct, they are verily wonderful. It is wonderful that any one at that age of the world, beyond the period of written history, could know the true relation of the circumference of a circle to its diameter—carried to five places of decimals; could know the shape of the earth, the length of its axis of rotation—therefore its size; and could derive a unit of linear measure from it as a standard; could know the diameter of the earth's orbit—therefore its circumference—deriving thence the sun's distance—length of a solar year and day; could so place the building that a vertical plane in it should give the true meridian for Egypt; that the opening of the entrance passage should admit the light of a star in the true north, and at the same time another passage admit the light of a star in the meridian in the south. More wonderful still, that they

should know that cycle of the precession of the Equinoxes. If they did not know these things, how does it happen that the geometry of that structure gives the information? is it all assumption? has it been tortured out of the lines with no basis of fact?

Different mathematicians, by simply taking the measurements of the lines put there by the architect and solving the problems suggested by them, have made the astonishing revelations. If the results can be shown to be true, and the designer did not know the hidden secret in those lines—did not have any knowledge of the astronomical truths involved—can we help concluding, also, that he was guided and controlled by divine inspiration?

A Remarkable Work.

THE opening of the Darien Ship Canal re-directs attention to one of the richest portions of the globe, which has been unnoticed for the greater part of the century. To understand its capacities we must go back to the records of the first discoveries and conquest of the Isthmus, when it paid tribute to Spain in thousands of gold and silver, and baskets of the finest pearls. Its great cities held palaces whose walls were a mile square, and fortresses which surpassed those of Europe. The ceiba tree and the tropic creepers have hidden the site of these grand ruins, but, guided by the light of history, the daring explorer will yet find not only these, but the deserted mines of gold and beds of sacred turquoise and of pearls. The history of Mexico and the Isthmus, in their early days, is one of the most fascinating pages in the world, whether to scholars or men of business, and it is fortunate that the period of reviving interest in these centuries, also, sees the announcement of the remarkable literary work which includes their history. The wealth of preparation lavished by Mr. Hubert H. Bancroft on his great "History of the Pacific States" affords a satisfaction to the world of which the volumes so far issued are a rich and surprising foretaste. The story of the conquest of a new world must have an absorbing interest, but the splendor of the natural resources of the countries reads like the tales of Eastern romance. From the treasures of material at command in his matchless library of 35,000 volumes on Pacific history, for which he has ransacked American and continental collections and Government archives, Mr. Bancroft has drawn a story of plain, authentic fact, which wears the coloring of romance. Old manuscripts, unknown to recent historians, and archives, supposed lost but brought to light by intelligent research, have added of late the missing links in the wonderful history of the discovery of America. The archives of Central American Governments, rare Spanish works, and manuscripts from the collections made by the Emperor Maximilian, and the eminent Mexican, Ramirez, have been sources of fresh and extremely interesting material, to fitly condense and convey which has been the labor to which Mr. Bancroft has devoted his best energies for twenty years,

with the assistance of from twelve to twenty educated secretaries in translation and reference work. The history thus produced by an author of uncommon ability must take place as a standard authority on Western America, giving not only its past, but its natural history, in accounts of the scenery, productions and inhabitants of the countries from the Rocky Mountains to the Pacific, from Darien and Sonora to New Mexico, Arizona, California, Oregon and their sister States. The information of all the writers that have ever written about these countries will be contained in Mr. Bancroft's Pacific History, a work so interesting that we expect to see it in every town and school library, if not in every household—the delight of the school-boy, for its marvelous stories of adventure; of the politician and the literary man alike, for its clear precision and its rich grasp of fact. In Europe an order of nobility would be the honor assigned a labor of such value—but the author's best reward will be to see his work read and beloved by the people for whom he wrote. The praise of the great scholars of Europe and America, of Carlyle, Herbert Spencer, Whit-tier, Longfellow and Draper, has been warmly given to his work, which, however, was written with the purpose to bring the information of a princely library within the reach of American homes. The large, open print, firm paper and binding have been selected to make a book welcome to the eye and lasting for use; one which will take the first rank among standard histories, and equally so in the interest of general readers.

Information in regard to the prices, etc., of this remarkable series, can be obtained by addressing Bancroft & Co., San Francisco. Inquiries addressed to this office will also receive prompt attention. Eleven volumes are now ready, and it is the intention to have a volume ready every fourth month until the series is completed.

LOW BEDS.—The use of the low bedsteads, with the trundle-bed, ignore a great and important principle, that relating to the fact that near and on the floor will be found the most poisonous gases, the carbonic acid of the sleeping room, since this is heavier than the air, falling and flowing into the lower parts of the house like water. It is cruel enough to put the children in a room which is already occupied by a sufficient number of persons—two are enough—without putting them, at the time when they are growing, and need every possible favorable condition, where they continually breathe the worst air—all of it being filthy enough—malaria!

Lumber Receipts.

THE following statement in regard to lumber receipts for the first six months of this and the preceding year may be of interest to many as showing the forward state of the building interests at the present time:—

1882.	1883.
Lumber, ft. 69,359,381.	Lumber, ft. 76,280,301.
Shingles, No. 13,823,761.	Shingles, No. 13,610,000.
Laths, No. 6,558,100.	Laths, No. 8,289,920.

The Material and Manufacture of Canes.

THE manufacture of walking-sticks and umbrella handles is an industry in which a great deal of capital is invested. The material is as various as can well nigh be conceived of. The *Chicago Times* recently had an article on the subject, from which we extract:—

Many are of imported woods, some from the tropics, China, and the East Indies. The celebrated Whongee canes are from China, where they are well known and celebrated for the regularity of their joints, which are the points from which the leaves are given off, and the stems of a species of phyllosiachys, a gigantic grass, closely allied to the bamboo. The orange and lemon are highly prized and are imported chiefly from the West Indies, and perfect specimens command enormous prices. The orange stick is known by its beautiful green bark, with fine white longitudinal markings, and the lemon by the symmetry of its proportions and both prominence and regularity of its knots.

Myrtle sticks possess also a value, since their appearance is so peculiar that their owner would seldom fail to recognize them. They are imported from Algeria. The rajah stick is an importation. It is the stem of a palm, and a species of calamus. It is grown in Borneo, and takes its name from the fact that the rajah will not allow any to go out of the country unless a heavy duty is paid. These canes, known as palm canes, are distinguished by an angular and more or less flat appearance. Their color is brownish, spotted, and they are quite straight, with neither knob nor curl. They are the petioles of leaf stalks of the date palm. Perhaps the most celebrated of the foreign canes are the Malacca, being the stems of the Calamus sceptonum, a slender climbing palm, and not growing about Malacca, as the name would seem to indicate, but imported from Stak, on the opposite coast of Sumatra. Other foreign canes are of ebony, rosewood, partridge or hairwood, and cactus, which, when the pith is cut out, present a most novel appearance, hollow, and full of holes.

The manufacture of canes is by no means the simple process of cutting the sticks in the woods, peeling off the bark, whittling down the knots, sand-papering the rough surface and adding a touch of varnish, a curiously carved handle or head, and tipping the end with a ferrule. In the sandflats of New Jersey whole families support themselves by gathering naneberry sticks, which they gather in the swamps straighten with an old vise, steam over an old kettle, and perhaps scrape down or whittle into size. These are packed in large bundles to New York City and sold to the cane factories. Many imported sticks, however, have to go through a process of straightening by mechanical means, which are a mystery to the uninitiated. They are buried in hot sand until they become pliable. In front of the heap of hot sand in which the sticks are plunged is a stout board from five to six feet long, fixed at an angle inclined to the work-

man, and having two or more notches cut in the edge. When the stick has become perfectly pliable, the workman places it on one of the notches, and, bending it in the opposite direction to which it is naturally bent, straightens it.

Thus sticks apparently crooked, bent, warped, and worthless are by this simple process straightened, but the most curious part of the work is observed in the formation of the crook or curl for the handles which are not naturally supplied with a hook or knob. The workman places one end of the cane firmly in the vise, and pours a continuous stream of fire from a gas pipe on the part which is to be bent. When sufficient heat has been applied, the cane is pulled slowly and gradually round until the hook is completely formed, and then secured with a string. An additional application of heat serves to bake and permanently fix the curl. The under part of the handle is frequently charred by the action of the gas, and this is rubbed down with sandpaper until the requisite degree of smoothness is attained. —*Scientific American.*

Why Some Mechanics Don't Get On.

WE were much interested the other day in drawing from one of the oldest practical mechanics of Cleveland the secret of his success.

Said he: "I have always made it a rule to do my work so well that it left a good impression on my employer." There is more in this than at first appears. Hard work is one thing; conscientious work is another. The hard worker may outwardly conform to all the requirements of the shop; he may always be in his place at the starting of the machinery; he may take short noonings, and he may be among the last to drop his tools at night, but after all he may utterly fail to get on in the world, and why? Let our experienced informant answer: "I know of a young man of just that kind. He works hard enough and wants to succeed, but somehow he can't. He came to me for counsel, and I found that he was slighting his work. That is, in his anxiety to turn off a large amount, he neglected the finish which always tells on good work. The consequence will be that, unless he makes a change, when times are dull he will be one of the first to be dropped by his employer." Superintendents and foremen notice these defects more closely than many are aware. The man who slides over his task, who lacks in thoroughness, who lets an unfinished piece of work leave his hands, is marked. In the unwritten law of the shop he is barred from promotion, while the conscientious workman is morally certain of advancement. Is the tendency of the day in the direction of a better finish to work? We think it is. As machinery is brought into competition the strife will be to secure superiority in cheapness, simplicity, and finish. Here it is that the thorough workman brings into play all the resources of his skill and honesty—his "mechanical moral sense," it has aptly been called. Here it is, too, that the slovenly, or careless, or hasty

workman utterly fails. There are some forms of bad work that can be deftly covered up, but the compensations of life bring the inevitable result—failure to him who does not put his heart in the work, success to him who not only does his task, but does it well.—*Trade Review.*

Whitewashes.

THERE are several methods of making serviceable wash. One is made as follows: Three pecks of water lime, one peck of silver sand, and half a peck of salt. This is used for old, rough fences and outbuildings. The common whitewash is made by putting quicklime into a tight barrel, pouring on water to slack it, and adding water till it is of the consistency of cream. This is used for ordinary work. But a much better whitewash, which stands weather well, is made as follows:—

Put half a bushel of quicklime in a barrel and add boiling water until it is covered nearly six inches deep; cover the barrel to keep the steam in, and when the violent ebullition is over, add water enough to bring it to the consistency of cream, allowing four pounds of rice flour to each half bushel of lime, or the rice flour may be mixed with the water for slacking, mixing the flour carefully in cold water, before putting it in the hot water. Stir constantly in the hot water until thoroughly set, and then pour it all over the lime, as directed.

To improve the above, add two pounds of sulphate of zinc and one pound of salt. To change the color, add yellow ochre for cream tints, raw umber and lampblack for gray tints, and umber, red, and lampblack for fawn tints. The permanence of whitewash thus prepared is remarkable, and, when once tried, will be used to the exclusion of the ordinary mixture. —*The Pacific States Watchman.*

M. FAYOL, a French investigator, has found that the creosote treatment for the preservation of wood sometimes doubles the durability of oak timbers used in collieries, but has little influence on pine. He further says that oak prepared with ferrous sulphate lasts ten times as long as in its natural state. It should be immersed twenty-four hours in a solution of 200 grammes of ferrous sulphate.

THE cable system for street-car traffic seems to be making some headway in England and Scotland. At a Council meeting in Edinburgh, lately, permission was given to lay down a length for trial, the Council reserving the right to reject it, if deemed desirable, after an inspection of the Highgate, London, cable railway system in June next.

ACORNS from America are in demand in Europe, for the propagation of oak forests. A special agent for the forestry department recently shipped 300 bushels of red-oak acorns and 120 bushels of pignuts to England and Germany, where they are to be planted next spring.

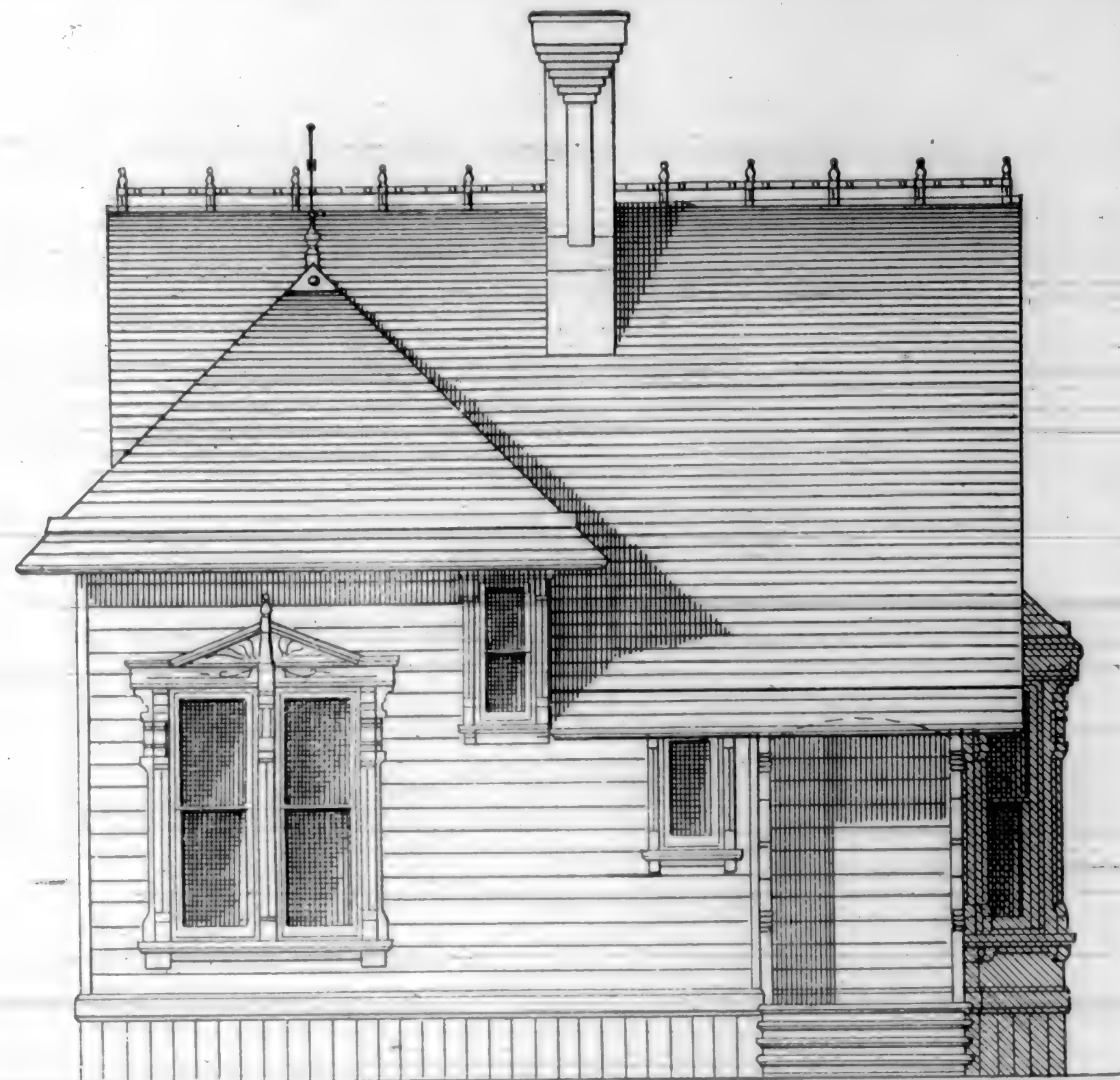


PLATE 6—A COUNTRY COTTAGE. FRONT VIEW.



PLATE 7—A COUNTRY COTTAGE. SIDE VIEW.

Arbor Day.

THE people of this State should rise up and demand that one more holiday be added to the too few which we celebrate. And no more appropriate day could be named than to follow in the footsteps of some of the Eastern States, and name a day on which all could join together and have a merry time planting trees. We hope our next Legislature will take this matter in hand and establish a grand State holiday to be known as Arbor Day; and let old vie with the young in transforming our valleys into magnificent wooded districts. Should our wise Solons establish such a holiday, it is to be hoped that they will provide for the proper maintenance of the trees after they have been planted. This might be accomplished by offering premiums for a certain number of trees that present a healthy appearance after a certain period of growth. We sincerely hope that the journals on this coast will discuss this matter in full before our next Legislature meets.

Draughts or Slow Poison.

AFTER all that has been said and done about the so-called "ventilation" of our public rooms, the people who frequent them are still shut in, in nine and a half cases out of ten, to a choice between taking poison and getting a chill—with the facilities much greater for the former. The average assembly room is still typified by the "hot air receiver" in which Adirondack Murray was once lecturing. It was built in the regulation fashion, with close walls on two sides, pierced in four places with small openings into dead-air flues, called, by a fiction of the architect, "ventilators" but up or down which no current was ever known to pass. The ceiling was, of course, solid, and the only chance to let in fresh air to the thousand people who were trying to keep up their heart and brain action on an atmosphere composed of lung exhalations, burnt-up air, and unconsumed gas, was to let down the large windows in the end. Up and down went the rattling sash and rustling curtains, as the gaspers and freezers took turns at the windows. Finally, the lecturer stopped and said, with the coolness and humor that characterized him: "Friends you may fix the windows any way to suit yourselves; only if I am to finish my lecture, I should like to have them stay fixed, one way or the other. For myself, if I am to have a choice between freezing to death or suffocating, I should prefer the former method as being cleaner. But, if the world stands for another year, and this dreadful hall with it, and you are to have another course of lectures, I would advise you to punch a hole through that roof," indicating the highly frescoed ceiling with his superb gesture.

The process hinted at in this rough suggestion has been followed in many of our pretentious halls and theaters. The builders have "punched a hole through the roof," in a more or less ingenious and artistic fashion; but, in thus providing an escape for the bad air, they

have exposed a large percentage of the occupants of the room to direct or cross-currents of air every time a lobby door is opened or a window is raised. There is yet no science of ventilation; or, if there be, it has not been applied where it is most needed. Many fairly effective devices for taking the overheated air out of a room have been invented; but the rooms are rare into which any adequate supply of pure air is introduced. The furnace fiend in the cellar will belch his blighting breath into a room as fast as it can find a way out—and too often faster, as the baked brains and laboring lungs can testify. But a rational system of ventilation, based upon the law of demand and supply, and avoiding stagnation on one hand and draughts upon the other, has not yet been brought within the reach of the general public. People susceptible to the insidious effect of foul air, and who visit places of public amusement, know what a "theater headache" is. They have a reminiscence of the taste of the atmosphere in their mouth the next morning, though they may not know what it is. Of all places in the world, except sleeping or thinking rooms, where pure air is needed, a public dining-room is the oftenest neglected in this particular. Added to the heat of the furnace or the steam-pipes, is the smoke of the gas and the scent of the dishes, and sometimes the fumes of the kitchen. In our grand hotels, elegant and perfect in all their other appointments, there is often—we may say commonly—no way of reducing the temperature and freshening the air except by lowering a window—with what effect Mr. Fitz feelingly hinted in the humorous speech to which we alluded in the opening. It destroys half the enjoyment of a good dinner to introduce pure air in this fashion, merely as an *entre* in the elaborate *menu*. One does not want to carry away incipient pneumonia or an aggravated catarrh as the penalty for dining away from home.—*Ex.*

PRACTICAL CARPENTRY.

PRICE \$1.00.

A guide to the correct working and laying out of all kinds of Carpenters and Joiners' work. Solutions of the various problems in Hip roofs, Gothic work, Centering, Splayed work, Joists, Hinging, Dovetailing, Mitering, Timber Splicing, Hoppers, Skylights, Raking mouldings, etc. This work should be in the hands of every mechanic. One of the features to which this book will undoubtedly owe its success, is the absence of those numerous formulas which serve only to confuse the ideas of so many workmen. Everything is written in a clear, concise, and practical manner, and its utility is brought within the grasp of those workmen who have not had the benefit of a school education. We will send the above work to any address upon receipt of \$1.00.

If the manufacture of glass is being tempered according to the building developments of the country, then the sash, door, and blind manufacturers can be said to have before them a prosperous demand. It is stated there are fifty new glass factories being built in the different States. To quite an extent glass means sash, and sash means doors and blinds.

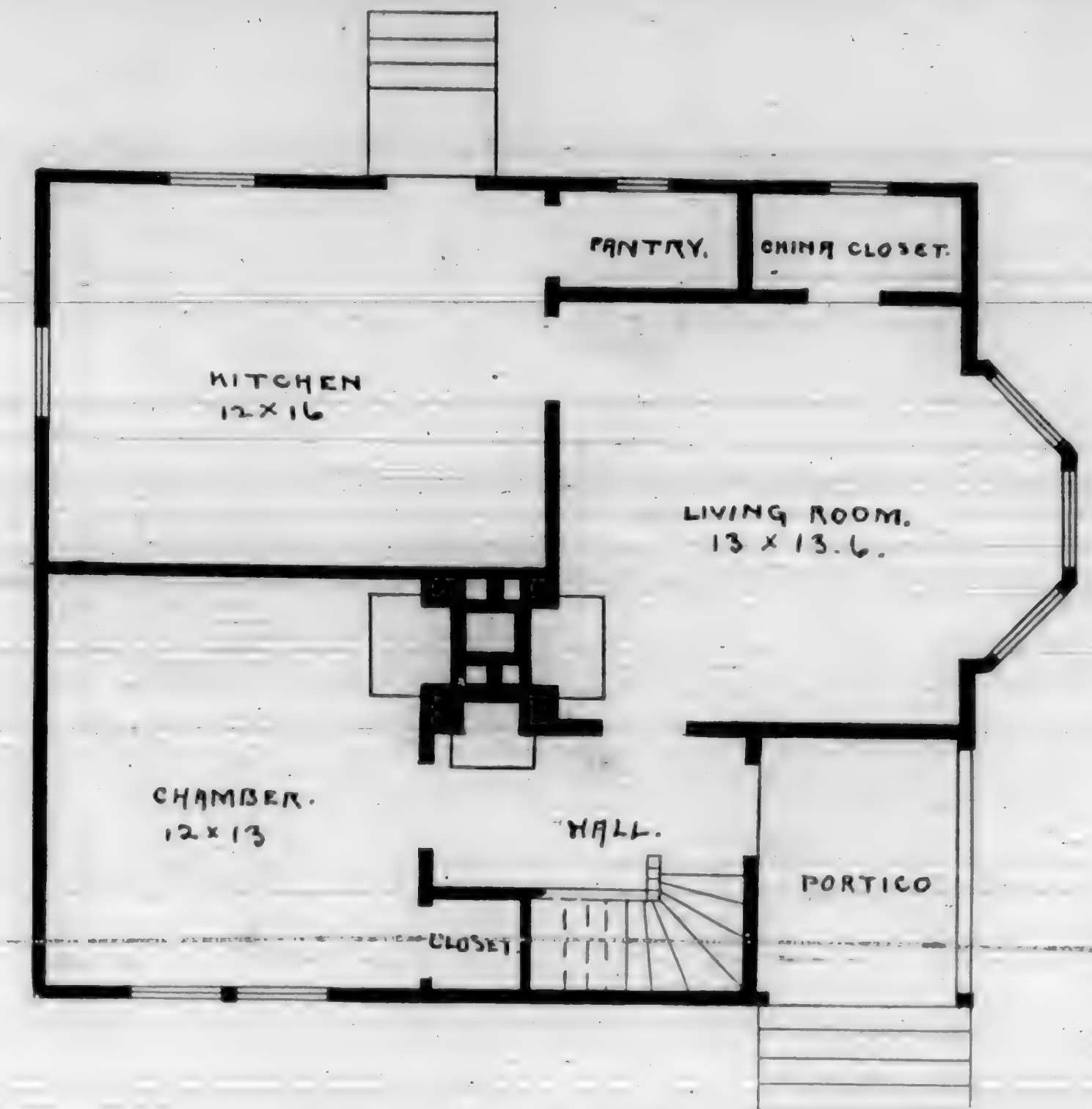


PLATE 8—A COUNTRY COTTAGE. FIRST FLOOR PLAN.



PLATE 9—A COUNTRY COTTAGE. SIDE VIEW.

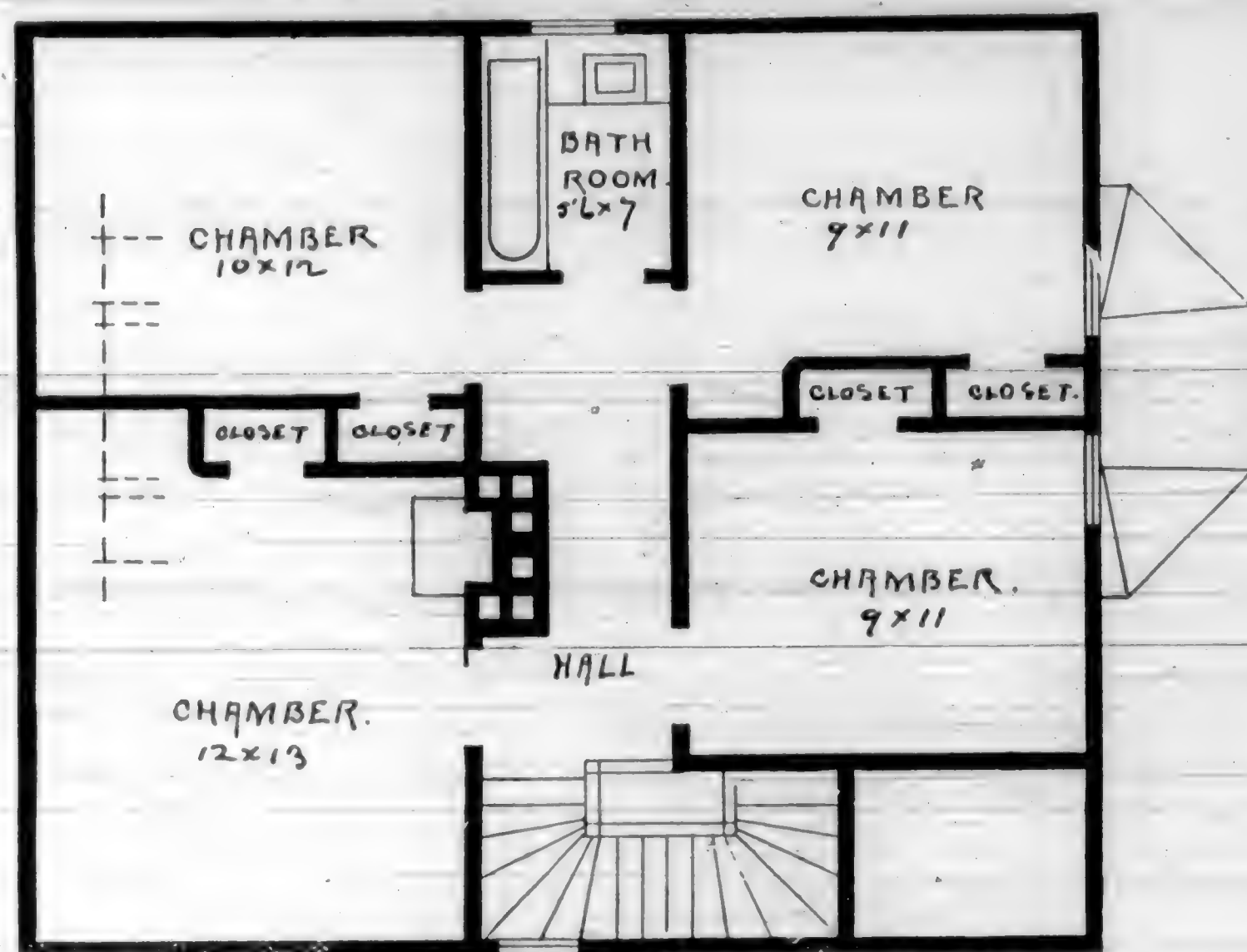


PLATE 10—A COUNTRY COTTAGE. SECOND FLOOR PLAN.

A Practical Answer to the Dr. Ayers' Theory.

THE following letter from one who is a prominent business gentleman, residing in one of the choicest elevated sections in the city, in a ten thousand dollar residence, is a conclusive contradiction of the fallacy recently promulgated before the Medical Society of California:—

"JUNE 3, 1883.

"MR. WOLFE: We are all down with malarial fever, and I am satisfied that the sewerage and plumbing of my house has much to do with it. Yesterday I noticed a terrible smell in the basement, coming from where the wastes connect with the sewer and hopper. The basement was closed, and no water being run through the pipes during the day, the smell was intense, and as soon as I let the water on, the smell went away. Whether the sewer is broken, or the joints in the sewers or plumbing pipes bad, I do not know, but we smell the sewer gas through the house and are all sick. I want you to examine where the fault lies, and have it remedied. My wife threatens to leave the house. The plumber has not done his work right, and we are alarmed for fear of the consequences. See whether the sewer trap is all right, and have large vent pipes put in, and make them run up above the shingles. I am afraid that the trap under the bath tub is not safe and it syphons out. I am greatly alarmed, for we have never had any such sickness before, and all the indications are that our present troubles come from the sewer gases. This is the opinion of our physician also. Please attend to the matter at once."

The foregoing is but one of hundreds of similar cases in San Francisco, and an exemplification of the folly of owners' purchasing houses built years ago, when sanitary science was in its infancy, and architects, owners and

builders had not acquired the knowledge since obtained in reference to the importance of perfect sewer and plumbing work, nor learned to realize that the underground conduits with which all buildings are connected, contain terrible death-producing agencies. The residence in question was built some ten years ago, by one of the present popular architectural firms in San Francisco, who may have exercised the best judgment then enjoyed, but which now develops a degree of error illustrated by the foregoing. After the recent purchase by the present owner, he made, as he supposed, all necessary improvements to correct the existing evils, but failed in his attempt, and to obtain perfect immunity from the effects of sewer gases, will be required to expend considerable more money; but when that shall have been done, it will require time to remove the impressions produced by present family afflictions, and establish a feeling of confidence that loved ones are safely protected from the bad consequences which follow in all cases where sewer gases are allowed to work their way into dwellings. If sewer gases are not promotive of any "special type of disease," they are nevertheless a means by which thousands are daily prostrated on beds of sickness, and thousands consigned to that slumber from which nothing short of the Gabrielic trumpet will ever awaken.

PLEASE NOTICE.

The 75-cent edition of the Steel Square and its Uses is OUT OF PRINT. We cannot supply any more, as we have received notice from the publishers that their stock of that edition is completely exhausted. We have a number of the new and enlarged edition, which we will mail direct to any address upon receipt of

ONE DOLLAR.

This edition contains 30 more pages than the first one issued.

The Care of Fixtures.

THE most troublesome of all is the ordinary house sink, into which the bulk of the greasy water from dish-washing is emptied. Contained in the hot water, the grease is dumped into the sink and out at the drain. Being chilled, however, in its contact with the cold metal of the sink or drain, it is at once deposited about the strainer and proximate waste pipes, the greater portion being deposited on the inner surface of the traps, where it remains to decompose. Here something more than water is necessary, and when, as with the modern flat or tenement, the sink is made the receptacle of the suds on wash-days, the drain is kept moderately and sometimes perfectly clean by reason of the various washing-sodas now in use. Though the grease has been deposited by means of hot water, it is not safe to expect that hot water alone will remove it, since it was the chilling of the hot, greasy water that first deposited the refuse grease. There are special fixtures for catching this greasy deposit at various points along the drain, but the better way is to eradicate the objectionable and carry it off altogether.

Where the sink is used for kitchen purposes alone, and there are no weekly flushings from the wash-tub, it is necessary to take pains to remove the grease by special means, introducing into the dish-water some one of the sodas or ammonia. The tubs, whether in the laundry or bath-room, require moderate though timely attention. In the case of the laundry tubs, the deposit of soft mud, left from clothes washing, is partially deposited at the lowest portions of the tubs, or sticks to the corners or joints, and if, as is often the case with what are called stationary tubs, a quantity of water is left in and the lids shut down, decomposition soon sets in, and an odor far more offensive than the sewer gas is experienced on lifting the lid or stirring the water. The tubs have to be thoroughly washed and flushed before the odor is thoroughly removed.

The application of disinfectants is of no use; cleansing must be resorted to. So, too, with the bath-tub, a similar deposit is left from the water either at the bottom of the tub or in the drain, or more especially in the trap.

All this trouble from the tubs can be prevented by proper care and cleanliness after use. They should be thoroughly washed and flushed after each service.

With urinals another special method of cleanliness is necessary, for while there are no greasy deposits, such as already described, there is, owing to the very rapid decomposition that sets in, a special demand for immediate flushing after use, or they will shortly become most offensive. Constructed of a proper non-absorbent, non-porous and non-corrosive material, a liberal flushing immediately after use will be sufficient, unless contained in a close and warm room. If the room is not properly ventilated, it is next to impossible, even with a most liberal flushing, to prevent an unpleasant as well as an unhealthy odor arising.

Exterior Painting.**THE BEST MATERIAL.**

THE public are indebted to the architect and builder for accurate and becoming designs, and for good and careful construction of buildings, but not always for their methods in painting. Frequently their specifications for material and their methods of application are mistaken, and do not result in the best and most economical work. For instance a contract may require that the exterior of a house shall be painted in pure white lead and linseed oil. Undoubtedly pure white lead has superior covering properties, and with good linseed oil makes a handsome surface, but it is not by any means the most durable or cheapest coating available. A proportion of zinc white, depending upon the amount of coloring matter employed, mixed with the pure white lead, will make a much better paint. There are technical reasons upon which this assertion is based, and they will be appreciated by every one, though he may have no practical experience with paints. It will be readily seen that the adhesive properties of the paint consist in the vehicle with which it is mixed. If water were used the adhesion would continue only so long as the paint should retain its moisture and the dry powder would be easily rubbed off. The same result would follow if the pigment were mixed with oil, as soon as the vehicle were absorbed, disintegrated, or otherwise removed from the powdered lead. Now it is a fact that a paint consisting of pure lead and the best linseed oil will soon disintegrate, leaving the powdered lead free to be easily rubbed off. On the other hand, the oxide of zinc forms with oil a paint which when dry assumes the appearance of an impervious enamel. This comes from the nature of the pigment, by which a chemical combination is effected. The writer, therefore, after many tests, does not hesitate to recommend a mixture of zinc with lead for all exterior paints. We said the proportion of zinc should depend upon the colors with which the paint is to be mixed, for ochres, umbers, siennas, and Venetian red act in the same way as zinc, and are preventives of the chalking difficulty to which clear lead is subject. As to the proportion which is the most economical with the best results, the writer would recommend that for the upper coat, say of a three coat job, standard white lead will bear 25 to 35 per cent. of zinc. If any considerable proportion of the colors named were employed in the mixture the smaller percentage has, in the experience of the writer, worked best. Many painters use the zinc in the priming coat, but clear lead, from its great covering power, is regarded as preferable. The inexperienced reader may ask, if zinc is so good why not use it clear? There are two technical objections. First—Zinc lacks body or covering properties, being much less opaque than lead. Second—Zinc clear makes a hard and brittle enamel, which is subject to what painters call cracking and chipping. No matter how employed as a

paint, it must, for these reasons, be tempered. The prepared brands of zinc white are tempered in their manufacture to avoid these very objections.

Now as to errors in methods of applying paint. We once saw a contract for painting a railroad depot and passenger house, in which there were many elaborate and small architectural decorations, requiring to be picked in with several different colors. By the terms of the contract it was a three coat job, and it was required that the painter should "pick in" the colors in each coat. The colors were such that the picking in needed only to have been done on the last coat. As such painting requires great care and entails much labor, the consequence was that a large amount of labor was lost in the unnecessary work of two "pickings in." Besides, in spite of the care of the painter, the painting was rough and slovenly, much aggravated by the repeated work of matching lines and colors. We recollect also that the painter was greatly out of patience because the contractor would not listen to his suggestion that he could do the painting much better with a single coat of the "picked-in" colors. Many architects are expert in the selection and arrangement of colors and tints on an exterior, but it ought not to be expected that they can have the practical knowledge of paints and material, and the best methods of application, which are requisite to avoid mistakes such as those above alluded to.—*N. C. Weiss, in Building.*

Strengthening a Foundation.

AN interesting way of strengthening a weak foundation was recently tried on a new building that suddenly commenced to settle. The excavation for the walls had been carried down until a mixture of coarse sand and gravel was found, which was deemed suitable. During a heavy rain water found entrance to the cellar, when the sinking resulted. The building was braced, the cellar drained, and then the inside wall of the foundation was uncovered down to a little below the bottom. A A-shaped piece of masonry having a height of about twice the width of the base was then built, the bond between it and the wall being carefully looked to.

After this had been finished upon the inside, it was repeated upon the outside. The base of each of these pieces was equal in width to that of the wall, so that the operation practically trebled the bearing surface of the foundation. It may be well to add that the water will not again be permitted to enter that cellar, as every passage way has been securely closed.—*Scientific American.*

Prescott's Truss Hanger.

THESE Hangers are particularly adapted for use upon barn, stable, depot, and storehouse doors, or in any place where elegance of finish is not required. A child is able to move a door hung with this Hanger. Dunham, Carri- gan & Co., Agents.

Building Intelligence.

Owing to the immense lot of extra work caused by a complete change of type in our last issue, a few typographical errors crept in our columns. The buildings on cor. of McAllister and Filmore reported to cost \$2,100 should have been \$21,000. The alterations cor. Jessie and 18th streets, reported as \$1,000 should have been \$10,000.

SAN FRANCISCO.

- Channel, nr. Sixth. Two-story frame, and one-story brick.
O.—A. Waldstein.
A.—Wolfe & Son.
C.—T. H. Day.
\$10,000.
- Channel, nr. Sixth. Factory.
O.—Coos Bay Stave and Lumber Co.
A.—Wolfe & Son.
\$20,000.
- Mission, east of Third. Four-story and basement brick.
O.—Warden & McClure.
A.—W. P. Moore.
C.—Richardson, brick work.
\$40,000.
- Golden Gate Avenue, cor. Fillmore. Five two-story frame flats, brick foundation, and alterations to adjoining buildings.
O.—Lewis Levy.
A.—Schmidt & Havens.
C.—W. Plums.
\$30,000.
- Block, bounded by Market, Waller, Octavia and Haight. Eighteen two-story frame, brick foundation. Thirty-six flats.
O.—M. A. DeLavaca.
A.—Schmidt & Havens.
C.—W. M. Fletcher.
\$55,000.
- Mission, x. Eleventh and Twelfth. Two three-story frame. Flats.
O.—Mr. W. Menzel.
A.—Schmidt & Havens.
C.—J. N. & J. G. Day.
\$11,500.
- Bush, cor. Fillmore. Two two-story frame. Brick foundation.
O.—Mrs. E. G. Butler.
A.—Schmidt & Havens.
C.—Robinson & Gillespie.
\$8,500.
- Pine and Octavia. Five two-story, brick foundation.
O.—H. T. Jones.
A.—Schmidt & Havens.
C.—R. Smilie.
\$16,575.
- Golden Gate Avenue, x. Laguna & Buchanan. Four two-story frame.
O.—Buckley.
A.—T. S. Welsh.
C.—J. W. Smith.
\$15,500.
- O'Farrell, x. Polk and Larkin. Two-story frame.
O.—Dr. W. A. Douglass.
A.—T. J. Welsh.
C.—John Blake.
\$8,000.
- Eddy, nr. Octavia. Three-story frame.
O.—W. Geist.
A.—H. Geilfuss.
C.—Kincaid & Baldwin.
\$8,000.
- Jackson, nr. Davis. Two-story brick.
O.—Mrs. Wilson.
A.—P. J. O'Connor.
C.—B. Farrell.
\$5,000.
- Hill, cor. Guerrero. Two-story frame.
O.—Mrs. Pomeroy.
C.—T. Maxwell.
\$6,000.
- Dolores, cor. Liberty. Two-story frame.
O.—T. V. O'Brien.
A.—Swain & Cleveland.
C.—A. Flood.
\$—.
- Hyde, nr. Ellis. Two-story and basement frame.
O.—Mrs. A. Touhill.
A.—G. A. Voelkel.
C.—J. H. McKay.
\$6,000.
- Guerrero, x. Twentieth and Twenty-first. Two-story and basement frame.
O.—A. P. Van Duzen.
A.—H. C. Macy.
C.—G. R. Lang.
\$6,500.
- Scott, x. Geary and O'Farrell. Two-story and basement frame.
O.—Mrs. Meason.
A.—George E. Voelkel.
C.—W. Plums.
\$4,000.
- Pacific, x. Pierce and Steiner. Two-story and basement frame.
O.—C. Page.
A.—W. F. Smith.
C.—J. Geary.
\$7,000.
- Jackson, nr. Buchanan. Two-story and basement frame.
O.—J. Gutte.
A.—Kenitzer & Raun.
C.—B. Brotherton.
\$11,500.
- Hyde, nr. Clay. Two-story and basement frame.
O.—W. F. Jones.
A.—Percy & Hamilton.
C.—A. Jackson.
\$5,500.
- Washington, cor. Larkin. Alterations.
O.—P. F. Fisher.
A.—H. D. Mitchell.
C.—R. McCann.
\$4,000.
- Brannan Place, x. Clay and Washington. Four-story brick.
O.—Chinese Co.
A.—W. H. Bayless.
C.—J. Smith.
\$6,700.
- Sixteenth and Dolores. Interior finish.
O.—St. Francis Church.
A.—Huerno & Everett.
C.—J. E. Massey.
\$5,200.
- Twenty-second, nr. Fair Oaks. Two-story frame.
O.—R. Blair.
A.—H. T. Bestor.
C.—J. McCann.
\$6,000.
- Franklin, cor. McAllister. Alterations to building. Three two-story frame.
O.—B. Windhaus.
A.—H. Geilfuss.
C.—B. Dryer.
\$13,200.
- McAllister, x. Franklin and Gough. Three two-story brick buildings. Two-story stable.
O.—H. Nieman.
A.—H. Geilfuss.
C.—F. Weinschl.
\$12,400.
- Sutter, x. Hyde and Larkin. Two-story frame.
O.—Schneider & Barton.
A.—Mooser.
C.—E. Klatt.
\$9,000.
- Calvary Cemetery. Vault.
O.—Camere.
A.—Mooser.
C.—Paltenghi.
\$4,000.
- Stockton, nr. Market. Alterations.
O.—P. Dorey.
A.—Curtlett & Cuthbertson.
C.—J. McCann.
\$2,000.
- Sutter, x. Powell and Mason. Two-story frame.
O.—
A.—Felton.
C.—F. W. Kern.
\$5,000.

all parts of the lower section of the city, and from Oakland, Alameda, and by way of the numerous lines concentrating at the ferry slips—it appears to us that if the owners of the property in question would take a broader view of the possibilities surrounding their investments, they would forthwith proceed with the erection of first-class buildings, and enter into a vigorous competition for the trade advantages which are now distributing and establishing themselves in so many inferior localities.

No Decision Yet—Lien Law.

A DECISION by the Supreme Court, construing and defining the legal force and effect of the present Lien Law of this State, has been anxiously looked for by thousands of interested parties for six months or more. A degree of uncertainty surrounds all building interests, owing to the unsettled features of the law as it stands recorded upon the statute books. The new dress in which the law is clothed by the new Constitution, creates an uncertainty in the minds of the legal fraternity, and the opinions advanced by lawyers are entirely speculative. Some holding that the law as written is effective, while others maintain that no law which contravenes,—practically nullifies the agreements and obligations of contracts,—can be enforced. The issue involved in the case now before the supreme tribunal of the State, covers the whole ground, and the decision when rendered will be one of the most important that has been considered and decided since the adoption of the new organic laws of the State; as it will establish the responsibilities of owners of buildings and construction improvements generally, and lay the foundation upon which contracts, bonds, etc., must be constructed, and settle the vexed question whether owners can be held for deficiency amounts beyond the sum of contract. Hitherto the decisions upon the same issues under the old Constitution, have all held that the terms and agreements of contracts were conclusive, and that owners could not be held for any deficit that might occur from any cause. What the decision will be in the case now pending cannot be known until the decision now so anxiously waited for and desired is made known.

The Garland Trap.

MUCH has been said and written in regard to the efficacy of traps in preventing sewer gas from permeating our dwellings. But the climax of perfection was not reached until the time of the introduction of the Garland Trap. In fact his name is being used as a house word by many of our citizens; for after performing their necessary ablutions, they point under the washstand and say, "Old Garland is there," meaning that a perfect sewer gas protector by that name prevents the effluvia of the noxious gas from coming into the room. Safety and simplicity are the essential characteristics of the Garland Sewer Gas Trap.

The *S F Chronicle* of July 1st, in its article, "City Laws," "some figures concerning building operations for the past six months," etc., says: "The most reliable source as to the number of buildings now going to completion, is, perhaps the books of the Spring Valley Water Works"—which for the past six months gives 391 as the total of buildings with which the pipes of the company have been connected. Then follows "Another authority [meaning the CALIFORNIA ARCHITECT AND BUILDING NEWS] which claims to have taken much pains in compiling valuable statistics, gives the following figures:" this is followed by our semi-annual statement, showing the number, as reported in this journal, to be 424, or 33 more than the number given in Spring Valley's statements. It then adds, to qualify the discrepancy in the two totals, that the reports of this journal "include of course, many which are not supplied with Spring Valley water."

We refer to the article mentioned, because it is incorrect in some respects, and not editorially clever in others. First, it is not true that the "Spring Valley Water Works' books are the most reliable source," and the *Chronicle* so admits when it says the reports in this journal "includes many which are not supplied with water," which is a fact. A considerable number of buildings are reported by us, into which Spring Valley water never enters, and the books of that company cannot therefore ever be a "reliable source" in reference to the number of buildings erected in this city. The water company's books however serve to sustain the practically, unimpeachability of the reports of this journal, and it would have been no more nor less than fair and friendly, had the *Chronicle* acknowledged this fact, which must have been clearly evident to the writer of the article referred to.

Secondly, it was not kind nor generous on the part of our contemporary to say "Another authority which claims to have taken much pains" etc., when it would have been just as easy to have mentioned the name of this journal, as that of the Spring Valley Water Works, particularly as the figures given, and the admission made by the *Chronicle* show that our statements were more nearly correct than the "reliable source" credited.

Again, our contemporary has too often availed itself of the information contained in our monthly reports of building intelligence to render the language—"another authority which claims" etc.—justifiable. We claim nothing that is not ours by right of actual fact, and as far as our reports of building operations are concerned they are so far recognized and admitted to be correct and reliable, as to be found from time to time copied in the columns of the *Chronicle*, *Call*, *Alta*, *Bulletin*, *Post*, and other journals generally with due credit, but not always, and one thing is certain, that if those reports were not, or did not appear to be reliable, we should have heard from some of the "live journals" named, who are too keen in their pursuit of accurate information, to allow themselves to be misled by doubtful

statements from unreliable sources. The fact that our reports have included all that appears on the books of the Spring Valley Water Works, with thirty-three additional, certainly entitles us to preferred credit for correctness. But as we have heretofore stated in our yearly summaries, it is altogether likely that, with all the care exercised, we may miss some, as some owners very unwisely prosecute the erection of buildings without architectural supervision, and the fact of such erections are only ascertained by the system of personal canvass of the city made by our reporters each month. Admitting this to be so, and taking into account the possibilities in this connection, the result would increase the difference in totals, as mentioned in this article, to perhaps twice the figure named, still showing, however, the nearer accuracy of our reports.

Pay for It, If You Want to Read It.

WHILE we are reaping a pleasing reward for the time, labor, and money expended in the publication of this journal, there is room for a large increase in the number of subscribers. There should be not less than ten thousand in California and the Pacific States alone. It is the only journal published west of the Rocky Mountains, in the building, sanitary, plumbing, and other similar interests, and not a single owner of real estate, nor a carpenter, or mechanic of any class, but should subscribe. Each monthly issue contains information and matter worth more than a whole year's subscription, and the high standing reached places it among the very best of class journals published. The fact that its original matter is reproduced in scores of journals of all classes, attests the value of its monthly contents, and the innumerable complimentary notices received, adds testimony to the fact that it is a recognized, valuable journal; and, as such, it should receive universal support. Those who have noticed its progress must have discovered the advance made in its every department toward that excellence promised in its earlier numbers. It has required many thousands of dollars and an immense amount of hard labor and sacrifice to bring about present results, and we certainly feel that we have a claim upon those in whose interest it is published, for financial aid and support. The fact that hundreds obtain access to its columns through the kindness of those who pay for it, is by no means creditable to those who practice "sponging," rather than pay the small sum of two dollars per annum, and receive it honorably. The position of "dead head" is by no means a nice one, and we trust that all those who have relied upon seeing it in "somebody else's office," or borrow it from subscribers, and all others, will send in their names and subscription amounts. It is a costly publication and should be paid for by those who read it.

It is sagaciously hinted that to determine the value of building stone a ramble among the tombs is wise. In far fewer years than most people imagine, monuments decay.

New York Street Architecture.

A. CURTIS BOND.

THE COMPOSITE.

A RECENT writer in the *Pall Mall Gazette* claimed that brick when used in building exteriors was a subterfuge, a substitute for something more substantial and more in consonance with the weight of a house. Whether there is any force in this argument, or, as is more probable, whether it is merely one of the idiosyncrasies of an individual, brick has certainly taken an undeniable hold of the New York taste. Brown stone for a time, and a considerable time at that, was "the thing," and brick was considered too awfully ordinary; but people seemed to have tired of the once expressionless fronts of our aristocratic dwellings and have turned to brick as a relief, until finally it has become a fashion—the aim of every man and thing, for when it becomes fashionable its reputation and its fortune are secured, temporarily at least.

In most instances this adoption of brick has led to the construction of buildings suited to that sort of material, and the Queen Anne style has naturally been much in favor, for in this, probably of all others, the brick shows its decorative qualities to the very best advantage.

Red brick is warm in appearance, an excellent offset to our variable (and, alas, too often invariable) weather; it is domestic, inviting, home like; a house looks more cheerful, more social, cosier in brick than in anything else qualified for use in the city: it gives one the impression that the people who live behind it are nice, quiet, hospitable folks (this impression is often an erroneous one, of course, but it creates a pleasant feeling for the moment), people that can be approached and talked to and invited over to the house to supper. While the great staring, blank stone wall gives a chilling sort of an idea as to those whom it harbors, throws out the suggestion that they are of the "set" and don't care particularly about increasing their circle; at any rate, have no desire to take you into it and then you shrug your shoulders and stroll out to the park and have a smoke, and your thoughts run in an uncomfortable channel, and you make up your mind that "the more you see of men the more you like dogs," or something of that character. This is my exaggerated opinion of brown stone, and I imagine others are beginning to entertain the same thought, for, as I have said, it is being displaced.

Instead of being a substitute, as is claimed by the writer whom I have just referred to, it seems to me that brick may more rationally be considered the fundamental building substance, the constructive element proper alike of the primitive and the modern house. As it is used and colored now, it may take on the appearance of terra cotta, and the fronts of some of our new flats, for example, are really unique in effect and frequently so in detail; the terra cotta panels and the apparently terra

cotta ground work make the façade more than ordinarily showy, and, what is even better, permanent and lasting, for brick, among its other good qualities, possesses durability.

In some places, antique cities and ancient villages one finds in wandering over Europe,

they use tiles for the front of buildings; good, clear, shining tiles, tiles that are never dirty, for every shower washes them off and they look fresh and new as if they were just taken from the shop; no rust, no green deposit, no fading yellow, nothing to the end of time (for that particular building), but tiles, blue, yel-

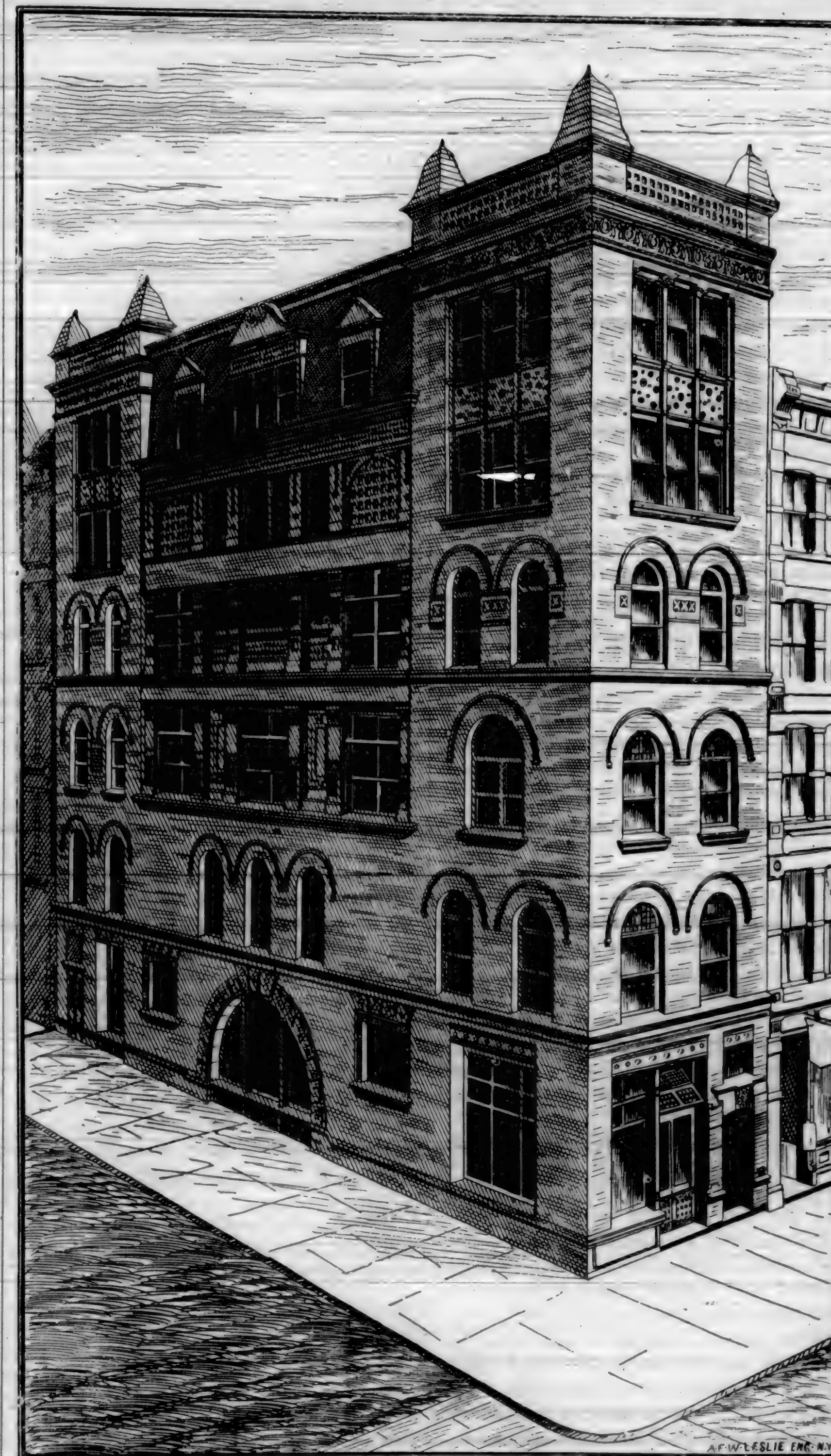


PLATE I.—NEW YORK STREET ARCHITECTURE.

Prepared for this Journal by A. Curtis Bond.

low, red, anything you please, first and last the same color, the same shade, the same tile. What a contrast these semi-civilized structures show to our streets! Painted bricks with the point scaling off, veneered brown stone and the veneer failing to adhere to its foundation, scagliola that looks moth eaten, stucco in a demoralized condition, and freestone with arabesques and scrolls worked upon it in mold. Why won't some courageous builder free himself from these horrible materials and try the effect of a tile front? It would require courage, perhaps, but I have an idea it would reward the attempt to introduce it, and the result, if adopted, would certainly be to vastly improve the appearance of our streets and detract somewhat from the chronic melancholy of our architectural countenances.

As I urged the claims of brick and found in it all the apparent essential qualities of a constructive material, it would hardly do to desert it entirely in favor of tiles as my preceding paragraph would suggest; so I must own to a certain allegiance to glazed bricks whose history has had particular attractions for me ever since I saw the old market church in the city of Hanover, which is said to be the oldest example of glazed brick work in existence. It is said that prior to the fourteenth century the glazed brick was but little known, or at any rate was very little used; early in the fourteenth century, however, its employment became more general, and from that time to a comparatively recent day, it has been more or less an accessory in architecture. A number of spires built from glazed bricks are found through Germany, and one who has never seen the effect of these glistening, brilliant structures can hardly participate in my enthusiasm in advancing them.

"The durability of glazed bricks does not depend upon their color, but varies according to the composition of the glazing substance. Yet, as the composition of the glaze reacts upon the color, it has been noticed that the darker kinds are, as a rule, better preserved. In the composition of the glazing substance each producer varies the proportion of the component parts according to the quality of brick to which it is to be applied, and according to the method of burning which he employs." These words are quoted from the report of the Hanover Architects' Society.

I wish these few sentences of mine might be productive of some good, and tiles or glaze be adopted in the place of paint and stucco.

The composite or eclectic, or whatever name the modern architect chooses to give it, has attained, and appears likely to retain, an unmistakable position among builders. Originally it gave the architect an opportunity for displaying his diversity of knowledge among the many differing and various styles that it was allowed, might be combined under this one general title; but as it has increased in popularity there has been given it a form somewhat distinctive to itself, and it may ultimately be ranked among the "orders."

The illustration accompanying our letter is an example of what may be termed New York Composite, and belonging to the most recent improvement of that character we can very safely accept it as embracing the latest and newest phases of the style. The building shown is of brick, with terra cotta trimmings, and the large square space on the side between the towers is painted a steel-blue, making a most peculiar and unusual, though by no means unpleasant, effect. The large windows in the upper part of the towers admit a fine light to two floors of architects' offices; the oval topped panels between the fifth story windows help to give variety to the general appearance, and in that way are most effective; the slabs between the windows of the third floor bear brass plates inscribed with the name of the building, the date of laying the corner-stone, and the names of the architects.

The building is known as "The Hartshorne," having been erected by Stewart Hartshorne, who has made himself more or less famous, locally, by the invention of a mechanical shade roller, that has probably brought about his ears more law suits and more litigation than almost any other one invention of any importance in the city. But it falls to the good fortune of some men to have a boom in this sort of free advertising that is no small element in their success. Those persons who are fond of tracing everything to its origin, tell us that the composite made up or composed of numerous other styles, was brought into being by the Romans when they were either originating or destroying everything on earth. They devised the form in order to show their dominion over all nations, most of these nations making use of one or the other of the component "orders," and thus being represented through its distinctive phase of architecture. The Romans heaped one above another, Tuscan, Doric, Ionic, Corinthian, until they completed a magnificent structure, and the composite though in some respects a nondescript, was, in others, the most beautiful of exteriors. Le Clerc writing of this style says: "It may with singular propriety be used wherever elegance and magnificence are to be united, but more especially in buildings designed to commemorate great and signal events, or to celebrate the corubine achievements of conquerors and legislators, inasmuch as the capitals or other ornaments may be composed of emblems and of allegorical representations."

Modern architects diverge widely from this model and have given us something more in consonance with the times.

At a recent meeting of the Maryland State Board of Health, it was decided that hereafter sanitary conventions or meetings should be held at least once a year, under the auspices of the board, in different parts of the State, with a view to promote a general interest in sanitary science, the first meeting to be held in Baltimore on the fourth Tuesday in October, 1883.—*Sanitary Engineer.*

The Mechanics' Fair for 1883.

THE preparation now in progress by the managers gives assurance that the exhibition which will be opened in September next will equal if not surpass that of any preceding year. And we presume that the good judgment and business perception of all manufacturers, inventors, artists, farmers, merchants, producers and dealers in goods, wares, and merchandise of every class and kind, will lead them to see and appreciate the value and advantages of the opportunity thus offered to expose and popularize that which each may have for sale or public patronage; and this appreciation should stimulate a general emulation in display, and so render the exposition, as it deserves to be, a splendid success. And we hope that exhibitors will amend the rule heretofore practiced, and have their spaces filled and fully arranged upon the opening night. The neglects and tardiness which has heretofore prevailed, of quite a number holding back, and not completing their exhibits for several days after the opening, has materially lessened the interest of the public in visiting the fair during the first week. This should not be so, and as very many of our Eastern visitors are likely to remain among us until after the opening, we sincerely hope that the display upon the opening night will be essentially as grand in every particular as that of any other evening during the continuance of the fair.

San Francisco Chapter of Architects.

THE regular meeting of the Chapter will be held the first Friday in August, at which it is earnestly desired that every member shall be present, as the nomination of officers for the ensuing year will be the special business of the evening.

The beneficial influences of the Chapter upon the profession, in an individual and general sense, is an admitted fact, and this fact should stimulate to earnest effort on the part of every member, to assist in sustaining and increasing Chapter interests, and making it a power for good in the architectural profession. And the Chapter vacation season expiring with August 3d, it is hoped that every member will be present.

PRACTICAL CARPENTRY.

PRICE \$1.00.

A guide to the correct working and laying out of all kinds of Carpenters and Joiners' work. Solutions of the various problems in Hip roofs, Gothic work, Centering, Splayed work, Joists, Hinging, Dovetailing, Mitering, Timber Splicing, Hoppers, Skylights, Raking mouldings, etc. This work should be in the hands of every mechanic. One of the features to which this book will undoubtedly owe its success, is the absence of those numerous formulas which serve only to confuse the ideas of so many workmen. Everything is written in a clear, concise, and practical manner, and its utility is brought within the grasp of those workmen who have not had the benefit of a school education. We will send the above work to any address upon receipt of \$1.00.

Pacific Grove, Monterey, vs. Carmel River.

THE INTRODUCTION OF THE WATERS OF THE CARMEL RIVER THROUGH PACIFIC GROVE AND TO THE HOTEL DEL MONTE.

NESTLED at the foot of verdure-clad hills facing the beautiful bay of the same name, lies the quaint and ancient town of Monterey. Its old adobe ruins suggests to the pleasure-seeker, visions of scenes in the tales of the Alhambra. One is struck with awe as he mounts the deep-cut steps to the tower of the Old Mission church, and gazes on the work of those who lived more than a century ago. We linger but a moment to gaze on the ruins of the fast decaying Convent, and mentally wish that some philanthropist would enclose them for protection against the wear and waste of time, that future generations may look upon the work of the founders of this western country and note the progress of architecture from the rude adobe to the magnificent capitol of our State, and other more modern constructions.

Leaving the quiet, dreamy old town of Monterey, "where every person seems satisfied with himself, apparently believing the world is completed—living on in the dreamy self-satisfied consciousness that the spirit of progress is at an end," the pleasure-seeker presses onward to the beautiful Pacific Grove, passing numerous points and things of historic, and present interest,—among them the window in the old adobe at which Mrs. General Fremont sat while writing her descriptive letter of California; the first brick edifice erected in the State; the solitary and semi-sacred cross which marks the spot upon which the reverend pioneer fathers first planted their feet on the shore of the bay of Monterey, bearing the legend, "June 3rd, 1770"; the old fort with its one solitary gun keeping sentinel only over the dead silence of the crumbling bastions; the adobe in which the early Legislators first met in council to deliberate upon and frame the organic and legislative laws of the State; the little cove where the fishermen rest from their daily labors, and on to the beautifully wooded lane leading to the Grove where thousands yearly meet to enjoy the comforts of a delightful sea-shore resort; over and through which the pure ocean breezes spread themselves, while weary ones rest in the shade of a thousand trees, and countless songsters warble forth sweet music from the branches of the cypress, pine, fir, and other varieties.

There are but few prettier sights to be seen than the beautiful view presented in the approach to the Grove. The drive-way is grand, straight as an arrow, even the branches being trimmed that nothing may mar its symmetrical beauty, it presents a scene that at once engages the attention of even the phlegmatic observer. One can well say that nature is not at variance with art, nor art with nature, they both being servants of his Providence. Art is the perfection of nature, and in the beautiful drive before us, as we look

upward and see the blue sky beyond the gently swaying trees, we say "tis very sweet to one who has been long in city pent to look into the fair and open face of heaven—to breathe a prayer full in the smile of the blue firmament." Thus it was with us, and arriving at the entrance of the retreat—"far from the gay cities and the haunts of men," we involuntarily paused at the sight before us. Lanes of fantastic cottages, gayly trimmed tents, romping, galloping children, nurses toddling the little ones in their arms,—surely we are but dreaming, or else our imagination is dwelling on an old oft-told fairy tale.

We rambled around the grounds, keeping always in view the object of our journey, and admiring the almost perfect sanitary regulations and conveniences of this beautiful resort. We say ALMOST because there has been but one thing lacking to make this place resemble that described in the opening chapters of the Book of Holy Writ, and that essential is a lack of sufficient quantity of pure water.

But master minds had long been engaged planning a remedy for the only defect that nature had imposed upon this quiet resort. Twenty miles away flows the beautiful Carmel River. For ages past, it has poured its limped waters into the bosom of the grand old ocean; but to-day, its currents have been brought under subjection, and in the future the Grove, Monterey, and del Monte will be supplied by its pure water. This river has long been noted for the almost chemically pure properties of its water. It is fed by numerous living springs and flows nearly its whole length over rocky ground. It is our pleasant task to describe how this water is brought to the Grove as pure as when it leaves the Carmel River.

The point selected by the engineer for the construction of the mighty dam that is to hold in its embrace the element without which all animal and vegetable life would cease, is about twenty-five miles from Monterey. To the uninitiated, a more uninviting place could hardly have been selected. Great credit is due to the intuitive ability of the engineer, by which at a glance he could see how each and every obstacle was to be met and overcome. Engineering difficulties that would have discouraged any one with less energy and skill, were so studied and handled that the work in contemplation seemed to be directed as were the pyramids of old.

From the dam in the river to the reservoir near the Grove, the water is conveyed in iron pipes. The first six miles, eighteen-inch wrought iron pipes are used. In places the bluffs are so steep that holes are drilled in the solid rock, into which are placed heavy iron brackets, and upon these are placed the large pipe above mentioned. A covering has been securely fastened over the pipes to protect them from falling rocks.

At the end of the distance named the pipes are changed in size to fifteen-inch boiler iron. This is maintained for a few miles, when it is again changed to a twelve-inch cast iron pipe,

* L. D. Norton, Esq.

three-fourths of an inch thick, and for the rest of the way the pipes are of this size and thickness. Much of the ground passed over is very rocky and full of clefts, as if some great force of nature had exerted itself to sectionize the ground by a system of deep cavities or gorges, many of which are bridged over; and in passing some of these clefts the pipe assumes the shape almost of the letter V. In such cases, at the bottom of each a cock is placed that the pipes in case of necessity may be cleaned of sediment, a cock is also placed at the apex, for the purpose of affording escape to pent up air.

That the cast iron pipe may be free as possible from danger, a trench about three feet deep is first dug in which the pipes are placed. After the latter has been tested the trench will be filled and the dirt thoroughly tamped. Trees near the route of the pipe line that show evidences of decay, have or soon will be cut down. A tree falling across the pipes will not be apt to break them on account of the depth they are placed in the ground. The more serious difficulty lies in the fact that the roots of a tree in falling may be under the pipe and thus lift it out of its bed, perhaps breaking one or more joints. As far as human ingenuity can do so, this has been guarded against.

Our engraving shows the point where the pipe reaches the reservoir. This is situated about one-half a mile above the main entrance to the grove. Plate No. 2 shows the character of the work done before the reservoir was constructed. The ground was covered with trees, and it was no small task to cut them all down, grub out their roots, and clear the ground of rubbish. It is and has been the main purpose of those having this work in charge, to preserve the purity of the water, and in order to do this, every particle of vegetable matter, roots, etc., have been removed from the ground covered by the water within the reservoir. All the top soil has also been removed, and our engraving shows a body of men shoveling this top soil into a large pile to be moved to the outer edge of the dam.

It will also be noticed that a deep trench runs across the site of the dam. This idea and its fulfillment is one of the engineering triumphs of the master in charge. This trench is from twelve to sixteen feet in depth, and extends down to hard pan the whole length of the ground covered by the water when the reservoir is full. It is about six feet in width. This is to be filled with a solid wall of clay well tamped down. While excavating the pipe line, a large mass of clay was met with, and it almost seemed as if Providence intended it for the use to which it is applied. The clay is first puddled and then the ditch is filled with it, while hundreds of rammers are making it an impenetrable wall against the encroachment of the water. As this wall is gradually built up, the soft dirt on the inside is taken off and placed on the outer edge of the dam.

When finished the dam will be one hundred

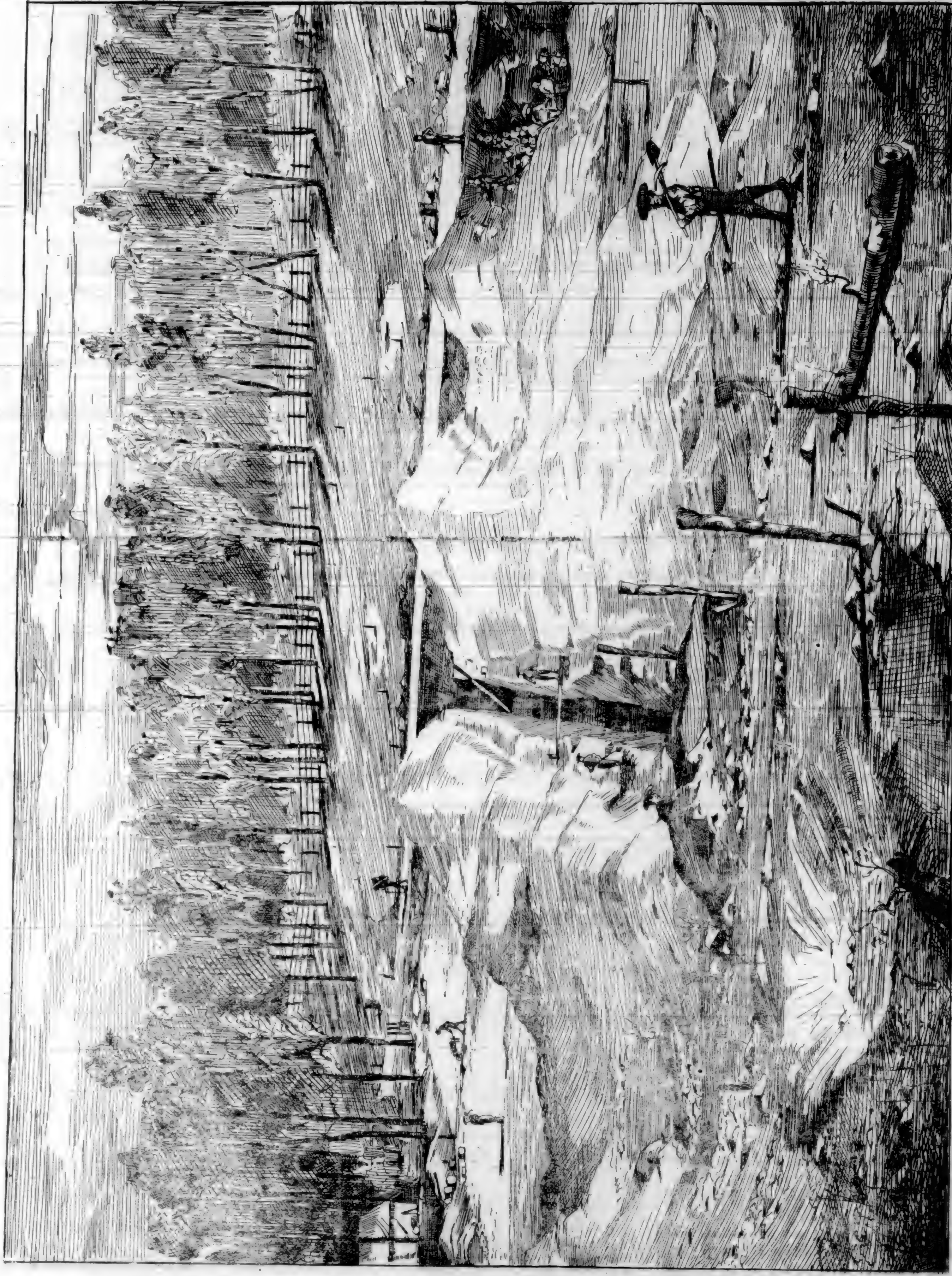


PLATE 2.—This engraving represents the construction of the new dam for the reservoir of the Pacific Grove water supply. The ditch shown is to run across the full length of the dam, and is to be filled with a solid wall of clay, as described on page 109.

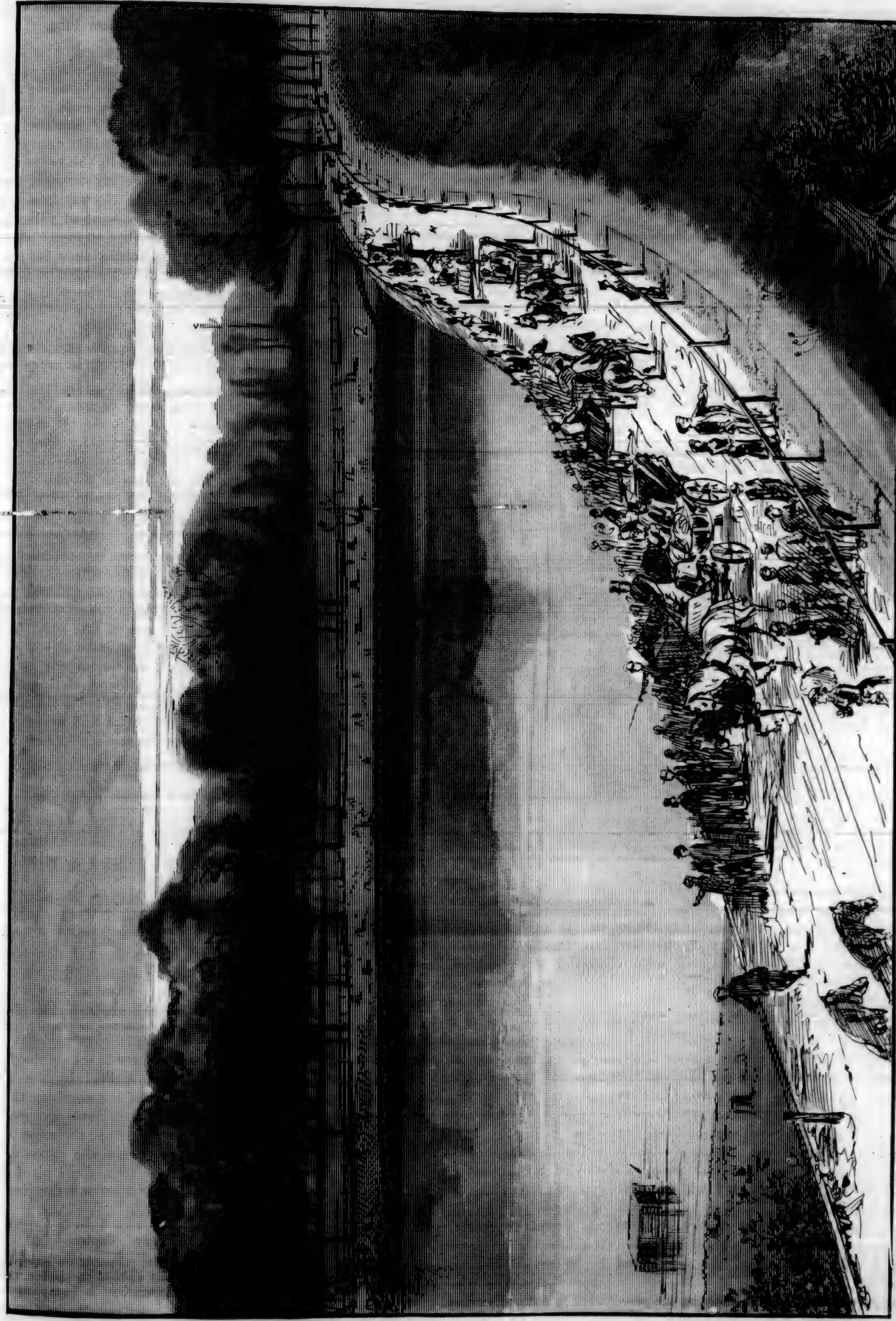


PLATE 3.—This engraving represents the dam when finished. It will be one of the prettiest drives of the many around and about Pacific Grove. See page 109.

and eighty feet wide on bottom, and thirty feet on top. Its height will be about thirty-five feet at the greatest point. The capacity of the reservoir will be about fifteen million gallons. The supply pipe will furnish one million three hundred thousand gallons daily, and should the supply pipe at any time be so damaged that it can not be used for a week or more, the water in the reservoir will be abundantly sufficient to supply all the country over which the pipes pass, for at least thirty days, and with reasonable use will last sixty days or more.

Much care has been exercised to prevent the formation of little shallow pools around the edge of the reservoir. Usually these are regular breeding places for mosquitoes and other insects. The whole outer edge of the ground encircled by the inclosed water will be sloped at an angle of about forty-five degrees, thus preventing the formation of stagnant water in shallow places.



From the reservoir the water is taken through a four-inch pipe over every portion of the Pacific Grove Retreat. It is the intention to change this size to a six-inch pipe whenever the demands of the grove require such a change.

From the description of the work now in process of completion, it will be seen that an abundance of pure water is guaranteed to those who seek the quiet precincts of the Grove for either health or pleasure. It will be greatly appreciated by those owning lots, as they can beautify their premises with flowers, trees, and shrubs, and have the great life-giving element at their very door. Another advantage greatly to be appreciated by those who love to drive over a fine road, will be, that the roads can be kept well watered. Tanks can be erected at a few different points, thus enabling sprinkling carts to keep the road in splendid condition between the Grove and Monterey.

We append a little sketch showing the pres-

ent facilities for supplying the Hotel del Monte, which although it is but a small engine inclosed by a rude shed, is a source of much attraction to the many little ones who are amused at the click chuck music of the pump as it is worked by the engine; and the pleasure thus afforded to innocent prattlers, furnishes the subject of numerous childlike stories for mammas and papas.

Now that pure water is to be supplied in quantities abundant and sufficient for all purposes, to those who seek the pleasant retreats of Pacific Grove, Monterey and Del Monte—while the waters of the broad Pacific Ocean lash the craggy shores, and the far stretching, crystal sand beaches of the bay of Monterey, it is reasonably to be anticipated that the portion of Monterey County encompassed in this article will at once, or at a very early day, become the leading and principal resort in the State; not only of the resident population, but of the thousands who now,

and the tens of thousands from all parts of our own and foreign countries, who will yearly visit this coast in search of the picturesque, instructive and pleasant things that so richly abound in all parts of California, and in the section of country under notice in a special manner. While grandeur of scenery and spots delightful for resting places during the summer months may be found in numerous other localities, we know of none which affords superior if equal advantages over the region under notice, with its land and ocean views, its splendid and numerous macadamized roads—unequaled by any other pleasure resort region—leading and winding through thickly studded wood, quiet groves and valleys; now exposing the smooth or ruffled bosom of broad ocean, now opening up extended views of hill and mountain scenery, and again closing in beautiful fertile glens and valleys, all combining to furnish food for the contemplative and appreciative mind with Nature's most perfect work in natural scenery.

Strength of Yellow Pine.

It is reported that a comparison of the relative strength of yellow and Norway pine was made at Dayton, O., with the following results: The specimens were dressed exactly one inch square, and these were broken in a testing machine by placing them on bearings, one foot apart, with the weight in the center. The southern pine had been air seasoned for two years and upwards, the Norway from a year to fifteen months. The weakest yellow pine broke at 736 pounds, the strongest at 1,102 pounds; average of eight specimens, 904 pounds. The weakest Norway broke at 501 pounds, the strongest at 790 pounds; average of ten specimens, 702 pounds, showing the yellow pine to be 28.7 per cent. stronger than Norway, and that a yellow pine sill 4x8 inches dimensions is equivalent to a Norway sill of 5½x8 inches, with the further advantage in favor of the yellow pine that it can be got much freer of knots and consequently stronger in comparison than these figures show, which are based on clear timber. Another test was made at a meeting of the Master Car Builder's Association, with the following results: Five pieces of each variety, one inch square and eleven inches between bearing points, were experimented upon, the pressure being applied in the center. The outcome showed strength of yellow pine at 500, 510, 500, 490, and 530 pounds breakage strain, or an average of 506; while Norway stood a strain of 620, 645, 730, 650, and 630 pounds, or an average of 635 pounds. These experiments do not appear to throw much light on the question of relative strength, and unless it can be attributed to the difference in seasoning, it is hard to find a satisfactory reason for such a discrepancy—*Northwestern Lumberman.*

Wheeler's Patent Wood Filler.

This is by far the best article of its kind that has as yet been brought to our notice. One coat prevents any further absorption, hence the oil in subsequent coats of paint will stay with the pigments. It gives the wood a surface as smooth as ivory. We are pleased to announce that the Bridgeport Wood Co., manufacturers of the above Filler, have established an agency in this city, where any quantity can be had. Architects will do well to call for this Filler in their specifications.

It is said that from 95 to 98 per cent. of all the railroad locomotives in use in the British colonies were manufactured in the United States, and that all of the continental European countries have their roads equipped to a greater or less extent from the same source. Within the last ten years the exportation of railroad locomotives from the United States has aggregated \$12,000,000 and the passenger coaches \$40,000,000.

Sample Copies.

Hereafter we will forward no sample copies of this Journal unless the price, twenty cents for each number, accompanies the order.

Supplement No. 2.

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Each page will be beautifully illustrated with designs exemplifying different classes of building in the styles of Architecture now prevalent on the Pacific Coast. Suburban and Country dwellings, City Residences, Cottages, with plans and explanations of the same,—in fact all kinds of buildings will be shown.

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Special care will be taken to present to Mechanics all the new ideas in regard to framing buildings, rules by which all the various cuts in Carpentry are made, and items of information generally in regard to the Building Trade.

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Special arrangements are being made for the distribution of this Supplement. In order that a copy may reach all the bona fide residents of this State, we have divided it into several routes. First-class men have been engaged, selected especially for their ability to further the interests of the projectors of this enterprise.

To show how the distribution is to be made we will describe one of the routes. One man will leave this city in a buggy, taking a

Tour Around the Bay.

He will stop at every town and leave every resident, as far as practicable, a copy. Whenever convenient along the route, he will leave some amongst the farmers. By this means the towns of San Mateo, Redwood City, Menlo Park, Mayfield, Santa Clara, San Jose, Alviso, Newark, Centerville, Mission San Jose, Niles, Hayward, Eden, Alvarado, San Leandro, San Lorenzo, Alameda, and Oakland will be thoroughly supplied.

Another employee will proceed by rail to Modesto; after supplying that town, he will in succession stop at the towns of Ceres, Turlock, Merced, Athlone, Berenda, Madera, Borden, Fresno, and in fact every town as far south as Los Angeles. We will send by express the number we desire to have distributed in each town, so when our Agent arrives in that place he can proceed at once to deliver the number sent. In this way his time will be used to advantage.

Of course the main design is to

Increase the Circulation

of this Journal; and advertisers will please remember that all steps taken in this direction is so much to their advantage.

A Limited Space Only

will be given to advertisements. The columns will be about 3½ inches wide. A square will be the width of one column, by a depth of one inch.

A Uniform Rate

of \$2.50 per square will be charged. No deduction for a space less than five squares. Special contracts made for larger spaces.

One Hundred and Six Reams

of paper, 480 sheets to the ream, of good paper have been secured, and we guarantee an actual edition of

Fifty Thousand Copies.

This is allowing 880 for wastage, but of course it will be much less than that number.

Oregon, Washington, Hawaiian Islands, and in fact this mammoth edition will be distributed all over the Pacific Coast and adjoining islands.

Particular Notice to our Eastern Advertisers.

We will not have time to carry on a lengthy correspondence in regard to the insertion of advertisements. The facts are just as we state. An edition of 50,000. A uniform rate of \$2.50 per square. There will be no choice place as all pages will be equally interesting. The perfect system by which we distribute this Supplement will ensure the notice of your wares being seen by more than

One Hundred Thousand

residents on the Pacific Coast. The fact that this Supplement will be under the superintendence of the Business Manager of this Journal, is a sufficient guarantee that all the designs contemplated will be faithfully carried out.

Please Notify the Manager

of the California Architect and Building News immediately the space you will require. Eastern advertisers not personally known to us, must send either a post-office order for the amount of their ad, or else send us references to parties in this City.

Address GEO. H. WOLFE,

Business Manager California Architect,
240 Montgomery Street, San Francisco.

Solid and Hollow Iron Columns.

A CONFUSION of ideas is sometimes found among practical men respecting the comparative strength of solid and hollow pillars. One hears it often said, for instance, that a hollow pillar is stronger than a solid one. Now this is, as one able authority has pointed out, not absolutely the case; it is perfectly true that comparing the strength of two pillars of the same height and diameter, one solid and the other hollow, that the latter has the advantage of being economically stronger. The fact is, the solid column is stronger than the hollow of the same external diameter; but the lesser area is more effective than the greater, because the central portions of the solid pillar are less useful in resisting the bending force than the metal in the circumference of the hollow pillar. But if the quantity of material in both the solid and hollow pillar of equal height is the same, the hollow pillar is by far the stronger. A simple geometrical construction will enable any one to understand this fact, by enabling us to proportion a hollow column of the same area as that of a solid one, by one of the diameters being given. It is shown, in fact, that hollow columns of the same area of metal as a solid one, may be made to any larger diameter, their strengths increasing proportionally till a limit is reached by the shell of the metal becoming too thin to insure a sound casting. Taking an example from Downing's work, a hollow pillar 9 inches in external diameter, having an internal diameter of 8.062 inches, and a thickness of 4.7 inches, or about one-half inch, is five and one-half times stronger than a solid pillar with the same quantity of metal. A thickness of one-half inch may be regarded as a practical limit in manufacture.—*Building News.*

PREVENTION OF FADING IN SHOP WINDOWS.—The Swiss *Gewerbe Blatt* recommends a remedy for an evil which drapers and many other shopkeepers have long experienced, namely, the fading or bleaching of many kinds of colored articles when exposed in the shop windows. The authority quoted says that this fading or bleaching is brought about only by the white rays of the sun's light, and, where it occurs, it shows that the glass is more or less perfectly colorless. It is found that if, instead of such colorless glass, the window panes consist of glass which is slightly yellow, the bleaching or fading process is prevented. Where the glass is colorless and cannot be replaced by slightly yellowish tinted glass, the desired effect may, it is said, be produced by simply giving the panes a coating of copal varnish.

New Catalogue.

We will mail a copy of our new catalogue of designs for Crestings, Fences, Finials, Posts, and wrought-iron work of every description, upon receipt of a letter from parties desiring them.

BIGELOW, SIMS & MORRIS,
Western Iron Works.



Architects, Contractors, Carpenters, and Mechanics generally are respectfully requested to furnish us items of interest for this column. We will gladly answer any and all questions pertaining to the architectural and building interests. If illustrations are necessary to explain your ideas, send us a sketch of them and we will make the cuts.

EDS. ARCHITECT:—In your really good article on the Pyramids, you failed to mention one very important fact, which is this:—It has been proven beyond a doubt that the GREAT PYRAMID was covered from top to bottom—over the “steps” with polished granite. Now to say nothing of the difficulty of putting this on up to the apex, the question presents itself, “How did they get that, the crown, the key of the whole structure, in its place.” This is a very difficult problem to solve. Of course I do not pretend that the above is an original question, but it may meet the eye of some one who has given the subject much study, and I for one would like to know the latest truths that the researches of science have made. Yours truly, J. B.

CLEANING SCREWS FROM RUST.—Rust can be removed from small screws, etc., that are too small for holding against an emery-wheel, by attrition. Take, say, one pound of screws, and place them in a box; a cigar-box will do. Put a small quantity of oil on them, and shake for another minute or so, and then sift the sawdust from the screws in a fine sieve, when the screws will be found to be as good as new.

STAINED glass windows can now be made at home by attaching to the plain window, in artistic combinations, the clippings and waste from the bench of the glass-cutter. There is a little wheel sold for something less than a dollar which will cut the glass, and with this the amateur can shape the pieces to suit himself.

A decided revival in the demand for mahogany is reported in the English markets. The wood is increasing in favor generally, and is much desired in cabinet work. Mahogany furniture is largely in stock. Figured logs are less desired, but the wood of rich color is greatly sought after.

IMITATION of ground glass can be easily produced by dissolving about two table-spoonfuls of Epsom salts in a pint of lager beer, and painting the glass with the mixture. When it is dry the glass will appear as if frosted, and the effect is very satisfactory.

“MODERN HOUSE CARPENTER'S COMPANION.” Price \$1.00.

Chimneys.

AMONGST the lost arts we must, it is feared, include the art of building chimneys which will fulfill their proper function; and the smoke nuisance not only poisons the air we breathe, and undermines our health, but it defaces our architecture into the bargain.

It is very much to be suspected that the building of chimneys is left in a great measure to chance, or they would not be so bad as they are. The conditions which should be observed to secure success are well known and are easily obeyed. First the chimney-stack should discharge at as high a level as convenient so as to ensure that the outer column of cold air shall have a marked preponderance over the equal column of warmer and therefore lighter air in the flue. The modern custom is to cut off the chimney-stack as soon as it shows itself above the roof. The additional height is quickly made up by the substitution of a zinc tube, and shows that the original error lay in robbing the stack of its due altitude. Secondly, the area of the flue is almost always in excess of the requirements. The traditional 14 in. by 9 in. was, as has often been pointed out, determined by the fact that the climbing boys who swept the flues could not ascend safely in less space. But with the disuse of boys for this service the reason for the old dimension of the flue vanishes. The late Mr. Cubitt found, as the results of experiment, that a better size was 9x9 inches, and that this was enough for all ordinary purposes. For many years the writer has adopted this form of flue and his experience of its efficacy exactly agrees with Mr. Cubitt's.

Thirdly, the outer casing of chimney-stacks is generally too thin. A half brick is the usual allowance, not "of the best material and workmanship." Now, we know that this is no protection against cold and wet, and that if the upper part of the chimney is cooled the ascending current is checked in consequence. The writer never on any account employs less than nine inches in such a situation, and he is confident that nothing less should ever be allowed if the draught of the flues is to be satisfactory.

And fourthly, the fire is too often quite unprovided with air from the outside, so that the heavier column spoken of above is not brought to bear on the base of the lighter one in the flue, and a sluggish action at the best is the result. The builder who is anxious that his flues should "draw," should be careful to provide a copious supply of fresh air in the region of the fire, and this can be done without draught by a modification of the expedient which, though a very old one, is usually associated with the name of Mr. Tobin.

With the above precautions it is not probable that any trouble will arise from smoky chimneys, but it must be owned that sometimes the evil is met with in spite of every precaution. The "best laid schemes o' mice and men gang aft agley," and the action of smoke from an open fire is now and then, to

say the least, capricious, and often baffles all our best endeavors.

This is a difficulty which should be resolutely faced, and if some form of cowl is inevitable it is the architect's duty to take up its design. If there is one characteristic which more than any other distinguishes the builders of past time from their modern confreres, it is the frankness with which they accepted, and the skill with which they turned to artistic account, the necessities of their time one by one as they arose. Evasion and subterfuge were alike undreamed of in their philosophy. They set themselves without hesitation and without reserve to their task of rendering comely whatever was found to be necessary or useful. There is not a beauty in the old work but is the result of the judicious treatment of what was at first a difficulty, and features which we copy long after the original necessity to which we owe them has ceased to exist, survive simply as evidence of this special and peculiar gift of our ancestors. The faculty was so complete and universal that its exercise seems almost like the result of instinct, and thus to lose its merit as art.

Amongst the many instances of the directness and certainty with which the early builders developed to the utmost the artistic possibilities of every new problem as it presented itself, we may cite the domestic chimney itself. The hall *louvre* was always a picturesque feature, and we should regret its abandonment in favor of the fireplace, but for the various and picturesque forms which the architects devised for the chimney-stack which replaced it. If we trace the history of this feature from its first appearance as a single shaft with side piercings at its summit until its glorification under the Tudors, one cannot fail to be struck with the ingenuity, the perseverance, and the versatility of its designers.

Hitherto the modern architect,—in face of the enormous probability that as soon as his building leaves his hands it will be disfigured by some sort of smoke-extracting apparatus,—has been quite careless as to what shape such apparatus shall assume; and there is something almost comic in the *san/ froid* with which, after taking infinite pains about the design and details of every other part of his work, he leaves to those who care nothing about it the task of crowning it with an array of cowls.

The conclusion at which we are compelled to arrive is that although by care we may very considerably diminish the necessity for cowls or some cognate contrivance, cases will arise in which they are indispensable, and therefore they should form the subject of the architect's attention. Here is a new field for the exercise of whatever skill in the art of design is left amongst us, and we would suggest the matter as a fit one for the Institute prizes. In making a serious attempt to devise a suitable form for a necessary adjunct of our buildings we should be following the steps of the architects of old who never shirked an opportunity of

the kind. Whether our endeavor should be attended with the success which invariably waited upon the efforts of our predecessors it would perhaps be rash to predict,—but at any rate the attempt should be made.—*The Builder*.

High Buildings and Fires.

THE increasing tendency of land owners and builders in large cities to utilize the ground area as much as possible by erecting lofty buildings, requires some commensurate means to prevent fires and to stay their progress. Our best steam fire engines are wonderful improvements on the old time hand engines, and they can force an unbroken stream of water in round, solid column for a considerable distance from the nozzle, unless exposed to a high wind or the direct heat of a raging fire. But these adverse conditions often exist and turn the water column into diffused spray, or dissipate it into mist or vapor, when most of its effective force is lost.

Recent experiments, however, suggest that if the force of the engine could be exerted on a confined column of water rising vertically to the roof, sufficient power would remain in the impulse from the engine to deliver streams of solid water over the area of any ordinary city building. A steam fire engine was recently tested which threw water 156 feet horizontally from a one-inch nozzle attached to a 2½ inch hose running 2,700 feet on a level and 200 feet above the engine. In this instance a very large column of water was made to deliver a moderately small column at a great height above the engine; but by the employment of two or more engines on the same hose, by means of the two-way or the four-way butt, a result may be reached which will place the roofs of the highest buildings under the control of the firemen.

This can be effected by a fixed stand pipe attached to the building so as to be easily reached by the firemen from the street. This stand pipe is, in effect, a prolongation of the ordinary engine hose, and the nozzle, with a convenient length of handling hose, may be attached to the top of the pipe, or to an opening on any floor.—*Scientific American*.

BRASS work that is so dirty by smoke and heat as not to be cleaned with oxalic acid, should be thoroughly washed or scrubbed with soda, or potash water, or lye. Then dip in a mixture of equal parts of nitric acid, sulphuric acid and water; or, if it cannot be conveniently dipped, make a swab of a small piece of woolen cloth upon the end of a stick and rub the solution over the dirty or smoky parts; leave the acid on for a minute and then wash clean and polish.

Important to those Receiving this Journal.

Should this Journal be received by any subscriber who does not want it, or beyond the time they intend to pay for it, let them not fail to write us direct to stop it. We will not knowingly send the paper to any one who does not wish it, but if it is continued through the failure of the subscriber to notify us to discontinue it, we shall positively demand payment for the time it is sent.

Paint for Floors.

A PAINT for floors, which economizes the use of oil colors and varnish, is described in the German technical press as having been composed by Herr Mareck. It is remarked that this paint can also be used on wood, stone, etc. For flooring, the following mixture has been found applicable: 2½ ounces of good, clear joiner's glue is soaked over night in cold water. It is dissolved, and then is added (being constantly stirred) to thickish milk or lime heated to boiling point, and prepared from one pound quicklime. Into boiling lime is poured (the stirring being continued) as much linseed oil as becomes united by means of saponification with the lime, and when the oil no longer mixes there is no more poured in.

If there happens to be too much oil added, it must be combined by the addition of some fresh lime paste. For the quantity of lime previously indicated, about half a pound of oil is required. After this white, thickish foundation paint has cooled, a color is added which is not affected by lime, and in case of need the paint is diluted with water, or by the addition of a mixture of lime water with some linseed oil. For yellowish-brown or brownish-red shades about a fourth part of the entire bulk is added of a brown solution obtained by boiling shellac and borax with water. This mixture is specially adapted for painting floors. The paint should be applied uniformly, and is described as covering the floor most effectually, and uniting with it in a durable manner. But it is remarked that it is not suitable for being used in cases where a room is in constant use, as under such circumstances it would probably have to be renewed in some places every three months. The most durable floor paint is said to be that composed of linseed oil varnish, which only requires to be renewed every six or twelve months. It penetrates into the wood and makes it water resisting; its properties being thus of a nature to compensate for its higher cost in proportion to other compositions used for a similar purpose. Its use is particularly recommended in schools and work rooms, as it lessens dust and facilitates the cleaning of the boards.—*The Builder*.

Scarfed Joint.

WHAT is meant by the term "scarfing," applied to wood or metal in making a joint? *Ans.*—It is often required to unite two pieces of metal or of wood, in such a manner that the joint shall not be thicker than the rest of the piece when joined. To make a secure joint, however, it is necessary that the ends of the pieces should lap somewhat, and to avoid the extra thickness, the edges that are to be joined are beveled off, or "scarfed," so that when the edges so beveled are laid together by overlapping, the two pieces have the same thickness. Such a joint is called a "scarfed" joint, or lap joint; and the operation is called "scarfing." The manufacture of lap-welded boiler tubes

affords a good illustration of forming a scarfed joint with metal, both edges of the "skelp," or plate, that is to form the tube being beveled preparatory to passing it through the forming die. In carpentry it is not necessary that the edges of the pieces of wood to be joined should be beveled; but any method of joining together two pieces of timber, by bolting or nailing them together transversely, so that the two appear as one, is called "scarfing," and the joint is called a "scarf."—*Wood Worker and American Lumberman*.

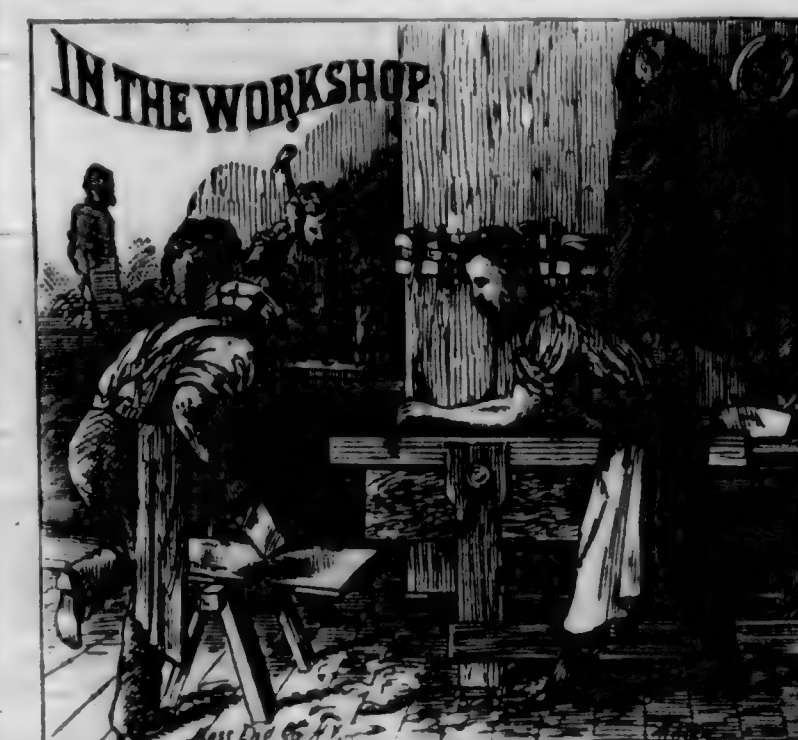
PITCH PINE.—Pitch pine is increasingly used all along the west coast of France, not only for parqueting, but in building. The American pitch pine flooring has been ascertained to have an advantage over that from the north of Europe—both costing nearly the same—which consists in its great durability and freedom from knots, giving it a much finer appearance. The French demand, it is expected, will grow large, while there is considerable consumption in Spain.

A WRITER says: Wood-workers are well known to be peculiarly liable to accident in the pursuit of their trade. Of course the keen edges and the swift-running machinery with which they have to deal, render their occupation a dangerous one, but I think it is safe to say that nine-tenths of the accidents can be fairly attributed to carelessness pure and simple. One proof of this is found in the fact that the larger part of the sufferers are not young and inexperienced hands, but those in whom familiarity has bred contempt.

SEVERAL kinds of hardwood lumber are gradually coming into use, which, a few years ago, were unnoticed. Beech is one of them. It is cheap and abundant, while the more popular hardwoods are becoming comparatively scarce and consequently high-priced. Beech has a fine grain, is quite durable, and is used in the manufacture of school and church furniture, chairs, and to a certain extent in furniture. The red variety has a handsome appearance, and can be made to imitate cherry.

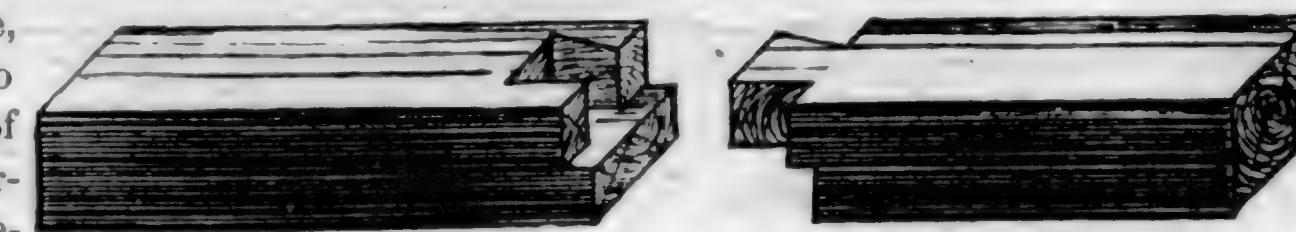
THE *Art Amateur* for July contains an admirable and copiously illustrated article on "The Theory and Practice of Pen Drawing," and is alone worth the price of the number to the many who are interested in this humble but useful art. No one interested in art should fail to examine the July issue of this excellent magazine.

In the Olympia District, W. T., a yoke of oxen for logging purposes costs as much as a span of horses—\$350, and the demand exceeds the supply. Hay costs \$30 a ton, chopped feed \$35, and wages of men \$68 to \$100 a month.



We will be pleased to receive for publication in this column items of information in regard to practical ideas connected with the mechanical part of the building trade.

EDS. ARCHITECT: In your September issue, 1882, you illustrated the various scarfs or joints used in splicing timbers. You fail, however, to give one that can be used when the timber is only a little long and a short splice is required. The following cut which I send you will explain itself. It is much used in the East when the timber, in length, will not justify the use of the long joints shown in your article of the date mentioned.



You also say that "in every splice, no matter what the shape may be, there should be bolts through the joints securely fastening them together." In the accompanying illustration you will notice that a very strong splice can be made and no bolts whatever are needed. Yours, etc., E. B. R. Portland.



We thank our correspondent for the above suggestions. We do not agree with him however, that the splice referred to is just as strong without a bolt. It is a very difficult one to make and have the parts fit perfectly, and unless a perfect fit was made, the joint would be a very poor one without being held together by bolts.

EDS. ARCHITECT: Please give me a rule by which I can find the number of studs required around the outside of a building, placed sixteen inches from center. S. R. T.

FIRST get the exact measurement of the outside of the building in feet. Take three-quarters of this amount and add one stud for each corner and angle, and one for each opening. Plates and gable studding are to be added extra. A rough and ready rule is to allow one stud for every foot of the outside measurement of the building.

"COTTAGES AND VILLAS." Price, \$6.00.

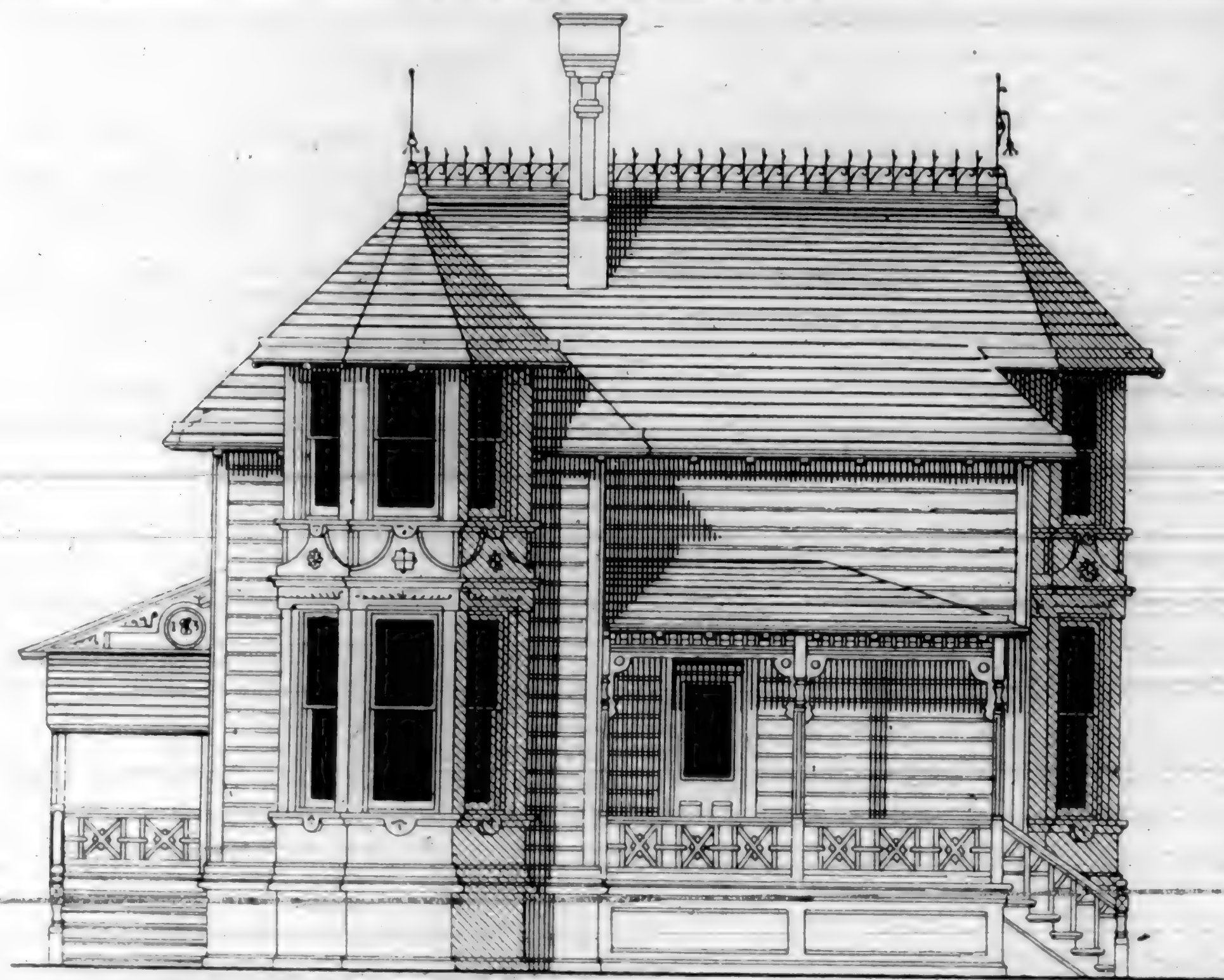


PLATE 4.—A SUBURBAN DWELLING COSTING ABOUT \$3,000.

The Other Side.

[We admit the following communication to our columns for the single purpose—as far as its references and inferences go—of showing in what manner, and to what extent skilled and unskilled labor has been and is affected by the acts and successes of the railroad companies. We leave the vexed question of regulating freights and fares—direct commissions, &c., to the tender mercies of the general press.]

STRANGE as the announcement may be to the average man, yet the fact remains that there are two sides to every question; the one idea, and one-sided creatures who foam over and fill the daily press with froth when discussing the railroad question in this State, seem to have forgotten, if in fact they ever knew this general proposition. Judging from their wild statements we are living under a tyranny worse than that of the Czar of all the Russias,—our State lying prostrate under its iron heel, and all enterprise heavily handicapped by its remorseless grasp, etc., etc., *ad infinitum*—while strange again is this fact, that the men who raise this howl of anguish, and thousands who join in it, never pay one dollar for freight or passage over this terrible road, but feeding daily at this miserable mess of prejudice, ignorance, and brainless nonsense, they gradually come to believe that they are the most down-trodden people on the earth's surface, and raising their hands in holy horror they cry, Down with the magnates (*magnates* by the way is remarkably effective), and howl all the louder in hopes that the noise may become so obnoxious to the railroad people, that they may be induced to offer them a little coin to stop their miserable wail.

Now we wish to state a few facts and ask

fair-minded men and women to give them their full weight in making up their minds on this important question. First—The large number of gentlemen employed by the great Railroad Corporation (hirelings, see daily press) include some of our most active and useful citizens, who take as much pride in the prosperity of this State as any portion of its inhabitants. And being as a rule well paid for the services they render, in return are faithful in the performance of their duties; at the same time obliging and courteous to those who transact business with the road, comparing most favorably in this respect with the working force of any Eastern corporation.

Second—The immense sums of money expended in this city and State, giving employment to thousands, encouraging home manufactures, and quietly but surely adding to the substantial prosperity of the Pacific Coast.

To call attention in detail to part of this constant outlay of money, we would cite the millions spent on the palaces on California Street Hill, the construction of which employed for several years hundreds of our best mechanics at the highest rate of wages, and whose beauty and splendor are the pride of every true citizen.

The very large expense incurred in building the California Street Cable Road, the efficient manner of its equipment and daily management; also the large amount of property enhanced in value by its construction.

The millions now being expended on the Market Street Cable system, sparing no expense to secure a roadway that shall last, run

smoothly, and be a continual source of pleasure to those who patronize it. This first-class road with all its branches will be one of the chief features of our city, its equipment and management the very best, while property all along its far-reaching lines has advanced, and will still more advance in value, giving promise of the erection of hundreds or new buildings as soon as it is completed.

The million and over spent upon the mole and new depot on the Oakland side, which is unsurpassed by any ferry company in the United States, and giving security and convenience to the thousands who use it daily.

The extensive improvements at Benicia and Port Costa, including the construction of the mammoth ferry boat *Solano*, with the slips, wharves, and landings, all of which involved a large outlay of money which also found its way into the hands of our best mechanics and laborers.

The purchase of seven thousand acres of land at Monterey, building the Hotel del Monte, laying out and beautifying the surrounding grounds, macadamizing twenty-five miles of

roads through the most picturesque portion of the county, so that all the principal points of interest can be reached by tourists with pleasure and comfort; buying the great Los Laureles Rancho with its superior water privileges from the Carmel River, constructing substantial reservoirs and conveying the water some twenty miles in iron pipes twelve, fifteen, and eighteen inches in diameter, so as to afford an abundant supply of pure water for the Hotel del Monte, the surrounding country and the well-known summer resort by the sea, Pacific Grove. Enlarging the grove, erecting new buildings, and sparing no expense to make both places the most attractive resorts on the coast; advertising them in the most thorough manner throughout the Eastern States and Europe, so that the Hotel del Monte, with its many attractions is as well known as any similar resort in the world, bringing hundreds of wealthy and enterprising men to California, thereby calling attention to the resources of this State, where such golden opportunities await all who have either capital, brains or perseverance.

In the matter of advertising alone the railroad people have done more to make the advantages of this State known than anything that has been done for years.

The great faith, good judgment, and indomitable pluck that induced the managers of this corporation to project a line across the wilds of Arizona, New Mexico, and Texas, reaching to the Mississippi and New Orleans on the Gulf, spending millions of hard coin in an investment that was open for all the capital in the

land to enter, but which lay dormant until the magic touch of our California railroad managers made it spring into life, thus making the far distant mines of silver, gold, copper and other minerals accessible to our people, and adding untold wealth to our Nation and State, making an outlet for the many products of this great commonwealth, and looking to direct communication with Europe at an early day. All this and much more being the result of the far seeing policy inaugurated by these terrible despots!!!

Thus in part only have we glanced at the great enterprises carried on so successfully during the past few years, and we leave it to all fair minded persons to consider if it is not time to give credit where it is due, and to stop this daily abuse of men who have shown such great ability to make money, and who have spent it lavishly for the improvement of the city and State where they reside.

Much more might be said, as the subject is far from being exhausted, but believing that the time is coming when the intelligent people of this State will refuse to be led any longer by a press that only cries "down with the railroad and its management," so that it can foist some favorite into power or fill its own pockets, we leave the subject, hoping that we may have said something that may hasten on the reign of justice and harmony.

Home Courtesies.

SINCE we presented the readers of this journal with its new dress, and in an enlarged form, we are more than pleased with the evidences of good-will shown to us by the editors of our California exchanges. And for the first time since we have published this journal we print a few kindly notices that have appeared in various papers, in regard to the evidences shown by us of increasing prosperity on our part. Many notices have appeared from time to time in papers published all over the Pacific Coast, but we have refrained heretofore from quoting them in our columns, and those found below are now given to show our Eastern readers the opinion entertained of us by our own co-workers in the journalistic vineyard.

The *California Architect and Building News* has become one of the handsomest periodicals on the Pacific Coast in its new make-up, and is worthy of the support of every person connected with building operations in any manner whatever. We are pleased to see it giving such unmistakable signs of success.—*Commercial Herald*.

The *California Architect and Building News* is decidedly the best publication of the kind in the West, and should be in the hands of every architect, contractor or carpenter in the country. Each number contains all the latest building news, and intelligent discussions of matters of interest to builders, besides from four to six pages of designs for buildings suitable for both city and country residences, together with ground plans and details. We have watched the progress of this excellent periodical and find that it is steadily increasing in interest and usefulness. The subscription price is but \$2.00. The publication office is 240 Montgomery Street, San Francisco.—*Fresno Republican*.

The June number of the *California Architect and Building News* is far ahead of any previous issue. It is printed upon better paper; contains some eight pages more matter; is more extensively illustrated than ever before; and in letter press is up to the highest standard of works of this class. The ARCHITECT, as it is familiarly known, is found in all its departments. It is carefully and judiciously edited; always truthful, clear, and unbiased in its statements. Aside from its merit as an Architectural Journal, it is also emphatically the "mechanics own paper," and richly merits the standing it has attained.—*Alameda Enquirer*.

We have received the *California Architect and Building News* for June, and we feel that it is nothing more than justice

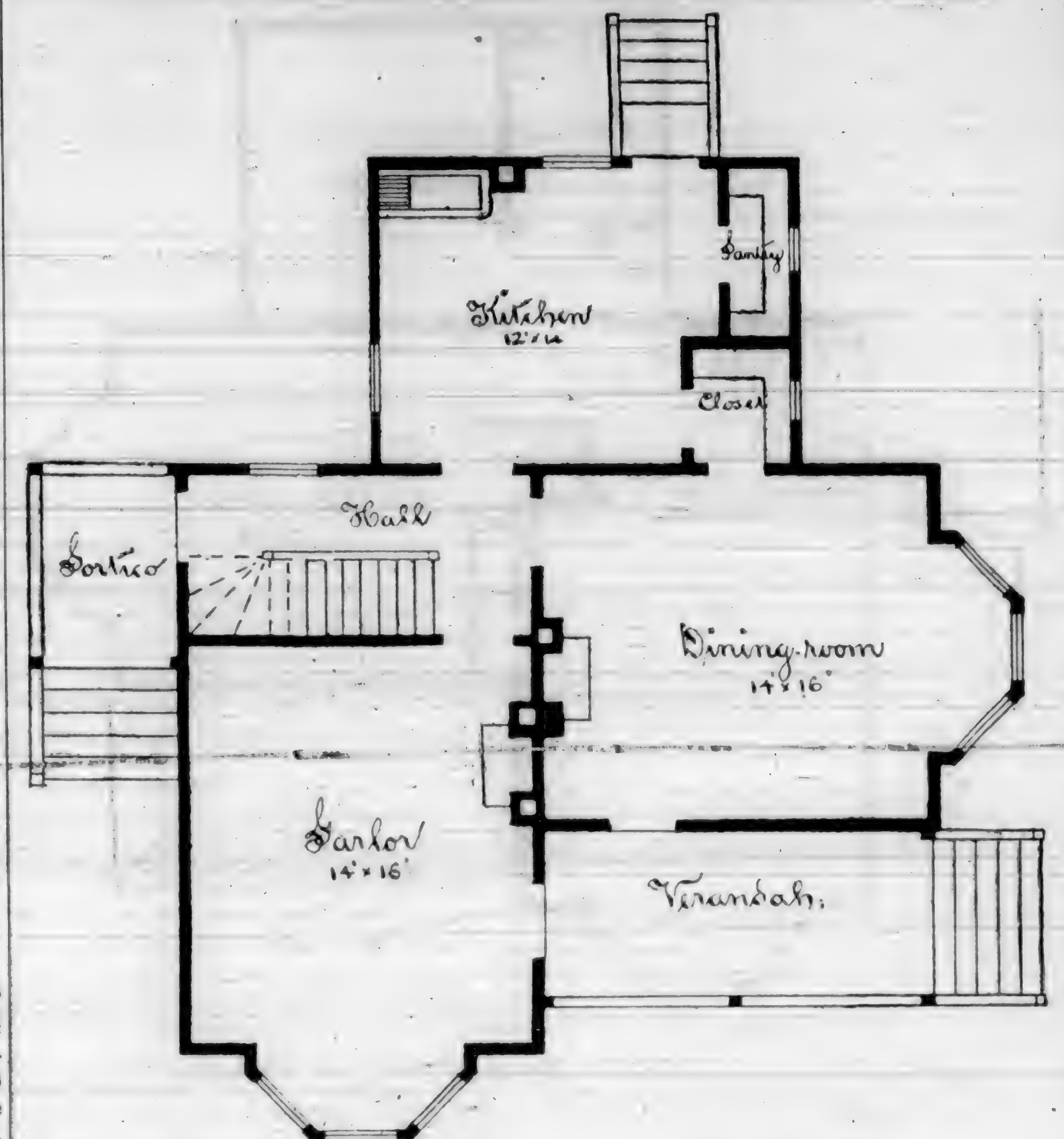


PLATE 5.—PLAN OF FIRST FLOOR, SUBURBAN DWELLING COSTING ABOUT \$3,000.

that we should call attention to the merits of the publication, and recommend it, especially to all engaged in any of the building trades, or in the supply of building materials. The *Architect* is very neatly printed and the contents such as must be of interest and value to all who build, own, or live in houses, and that includes pretty much everybody with sense enough to go in when it rains.—*Hayes Valley Advertiser*.

The *California Architect and Building News* for June comes to us with a new dress and enlarged form, an indication of its popularity and merited patronage. We wish it continued success.—*Petaluma Argus*.

EVERY carpenter and builder should subscribe for that excellent journal, the *California Architect and Building News*. The article on the pyramids in the June number was alone worth the price of subscription. The illustrations of plans for dwellings are excellent, and no carpenter can afford to miss the useful information given in each article.—*Closterdale Sentinel*.

The *California Architect and Building News* for June lies on our table. It has come out in a new dress and in an enlarged form. This monthly journal is becoming a very potent factor among our architects and those who intend to build. It is well conducted and filled with articles that are of great importance to all who are interested in the building progress of our city and State. The number before us is especially complete and interesting.—*Mission Local*.

The *California Architect and Building News* for June is on our table. It is one of the best publications of its kind in the United States, and we are glad to learn that it is meeting with success. Every architect, carpenter, and builder should subscribe for it.—*Riverside Press*.

The June number of that splendid publication, the *California Architect and Building News* has been received. Its monthly plans alone are worth more to builders than the price of subscription, while its sanitary suggestions are of value to every one.—*Watsonville Pajaronian*.

It is with pleasure that we note the great evidences of thrift and prosperity possessed by the editors of the *California Architect and Building News*, as shown by their enlarging their journal, and at the same time donning a complete new dress. The June number is especially interesting. The article on the Pyramids should be read by every one; and there

is not a mechanic in the State that should fail to subscribe, now that Part Two of the "Steel Square and its Uses" has been commenced. It is emphatically the representative of the building interests of this coast. We are especially pleased with the progress of this journal, as one of its editors for a number of years resided in this town, and we want to lay claim to our share of literary personages, whose minds have been partly trained in our beautiful village. Success and long continued prosperity to the *California Architect and Building News*.—*Healdsburg Flag*.

The June number of the *California Architect and Building News* contains the most beautiful elevations and plans we have yet seen in that journal. This journal is improving in its engravings as well as its reading matter. No live mechanic or head of family should be without a copy.—*Santa Rosa Republican*.

The *California Architect and Building News* is a monthly publication published by the S. F. Architectural Publishing Co. It is a useful publication to carpenters and builders generally, and contains well executed drawings of cottages and country residences, with plans of the different floors, besides a great deal of information to the architect, builder, and farmer. In its new dress and enlarged form it presents an appearance not excelled by any journal of its class in the United States.—*Mariposa Gazette*.

The *California Architect and Building News* is getting to be a valuable and very interesting publication and is cordially recommended to our building trades. It has lately donned a new dress, and in its typographical appearance and the ability displayed by the editors, it takes rank amongst the best of our scientific journals.—*St. Helena Star*.

Modern House Painting.

A NEW lot of this celebrated work has been received, which will be forwarded to any address upon receipt of the publisher's price, \$5.00.