the bottom piece in an irregular zigzag line. The simple dropping in succession of these pieces to the stage produces the falling of roof and wall. The fire itself is represented by chemical red fire and powdered lycopodium used separately, the former to give a red glow and the latter to represent flames. The shutters, which are to fall, are fastened to the scene with a preparation called "quick match." This is made of powder, alcohol, and a lamp wick. The window frames and sashes are made of sheet iron. They are covered with oakum soaked in alcohol or naphtha. These sashes and frames are not fastened to the canvas scene at all, but are placed a short distance behind it upon platforms. The quickest possible touch of flame ignites the oakum, and, in a moment, the fire runs around the sash, and nothing is apparently left but the blackened and charred wood. Steam is used to represent the smoke that issues from the crannies in the walls of the burning building; and an occasional crash, followed by the ignition of a little powder to produce a sudden puff of smoke, gives the spectator an idea of a falling rafter. Behind the entire scene is placed a very large endless towel upon which is painted a mass of flames. This is kept in constant upward motion; and, when viewed through an open window in the house, gives a good idea of the supposed raging furnace within. Add to these things a real fire engine on the stage, a host of yelling supernumeraries in discarded firemen's uniforms, and the spectator is easily filled with a sense of tremendous danger. Nevertheless the only flames upon the stage are those arising from the burning of lycopodium in a "flash torch," and they are only allowed to blaze up for a second or two at a time. Fires in theaters resulting from a fire scene, are usually caused by carelessness in handling the powder which is used to produce puffs of smoke.

A DRAWING ROOM CORNER AND AN OCTAGON BOUDOIR.

THESE two interior views may be taken as specimens of the drawings with which Mr. R. W. Edis' forthcoming book on

THE PROSPECTS AND POSITION OF THE ARCHITECTURAL PROFESSION.*

By JOHN McLACHLAN.

THE position and prospects of the architectural profession are of much interest to all of us. Whatever is derogatory to the dignity and honorableness of our calling; whatever in the conduct of any of our own members, or of others, tends to lower us in the eyes of the public; whatever obstacles stand in our way to professional improvement and advancement—all such considerations, hostile to our calling, will be naturally deplored; and, on the other hand, whatever tends to raise the status of architects, to elevate their position in society, to improve their opportunities of professional training, to encourage a cordial sympathy and fellow-feeling among the members—I say, whatever tends in the direction of these objects will naturally excite your approval. A general observation may be made which will find nobody bold enough to controvert. Within the last half century—in fact, within a much shorter period, an enormous stride has been taken both by our own and other countries in all that relates to art. Artistic ideas prevail now in regions where they were never dreamed of before. Furniture, dress, hangings, wall-papers, crockery, and a thousand other departments are regulated now by the same canons of taste which guide art in the longer acknowledged fields of architecture, painting, and sculpture. If we look around us for a moment, evidences of this truth crowd upon us. In the matter of furniture, for example, a glance at the windows of some of our best furniture dealers, or a visit to some recently furnished houses, indicates to us the greatest diversity of design in all articles of furniture—the healthy spirit of competition and emulation among the manufacturers, and the sound principles of design which, as a rule, guide them in their work. There is not now the depressing uniformity of design which pervaded the furniture of fifty years ago, nor the pernicious attempts of falsehood which consisted in making wood look like marble or stone. How often do we come across in the houses of 50 or 100 years

ful for the past and hopeful for the future. I venture to think that we find in furniture and house decoration a great advance. Simplicity of design, no desire shown to make wood appear any other material, no huge scrolls and other decoration where they are not needed, but the sound principles of construction which apply to wood carefully attended to, parts kept all in due harmony, a directness of purpose visible in making the article of furniture, whatever it may be, clearly and cleverly serve the object of its existence; and when ornament is applied, it is applied with reticence and good taste. The attention bestowed by architects on the whole subject of internal decoration has been so great of recent years that a fear has been expressed in high quarters, and from many sides, that if things proceed as they are doing, the architect will shortly merge in the house decorator, that in the devotion of his energies to designing sideboards, dadoes, dresses, carpets, and "cosy-corners," he will lose altogether the will and the power to design and carry into execution the larger, more masculine, and more important subjects which come within his professional scope. Aqueducts, bridges, sea-ports, terraces, gar dens, fortresses, and viaducts on the Continent, are still within the architect's realm, but it is without doubt that they are so in this country. Without entering into the subject, which is a very important one, and one well worthy of prolonged consideration, of the transference of various kinds of work from architects to the comparatively youthful profession of civil engineer, the point on which I wish to press at present is the vast attention now bestowed on the tasteful decoration of buildings internally, on such matters as the color and material with which the walls are to be covered, the patterns of paper, the carpeting, and so on. There is a recognition of the canons of taste displayed by even the most careless of housekeepers on such subjects, which is greatly encouraging to those who have a love for art. Glass-staining is a subject which naturally claims our attention in this connection. It is a subject of great congratulation, I think, that good stained-glass is confined not to our churches and public buildings as heretofore, but has found

A DRAWING ROOM CORNER.

AN OCTAGON BOUDOIR.

SUGGESTIONS IN DECORATIVE ART.

"The Decoration and Furnishing of Town Houses" will be illustrated. These plates are here only slightly reduced from the originals, but in the book itself the drawings are smaller. —*Building News*.

THE NICE OBSERVATORY.

THE new observatory at Nice, which is being built at the expense of M. Bischoffsheim, will comprise at first two equatorials, one meridian, and several accessory instruments. One of the equatorials will probably be the largest astronomical apparatus in the world. Its focal distance will be 18 meters, and its aperture 0.76m. The cupola will have a diameter of no less than 22m. The construction of the object glass is intrusted to MM. Paul and Prosper Henry, of the Paris Observatory. The instrument alone will cost about 250,000fr., and the cupola will be correspondingly expensive. The total cost of the Observatory will exceed two million francs.

To remove wheel grease from woolen material without injuring the color of the fabric use good benzine.

ago, mantelpieces of mahogany, with pillars either Doric or Corinthian, fluted and carved with all the details of the Greek or Roman originals, including dentils, blocks, and egg and dart ornaments, or sofas and sideboards with elaborate, heavy, useless scrolls and details, copied—and not well copied either—from the marble work of the Temple of Lysicrates or the Tower of the Winds.

Contrast with such work, with all its pretentiousness and painful attempt to appear what it is not, and the utter poverty of design displayed—and be it remembered that this kind of stuff was all that could be got 50 years ago, there was nothing else to be had—I say, contrast this furniture with what we saw at the Paris Exhibition the other year, where, in obedience to the demands of educated taste, India, Japan, and all the realms wherein good and tasteful stuffs are produced, were called into play in the service of upholstery and house decoration; or indeed, contrast the furniture of our grandfathers with what we see in our best shop-windows now—and we have much reason to be thank-

* Presidential Address, delivered at the meeting of the Edinburgh Architectural Association, November 17, 1880.

its way into our private houses. In Edinburgh and other portions of Scotland, one is certain to find in the hall and staircase of our good houses, well-designed and executed stained-glass, giving an air of refinement and art which nothing else can give. A window is more potent as an artistic medium than any dead surface can possibly be. Obtuse people may ignore the beauty of a wall-paper, or the lines of a fresco, simply because there is no compulsion to look at them, but no person, even the most unnoticing, can fail to take cognizance of the stained-glass window of a hall or staircase.

The very use of one's eyes is dependent upon the rays which come through the glass, every article or object looked upon is tinged with the color of the medium—and perforce the attention of the most phlegmatic is called to the window. It is of vast importance, therefore a matter of great congratulation, that this important feature of a house is becoming more and more artistically treated. The universal arrangement for a hall or stair-window of 20 years ago, of a diaper-pattern of ground sheet in the middle, with ruby border four inches broad, with a Vitruvian scroll picked in the red, and with never-failing blue pateras at the corners, is rapidly

dyng a natural death. Such an arrangement is confined as a rule now to the semi-detached villas of speculative builders, whose object in building houses is not to produce anything beautiful to look upon, but simply, like the scissors-seller in the "Vicar of Wakefield," to produce an article that will sell. I do not say that the orthodox arrangement above described—with its red periphery—is an ugly one. It very often is not ugly; but the objectionable thing is, that it was a universal arrangement, indicating an utter deadness and torpor in the treatment of this important feature. Let us rejoice that the torpor has passed away, and that in the active application of well designed stained glass we are seeing the indication of more artistic times. In the recently-revived Queen Anne architecture stained glass and colored glass of various kinds play a very important part for the upper portions of windows, above the broad transom of wood or stone which is a common feature of the architecture. It is not the least likely that the Queen Anne style will take much root here. It is essentially a style suitable for brick, while our building material all over Scotland is stone—good freestone. The difference of material must and ought to exercise a vast influence on the designer. The lines and proportions suitable for the use of small rectangular blocks of brick are totally out of keeping with the more colossal proportions which are becoming with huge blocks of stone or marble. The style of design which is right and suitable and beautiful in the one case is totally out of keeping in the other. While this is so—I am quite satisfied that this exceedingly quaint style of building, with its thick astragals, lead lights and beautiful small and well-proportioned mouldings, will never come so far north to any appreciable extent—I think it a subject well worthy of attention whether we might not, in imitation of its love for stained glass, introduce into our windows, both of living-rooms and bedrooms, a great deal more variety and glory than we usually think of. In an architect's practice, here and now, after he fills a window of a dining-room or bed-room with the best British plate, one-quarter inch thick, or 21 oz. sheet, he thinks his duty is completed there. Now I think we might very well and profitably bestow a little more time and consideration than this summary procedure indicates upon our windows. Where light to the rooms is not of supreme importance, as, for instance, in a villa with no immediately contiguous dwelling, it might very well be considered whether a little stained glass in the upper sashes or borders might not be advisable. The feature is a very pretty one, and I see no reason why Queen Anne should have a monopoly of a feature which may be made to apply to all architecture. The improvements in all departments of industry where knowledge of the beautiful can be shown in undeniable. The source to which we more directly trace this great advance is naturally our schools of art. Our carvers in wood and stone, our engravers, our modelers, our designers for furniture, crockery, and ironwork, have all had their hands and eyes trained under able teachers, and with the best models of antiquity before them. Such schools are not confined to Edinburgh and Glasgow, but are to be found in all the important towns of Scotland. Their influence within the last 25 years has been enormous. All those of us who have undergone the training of such schools, can testify to the influence exercised by them on individual character. Brought in contact with the best work of past times, and under the tuition of able, energetic masters, whose hearts are in their work, if there is any latent art talent within us, any burning love for things beautiful, it is sure to take fire under such circumstances.

It is a subject of congratulation that, in addition to the numerous schools and lectureships of art throughout the country, we are now to have a chair of art in our Edinburgh University, the funds for which are insured by the provisions of Sir John Watson Gordon's will. This chair will, without doubt, give great impetus to all artistic subjects among us. It is not to be anticipated that immediate effects will appear. Rome was not built in a day, but the leavening influence of a professorship of art in an intellectual center like that of Edinburgh will soon render itself felt. This is our first professorship of art in Scotland, and it is to be hoped that the influence on a hard headed, close-fisted, metaphysical matter-of-fact people will be encouraging. We labor at great disadvantage in Scotland in all matters of art as compared with such favored countries as Italy, where the very air is laden with artistic ideas; where the common, blue-bloused workman will criticise you a work of Michael Angelo or Titian in no ignorant babble, but in good set terms. Or I might take an example from the cognate field of music, from an incident which happened under my own eyes in Florence. An audience composed of plain people, the burghers or shopkeepers of the city, at an operatic performance united in condemning a prima donna's bad note, and would in no wise permit her to proceed till after three attempts she accomplished the faulty note to their satisfaction. Such an incident is impossible in Scotland: we have no such artistic training here. The day is just dawning upon us.

In Italy the people have been under training in such matters for centuries. Art runs in their blood. The great men of their country, of whom even the common people are proud, are not so much their kings, their warriors, and their statesmen, but their architects, sculptors, and painters, their Tintoretos, Veroneses, Michael Angelos, Palladios. What a contrast this is to our Scotland! In a bleak, unfertile, rocky country our ancestors had enough to do to wrest a living from the sterile rocks. No time was theirs for the amenities of life, for those arts which render life worth living for, the painting, the sculpture, and the architecture. A better day is drawing upon us, the country is becoming, by the sturdy energy of her sons, more and more wealthy. The cultured leisured class are increasing in number, and the arts of peace are flourishing.

It is of the utmost importance that as we proceed in our race of artistic life, our taste should be wisely guided, that true canons of art should regulate us both in designing and criticising. It is from this point of view that the appointment of a professorship is of national importance. The prelections of the class-room will influence the whole people, stirring up thought, discussion, and controversy. Our national love for combat and metaphysics will find ample play in rival theories of art-opposing styles of architecture—different canons of taste—but contest indicates life, and as these subjects of art are discussed among us with more and more vigor and knowledge, the more does the subject itself become part of the life and soul of the people.

Having said so much on several incidents and features which seem to be entirely favorable to our profession, which appear to tend to consolidate our honorable position in society, and which tend to the enlarging and extending of our professional knowledge, it may not be out of place to take note of things which lower us in the eyes of the world, some characteristics of modern architects which do not raise

them in the eyes of men. It is not wise to be too self-complaisant, to be perpetually singing pæans of self-gratulation over our progress. It is well to look in the mirror occasionally to see where stains and soiling are, so that a cleansing remedy may be applied to remove defects where they are found to exist.

Among the subjects affecting our profession which are perpetually cropping up in law courts or elsewhere, is that of commission. I do not mean, of course, the legitimate fee of 5 per cent., which is nothing more than fair remuneration for the arduous and responsible work of the architect. The commission which appears in so many lawsuits as being paid to architects is the surreptitious, underhand, disgraceful bribe applied by manufacturers, patentees, and other proprietors of building appliances to have their goods introduced into buildings. There can be but one opinion among honest members of our profession about this species of commission, and I think it is not unbecoming an association like this to set its face against such practices, which assuredly tend to disgrace our calling. The leaven of this corruption works in divers ways, and I think it is well that every upright practitioner should lend a helping hand to its exposure. One test is sufficient to blow all the plausible theories advanced for accepting commission such as I speak of into the clouds. If the architect will in plain words inform his employer that on the £100 roof which he has just designed he has pocketed £25 of commission irrespective of his fee, then, but not till then, I shall believe that the architect is acting as an honest man.

There are, however, other and grosser forms in which commission is sometimes taken, or in which I have heard it was taken, which only require to be mentioned to receive the hearty condemnation of such an association as ours. I have heard that some men calling themselves architects have in taking estimates so manipulated the offers of the tradesmen as to secure the work for creatures of their own; have so arranged the figures of the offers by opening them beforehand and adjusting them with contractors on whom they wished to confer the work, that large slices of emolument should be hidden in the estimates, ultimately to pass into the pocket of the architect. Such a form of wickedness—for it can be called nothing else—is little liable to become common unless among men who are bent on being rogues. It is conscious of its blackness and so keeps out of sight. Let us, then, visit with righteous indignation, wherever we find them, such mean and dastardly attempts to lower an honorable calling. As long as we accept and act upon the sound and healthy principle that the architect should in connection with his work receive *no remuneration whatever* except what he receives directly and immediately from his employer, there is no danger of our profession falling into disrepute. Let us act as upright men receiving no back-hand gifts or commissions or douceurs or bribes, and visit with exposure and contempt all attempts to the contrary mode of dealing, and I venture to think that in course of time we shall take a higher and more honorable position in society.

An aspect of this commission question presents itself which is of vital consequence to the outside public who employ architects. These members of our profession who live by their legitimate fees may often be twitted with the largeness of our recognized fee of 5 per cent., and be told that many practitioners work for less. I have no desire to lay down a hard and fast line on this point, and say that in some instances—such as in the case of large plain buildings, stores, or warehouses, where there are hundreds of pillars of the same dimensions, windows all the same, and so on—I say in such a case our fee may with fairness be modified very much. There is no possibility of laying down a hard and fast line of remuneration. Each case must be decided upon its own merits, and with a fair spirit on both sides—there is no danger of any serious collision between client and architect. But speaking generally, I am satisfied I am expressing the feelings of all architects who have been in business for any length of time that the ordinary recognized fee is as fair and moderate remuneration as could be stated. A less fee will not remunerate any professional man adequately, if he discharges his duty faithfully and energetically to his client. And it is here that this question of commission works mischief. Some architects offer their services for 3, 2, even 1 per cent. I have heard of some cases where architects offered even to work for nothing. I would warn all clients to look with much suspicion on such offers, because it is scarcely possible that the architect can be acting in good faith. He finds his fee inadequate, and inevitably betakes himself to devious ways of commissions and bribes from contractors to eke out his living. This is so palpable that it is astonishing the outside public who employ architects do not see it. But it is within my own knowledge that there are men belonging to our profession who habitually undertake work for a nominal fee to the client, but who make that same client pay the amount of three or four fees by manipulating the items in the schedules with the contractors in such a way as no client can detect. The thing is scandalous and disgraceful, and we cannot do better toward our profession than by denouncing such courses of procedure, and in our own practice, preserving clean hands. Depend upon it, honest, upright dealing will, in course of time, receive its due reward.

FLEUSS'S DIVING APPARATUS.

MESSRS. FLEUSS & DUFF have called attention, in a letter to the editor of the London *Times*, to the successful use of Fleuss's patent diving apparatus, in that part of the Severn tunnel which is now inundated: "The diver has succeeded in getting down the shaft, some 200 ft. deep, and then going a quarter of a mile up to the head of the tunnel, in order to close up the door so that the pumps might be enabled to clear the water out. After several unsuccessful attempts with the ordinary gear, we were applied to for our apparatus, and this was tried on Thursday, and proved a complete success, the diver easily accomplishing what had become an impossibility with the ordinary means of diving, owing to the great length of air tube necessarily required."

FRENCH LIGHTHOUSES

ALL the lighthouses on the French coast, except three which are provided with the electric light, have been lit since 1873 with lamps burning mineral oil. The luminous intensity of the apparatus has been greatly increased, and notwithstanding the increase a saving has been effected of more than 400,000 francs (\$80,000) per annum, or more than 80 per cent. of the cost of illumination with Colza oil. The use of the mineral oil has not caused a single accident in lighthouses, and after some trials it has also been brought into use for floating lights.—*L'Ingen. Univ.*

THE METRIC SYSTEM—IS IT WISE TO INTRODUCE IT INTO OUR MACHINE SHOPS?*

By COLEMAN SELLERS, M.E.

THE organization of a society of mechanical engineers offers a convenient and fitting opportunity for the presentation of the views of a mechanical engineer on the subject of the metric system to members of his own profession and to those who are similarly interested. During the month of May, 1874, I had the honor of reading before the American Railway Master Mechanics' Association a paper on "The Metric System in our Workshop: will its value in practice be an equivalent for the cost of its introduction?" In that paper I treated the subject mainly in reference to its cost. From what has since been published by those who advocate the enforced substitution of the metric system for the weights and measures in common use in this country, it is evident that the subject will bear to advantage a different treatment. I now propose to supplement the question of cost by an endeavor to show that the system, *per se*, is not so well adapted to the wants of machinists as is the one now in use, and that its enforced introduction will do harm to our industries in place of doing good.

In addressing to the members of the American Society of Mechanical Engineers arguments in opposition to any compulsory legislation in this direction, I feel that I am speaking to men who are familiar with the subject and who have already given thought to the results likely to obtain from the proposed change in the system. I feel too that I am speaking to those whose habit of thought fits them to consider the subject without bias. Mechanical engineers, of all men using weights and measures, are the ones most eager to adopt what in the end will be of the most use. To them weights and measures are not abstract ideas, but tangible substances. Engineers make the machines for weighing and measuring, and the result of their use of those machines exists as fixed matter, costing millions upon millions of dollars.

To the great bulk of mankind engaged in trade, in buying and selling, in bartering and exchanging, it matters little what system they adopt; it matters little whether they are obliged to use a yard-stick or a meter-rod, pounds or kilogrammes, quarts or liters. The cost to them of a change from one to the other is the cost of the few devices needed in weighing and measuring; the *rationale* of the system may never enter their thoughts.

With the machinist the case is different. He must not only possess costly means of measuring and weighing, with a degree of exactness unknown to others, but the results of these weights and measurements are fixed and unalterable. Enormous expenditures on tools, on drawings, on patterns, on everything he uses in making or building his machines, are on what is involved in the primary system used in determining weight and size. The product of this expenditure means everything that makes modern civilization possible. I propose, in this paper, to consider the subject only as it relates to our own profession; not in regard to its effect on the grocer, the drygoods man, or on the druggist. I propose to show why, after nearly twenty years' constant use of the metric system of measurement, I record my opposition to any enforcing legislation in this direction, because *the metric system is not well adapted to the practice of the machine shop.*

To render my arguments of any value I must endeavor to express myself so as to be understood by those who are not mechanics, and must crave the indulgence of my associates for dwelling, as I shall have to, on details so familiar to them, and for making my explanation of the usages of the workshop so elementary.

For nearly twenty years one large department of Wm. Sellers & Co.'s establishment has been worked on the metric system, as thoroughly as the system can be worked in any machine shop; as thoroughly as it is worked in France or Germany. The drawings made for this department are to the metric scale, figured in millimeters. The small tools and gauges are to metric measurement only, and the product of the shop is scaled to metric sizes and called by names based on those sizes.

During all these years, and for many years before, we have taken pains to inform ourselves, so far as lay in our power, as to all possible good to be derived from the system, in the drawing room as well as in the shop. We inquired into its defects and endeavored to overcome them by the same means as are resorted to in metric-using countries. The system is urged by theorists as a perfect system. All nations, we are told, should adopt it to bring about a desirable unity in weights and measures, even if all cannot be made to speak our language and all cannot be equally good and pious, as measured by some international scale of goodness and piety.

The metric system was legalized here in May, 1866. Some of its enthusiastic advocates now urge its being made exclusive and obligatory. Societies are organized to teach its principles to the people, and much money has been expended in publishing, but up to this time few conveniences have been placed in the hands of mechanics to enable them to use it in their calculations. Some years ago (the conditions remain the same to-day) letters addressed to leading publishing houses asking for metric books in the English language, equivalent to those to which we constantly refer, which books are as necessary to us as are our other tools, failed to bring a single favorable answer. What was asked for, was some book in which formulæ shall be given in the most convenient form expressible in relation to the metric nomenclature. Many books can be found urging its merits as a system, and the writers of these, in showing (?) that the metric system can be learned entire in, say, fifteen minutes, may think they have done what is needed, but no book yet published in the English language, so far as I have been able to learn, even approximates to what is required. We have nothing like the hand-books published in German. These Germans, in teaching their people, gave side by side in these almanacs of mechanics the formulæ expressed in Prussian inches and in meters. When the year 1880 came around they dropped the Prussian inch from these books when it was possible so to do. There are many very good books of tables for the ready conversion of the measurements of one system into the other, but unless an engineer is as familiar with the metric system as with his own they aid him but little. On the other hand, our English work books are many and valuable. The great bulk of literature of primary importance to mechanical engineers is in English and expressed in feet and in inches.

The absence of these help books need not, however, prevent any one familiar with the metric system from using it in his practice. If he can think in the new system he can work in it too. He can formulate what is directly needful to him if he will take the time and trouble so to do. The

* Read before the American Society of Mechanical Engineers, Nov. 4, 1880.