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THE troubles of the Illinois State-house commissioners are not limited to their intercourse with architects. A very pretty quarrel has been going on for some time with some of the disappointed bidders for the work. The contracts for the building having been given to Messrs. Kanmacher and Denig, the next lowest bidders, Messrs. Farman and Pearce, complained that they had been unfairly discriminated against in the competition; that the letting of the contract was a put up job; and that the contractors' securities were inadequate. They therefore demanded an inspection of the papers, and that being refused, sent a letter to the commissioners, notifying them that there was reason to suspect them of want of fairness in letting the contract, and want of prudence in accepting the bond, promising to "institute such proceedings as may be lawful and necessary to secure fairness and protection," — in other words threatening them with a law-suit, — and requesting them to furnish for their information (Farman and Pearce's) a copy of the contract and bond. The commissioners, after two days' deliberation, declared the openness and fairness of their competition, and the rigor of their bond; and refused to submit the papers to inspection, on the ground that the bondsmen did not care to have their names known and that the commissioners were responsible for their acts, not to the disappointed bidders, but to the Legislature. We do not hear that the thing has gone any farther as yet, nor do we know anything of the merits of the question; but we should think that if all public officers were to be required to produce for inspection and justification their records and documents before anybody who chose to call for them, they might find that they had nothing else to do.

THERE is discontent among the faithful at the slow progress of work upon the foundations of the Washington Monument, under Colonel Casey's direction. Some one has taken the pains to compute that at the present rate it will take two hundred and forty-one years' work to finish the monument according to its design, — a computation which to many people will be not unpalatable. The wish, therefore, occurs that the work might be put into the hands of some contractor who should agree to finish it within a given time. The writer of a letter from Washington in the *Hartford Times*, from which we take these facts and fancies, prophecies that people will by and by find out "that it is a bad investment, besides being a fearfully slow one, to put any kind of public work into the hands of army officers." We are afraid that this represents the idea of a good many inconsiderate people. If the friends of the monument should grow so impatient of official deliberation as to tire of importuning the Government for aid, there would, perhaps, be no harm done; nor could we quarrel greatly with those who may wish, if the monument must really be finished, that it could be by contract work of the ordinary perishable kind. The difficulty would be, we suspect, in providing the money to pay the contractor, though it is very likely that contractors might be found, such as they were, under almost any circumstances. But for a real friend of the undertaking to wish to get it out of the hands of government engineers we take to be a serious mistake. The common tendency to undervalue the deliberate thoroughness of their work is one of the bad signs of the times. The Washington Monument is a difficult if not a hazardous construction, and there are no men in the country in whose hands one may

feel that such a construction is, on the whole, quite so safe as in theirs. It is well to have them to remind us that in our most important works solidity and good workmanship are yet more important than haste or cheapness.

NEW ORLEANS is taking its turn of uneasiness at the recklessness of dirt contractors and graders. The *New Orleans Times* not long ago called attention to the fact that the garbage which had been removed from the city was brought back and used for filling, after the manner of contractors. In consequence of this complaint a committee was appointed by the mayor to examine into the matter. The report of this committee, just rendered, shows a deplorable condition of things. Visiting the dumping ground of the street cleaners, which singularly enough is in the city itself and surrounded by many houses, they found three acres of land covered with four feet of foul deposit, kitchen refuse, dead animals, and other disagreeable substances, upon which a hundred or two of stray swine were feeding, rooting up the soil in all directions, and filling the air with horrible odors which sickened the people in all the houses about, and even infected the milk in the dairies. Examination of people in the neighborhood showed that this accumulation had been used by somebody as a hoard to draw from during the spring and summer, so that a good deal of it had been carried away somewhere. Further inquiry showed that where street filling was going on it was the custom to use first a layer of street garbage and market refuse without the ceremony of taking it to the dump, and then a top-dressing of street-dirt, which was probably the contribution of the dumping ground. One cannot help wondering how such things can pass unnoticed by the authorities of a city where yellow-fever is a regular visitor, in spite of the statement which we saw not long ago that the dirtiest regions in New Orleans — and the description of them was not savory — were the healthiest. The wonder grows a little when the committee tells that the City Council passed an ordinance allowing street-dirt to be used as a foundation for the monument to General Lee, him who of all the confederate heroes was perhaps in best odor everywhere. This privilege, says the committee, was "abused," for "the foulest stench imaginable greeted the passers by." At one point however the contractor's fortitude gave way, for being ordered to bury dead animals in some road filling he refused, and hauled them to the dump.

WE have called attention before (*American Architect*, Jan. 12, 1878) to the complaints of the Conservators of the Thames that the costly sewers of London were failing to satisfactorily accomplish their purpose. These complaints, which have brought on a prolonged war between the Conservators and the Metropolitan Board of Works, have been supported by the popular voice, and have been revived in great strength by the experience of the passengers who survived the disaster of the "Princess Alice," a short time ago. She was sunk by collision a little way above Barking Creek, where is the outfall of the great sewer, and our readers may remember that the foul condition of the water in which the passengers were submerged led some persons to adopt the rather overstrained theory that they were poisoned rather than drowned. This accusing surmise brought the Metropolitan Board to their feet with a resolution of inquiry, as a result of which they have plumply declared that the sewage which goes into the Thames is neither noxious nor offensive, and by this assertion they stand stoutly, notwithstanding the fact which seems to be amply proved that the sunken hulk of the "Princess Alice" was found to have been covered before many hours with a deposit of indescribable foulness. In spite of this, and of the testimony of one of their members, who unfortunately lived near the outfall, the Board stood gallantly to their colors, and voted down a resolution which was proposed, requiring a committee to report whether the sewage could not, at a moderate cost, be so purified before its discharge as to make it innocuous and inoffensive, — because, said they, to do so would be to condemn themselves by admitting that what they discharged was noxious and offensive. To this they add the assertion that the amount of suspended matter in the water is very trifling and that the deep-water channel has increased in the last four years. The engineers of the Conservators reply that the analysis of the Board is of water taken during an unusual flood, that the increase of the channel is the result of dredging, that

it dates from before the establishment of the sewers and has almost stopped since, that ships have grounded where ships did not ground before, and that banks of mud have deposited in various places, whose origin is unmistakably in the sewers. The general opinion of those who have given the matter thought, backed by the testimony of popular observation, seems to be decidedly against the Board, and there is talk of prosecuting them for discharging unpurified sewage into the river, if money can be found to maintain a suit which would doubtless be very vigorously defended.

THE Boston Society of Decorative Art proposes to establish a class in porcelain-painting, which, like the School of Drawing and Painting, and the School of Carving and Modelling, will be given shelter by the Museum of Fine Arts. So popular has this kind of decoration become that it is worth while to provide some means of instruction in it, both to give capable amateurs an opportunity of learning to use their ability to advantage in an art, which, like all other arts, has its technical secrets, and still more, perhaps, to give a standard of comparison and a chance for discrimination between the capable and the incapable, a thing of which our amateur decorators stand a good deal in need. The class will be taught by Mrs. William R. Ware, whose skilful work is well known since the Centennial Exhibition. At first the instruction in painting will be only in the less difficult art of over-glaze painting, which is all that most amateurs are likely to busy themselves with, leaving the greater difficulties of under-glaze work to the future; but it is proposed to set up wheels in one of the rooms at the Museum, that the pupils may get instruction in "throwing," and opportunities for practice at the wheel will be provided at the potteries in Chelsea. If this practice can be carried so far as to produce some skilful workers in the clay it would have a double advantage; for not only might the work of such amateurs be a gain in itself, but their influence on the manufacturers might be a very good stimulus. There is no better training of eye and hand than the shaping of fictile ware, and the training may be made of just the exacting kind that our amateurs specially need. The hasty multiplying of manufacture is not favorable to excellence in fictile work. It is not difficult for amateurs to equip themselves for it, and the mechanical skill which it requires though refined is, so to speak, in small compass, and therefore requiring a less range of experience than in most arts. The competition of a few amateurs of real skill, working deliberately, and producing little, but that of the best they could accomplish, might be of good service in improving the quality of the work of the regular manufacturers.

OUR lady sculptor, Miss Hosmer, who has been receiving considerable praise from London newspapers for the model of her latest statue, "The Pompeian Sentinel," by no means limits her activity to sculpture, but seeks distinction also as an inventor. It is some time since the first announcements of her discovery of a process for compacting ordinary limestones into fine marbles, by the simultaneous application of pressure, heat, and moisture. She is said to have actually contracted, under her patents, to furnish floorings, wainscoting, and other decorative work in artificial marble for the British Embassy building which is now going up at Rome. A correspondent of the New York *Evening Post*, writing from London, besides crediting her with one of the many inventions for turning the leaves of a piece of music, describes a new method of modelling which she has contrived. She makes a rough model in plaster of Paris, and when this is brought into the proper poise and proportion, the surface being left somewhat within the intended dimensions, it is covered with a thick coating of wax, in which the actual modelling is done. This method she claims to be much less troublesome than working in clay, while the model is far more durable than one of clay, requires less care to keep it in condition, and gives much better the effect of the intended marble, besides being pleasanter to look upon.

MISS HOSMER'S *Capo d'opera* in invention, however, is the discovery of a new means of applying motive power; or even a new power, if we may trust our inferences from the account of the *Evening Post's* correspondent. The power is that of the coming motor, electricity; but there is neither battery nor electro-magnet, nor circuit, nor any means for transmitting an electric current, it is said, the power being furnished by a series

of permanent magnets in a manner which utterly defies all the present theories and expectations of scientific men, and by means of contrivances which she is not yet prepared to make public. The invention has been a study to her for fifteen years, says Miss Hosmer, and a London instrument maker is now building a machine of four-horse power, which will be exhibited in London this winter, when it is finished, and show that a revolution in power-machinery is impending. Miss Hosmer cites the testimony of some mechanics in favor of her success, though she does not seem to have yet provided herself with witnesses among scientific men of known position. Of one gentleman, who reminded her that she was seeking after perpetual motion, we are told that he "could scarcely believe his own eyes," and had to be convinced by repeated demonstrations, at the end of which he had quite lost his faith in the impossibility of anything. It is perhaps useless for anybody who is not in Miss Hosmer's confidence to conjecture how a permanent magnet, if such things are to be found, or a series of them, can be made to furnish continuous motion, nor is it quite safe to decide against even the discoveries of amateur science till they are made known; but the ungallant reader may hope to be forgiven if he is a little reminded, by these accounts, of the familiar feat of standing in a basket and lifting one's self by the handles.

WE have received the first number of a new German technological periodical to be published fortnightly in New York, by Mr. Paul Goepel, Tryon Row, and called *Der Techniker*. It is a quarto of sixteen pages, approximately on the plan of the *Scientific American*, but intended especially to meet the wants of German Americans, or, as the editor in his short and straightforward salutatory says, "to further the interests of German inventors as well as the advance of such branches of industry as are in German hands." It is a neat, well printed journal, from Roman type, like most German technical publications, illustrated with clear cuts of various machines; and touches in this first number a considerable range of subjects. It has illustrated articles on some English hydraulic metal-working machines, on Klinkerfues's Hygrometers, a pneumatic beer-pump, Trouve's Polyscope, and a workmen's Respirator, a descriptive list of selected German inventions, and designs for a common chair and an easy-chair taken from the *Workshop*. There are, besides, the first of a series of letters from the Paris Exhibition, this one on the display of carriages; an interesting letter about Mr. Edison and his inventions, based on a letter to the New York *Tribune*; an article, to be continued, on patent laws; a current trade review; a full list of recent German and American patents, which is apparently to be continued from number to number, and a variety of short articles, original and selected, including book notices, articles on the polishing of metals, on trade-marks, the Mississippi jetties, the tobacco trade, the Vesuvian Railway, etc. The original material of the paper seems to be clearly and capably written, entirely from the practical point of view rather than the theoretical.

THE EXPLOSION OF STEAM-BOILERS.¹

THIS little pamphlet is, as its title indicates, mainly controversial; but it raises and discusses questions which are of paramount importance to the whole community. Modern civilization brings us in contact with the steam-boiler at every turn in our daily life. Leaving out of view its various industrial applications in factories, in steamboats, and in railroads, it is now very generally used for furnishing the supply of heat in stores and offices. It is precisely in this latter application that the lowest grade of intelligence in those who have the care of the machine will be found. We use the word machine advisedly. A steam-heater for a dwelling cannot be placed in the same category as the ordinary furnace. It is a machine, and a very dangerous machine if tampered with or improperly treated. And yet it is undoubtedly true that many of these machines, especially when used for ordinary heating uses, are under the superintendence of men who have no qualification beyond that of a fire-stoker. We know that Patrick and Bridget wear out and use up our air-furnaces by the most flagrant disregard of ordinary physical laws. We endure this from year to year, put our hands in our pockets, and draw out the means of repairing damages, and remain content. Should we remain thus content if we really believed that a like ignorance or negligence on the part of attendants might at any moment lead to an explosion and the destruction of human life? And yet, if we accept the statement of the author of the "Attack upon the Judicial Decision," this is what we should expect. He says, "There is no mystery, no occult, potential energy suddenly and

¹ The Cambridge Boiler Explosion. An Examination of the Attack, in the Columns of The Boston Daily Advertiser, upon the Judicial Decision. By I. R. ROBINSON.

mysteriously liberated, and not a particle of proof of originally poor iron;" and he then goes on to show that the use of water unfit for the purpose, and the *abuse* of the machine, led to the explosion. We have no intention of entering into the controversy between these two disputants. The points in controversy were fully examined, in the light of the testimony of the best experts, and a judicial decision has been rendered. What we do claim is that a boiler, supposed to be perfect when delivered to its owner, cannot with safety be left to the charge of ignorant or inexperienced superintendence.

Then arises the question, How do we know, when we purchase a boiler, that it is perfect, and suited to our purposes? The law steps in here, and says it must be inspected, and we must show the certificate of inspection. There seems to be no dispute in this case that the boiler was inspected, and was certified to be safe for one hundred pounds pressure, and yet that it burst at a temperature of 311° , which corresponds to a pressure of 64.33 above the atmosphere, with "everything in a normal condition; no excessive pressure, no lack of water, no apparent disturbance inside or outside of the boiler, no excessive fire or blowing off of steam." Does not this show that there was something at fault in the inspection?

We think the author of the pamphlet before us has presented his whole case in the strongest terms, when he says, "There are many boilers in use that are as unsafe as was the one in question at the time of its explosion; and it does not tend to greater security, and it is not for the interest of the owners of these boilers, to believe that they may be used with impunity provided they are kept clean."

In justice to the author we must quote his second paragraph: "There are three hypotheses as to the causes of explosion: (1.) The one upon which our practice has come to be mostly based, that they are all caused by gradual rise of pressure, or gradual reduction of strength. (2.) That they are caused by forces too potent to be withstood by any attainable strength. (3.) That many explosions have their origin in an explosive evaporation of water within the boiler; but this never to an extent that may not be entirely obviated by suitable construction and management, or withstood by the observance of sound principles of construction."

The first hypothesis, the author says, has no scientific basis, and ignores the most prominent causes of explosions.

If the second hypothesis were true the only remedy would be the total exclusion of the steam-boiler from practical use. We might as well harness into a buggy an untamed wild beast.

The third is evidently the only one which appeals to our author.

We wish we had space to follow the author through all his statements, for every sentence is full of matter for serious thought to the public, and every statement so supported by figures (not results, but the detailed computation) that every one conversant with the subject can follow the writer's reasoning, and agree with him or not.

The first point presented is one which only experts could determine. The stock of which the plates were made does not possess "qualities that are indispensable for steam-boilers," and a boiler of the size used could not be built "for a working-pressure one half, even, of that for which the boiler was certified." Plates of that brand sell for half the price of the best roll-welded plates, and for less than one third of the best hammer-welded plates. Just here the outsider may very properly ask, What does brand mean? Brand ought to mean, if it does not in all cases, not merely who the manufacturer is, or whether it bore such and such tests of compression, extension, or torsion, but, by ultimate reference, it should show also of what iron it was made, of what ores, and whether hot or cold rolled. We think Kirkaldy's experiments first called attention publicly to the fact, which is distinctly stated in this pamphlet, that "a knowledge of the tensile strength alone of iron is of no value whatever as to its fitness for use in a steam-boiler;" in other words, Kirkaldy showed that one quality of iron bar, for instance, would bear a high load, and then give way without warning, like cast-iron, while another, more ductile, would not yield until its sectional area was reduced, perhaps one half, and thus its tenacity per unit of area brought very high. That is to say, the bare statement of so much tensile strength conveys a very imperfect knowledge of the quality of iron for a specific purpose. Let those who need any further information upon this point read the account of the experiments made to determine from what ores the iron must be made, and in what proportions the different irons must be combined, to obtain a suitable metal for cannon. The purchaser of a boiler cannot be presumed to have expert knowledge, but such knowledge may, and indeed must, be required on the part of inspectors. This pamphlet tells us that multitudes of boilers are placed upon the market made of plates totally unfit, when new, to bear the pressure for which they are certified. "Plates very rarely test better than the brand. The variation is almost invariably the other way, . . . the tensile strength brand varying from five to twenty-five per cent in the better grades of plates above the minimum actual strength, and from twenty-five to fifty per cent above in the lower grades." As the weakest link determines the strength of a chain, so in a boiler the weakest plate and the minimum thickness should be used in computing its strength.

There is no dispute as to the correctness of the ordinary formulae for computing the strength of boilers under a steady statical pressure. This formula is $pr = tK$, in which p is the pressure per square inch, r is the radius, t is the thickness, and K is the tensile strength of the iron. As the plates are weakened by punching, Fairbairn's rule is adopted, which allows to a double-riveted seam only $\frac{1}{10}$ of the resist-

ance of the plates of which it is composed. Fairbairn's factor of safety for best materials and workmanship is 6; for good materials and workmanship, 8; for poorer quality of iron, or for defects in the process of manufacture, this may rise to 9, 10, or more, up to a total rejection of the boiler as unsafe.

There is some difference of opinion as to the degree to which the testing pressure should be carried. If not carried far enough, it is worthless as a test; if carried too far, it may strain the materials beyond their elastic limit, and thus impair the future usefulness of the boiler. The committee of the Franklin Institute, after a thorough and extended examination into the causes of boiler explosions, proposed that the law should require the test by hydraulic pressure to be carried up to three times the working pressure. Under such a law the Cambridge boiler would have been tested at 300 lbs., whereas the actual test was only carried to 150 lbs.

We have not space to follow the author through all his discussions. The action of plates under thermo-tension, in which field the Franklin Institute made an extensive series of experiments, is here examined. The effect, upon the strength of boilers, of poor rivetting and of good rivetting, of imperfect welding in the manufacture of the plates, of the use of a poorer quality of iron as the filling of the pile during manufacture, — all these points are examined and commented upon.

As we stated at the outset, the pamphlet is controversial in its nature, and its main object was to answer the "attack," and to show that this particular boiler was originally weak, and not fitted for the work for which it was certified; that it was exploded, not in consequence of deterioration by scale on the bottom, not because of neglect or abuse, but because of what the author characterizes, in his third cause of explosions, as "an explosive vaporization of water within the boiler." In other words, a part of the water within the boiler was overheated, a volume of steam was suddenly generated which caused a surging of the water against the back end of the boiler; the iron was "short," and could not withstand this suddenly imposed pressure, and consequently "the back end of this boiler was undoubtedly broken off by the surging of the water within the boiler against the back head."

We call attention particularly to the statement, that this boiler was broken through the *transverse* seam. The same theory which gave for longitudinal rupture the formula $pr = tK$ gives for transverse rupture the formula $pr = 2tK$. That is to say, a boiler is twice as strong against transverse rupture as against longitudinal rupture; or, other things being equal, it will require twice the pressure to rupture it. The formula assumes statical pressure and uniform tenacity of the plates in all directions. Yet here was a boiler certified to bear 100 lbs., and which therefore should require 200 lbs. for transverse rupture, which, under a sudden impulse, gave way transversely, when the pressure was, according to all the testimony, far below that which it was certified to bear. The difference between the mere statical pressure of the steam confined in a boiler, and the work which will be done by a sudden release of this steam, and the conversion into steam of water under a high pressure and temperature, is too important to be overlooked. If we raise a pound of water 1° Fahrenheit above its temperature at maximum density, we store up in it an energy equal to 772 foot pounds, — that is, in cooling one degree, it must by the law of thermodynamics do the work of lifting 772 lbs. through one foot. The boiler under consideration was working with steam at a temperature of 311° . A very simple computation will show the destructive power developed when this steam and the water with which it is associated have their temperature suddenly reduced by an explosion from 311° to 212° . The author of the pamphlet, while showing that his adversary's estimate is entirely erroneous, proves at the same time what we are most concerned with, that in every boiler we have a reservoir of stored energy of vast amount, capable of producing wide-spread destruction, if suddenly released by an explosion. If the boiler, even of good material, is so constructed that a thorough circulation does not take place, this explosion is likely to occur at any moment. Zerah Colburn, in his essay on "Boiler Explosions," says, "Destructive explosions often occur at pressure of ten pounds to twelve pounds per square inch in low-pressure boilers; and it is on many accounts improbable that anything like the calculated bursting pressures of boilers is ever reached, even where the most frightful explosions have occurred." Our author closes some remarks upon construction with, "Showing that there was no suitable provision for the circulation of the water within the boiler. And there was no provision for the safe deposit of sediment. A boiler with these defects would be unsafe, even if built of the best materials."

While we recommend this pamphlet most strongly, as presenting in a very clear and forcible manner some of the principal points connected with steam boilers, apart from the special controversy which called it into being, we cannot close these remarks without stating that, after all, the thing that most forcibly suggests itself is the utter inefficiency of our present system of inspection. The law requires that boilers shall be inspected, but at the same time it holds owners responsible for any damages resulting from their use. Can any one, after a careful study of the pamphlet before us, turn to his inspector's certificate with any sense of security? Here we have the testimony of a well-known expert that the material not merely of this boiler, but of many is iron totally unfit for the purpose and unsafe at any pressure; that modes of construction are in vogue which would render a boiler made of the best materials unsafe;

that factors of safety are adopted, below those which experience has sanctioned in other countries; that the test by hydraulic pressure, instead of being carried to three times the working pressure, was carried to one and a half times. If this is the way in which certificates are given, and the weak machine is then entrusted to ignorant superintendence, the only wonder is that destructive explosions do not occur more frequently.

THE LIGHT OF THE FUTURE.

OF the various magneto-electric machines that have been brought forward, that of M. Gramme is the most generally used. As soon as his machine became practicable, an English company purchased the English and American patents, the Société d'Encouragement awarded a gold medal to the inventor, and a large number of manufacturers ordered the apparatus. The exhibitor has been awarded prizes at the Exhibitions of Lyons, Vienna, Moscow, Linz, and Philadelphia; and now about 500 machines of his construction, with magnets or electro-magnets, have been delivered, and the demand for them is still increasing. Electric lighting, which before M. Gramme's invention did not exist, speaking industrially, is at the present day within the domain of things practical. It is not within our scope to give a detailed description of his machine; it is sufficient for our purpose to state that it furnishes continuous electric currents, the direction and intensity of which may be changed. The electric current having been generated is conducted through an insulated wire to a perpendicular rod of retort carbon, the point of which is placed exactly above the point of a similar rod, the distance between the points being less than a quarter of an inch. This intervening space is the electric arc, and the current passing through that interval from the rod above to that below heats the points to a state of intense incandescence, producing the electric light. The current passing only in one direction, — from the upper or positive pole to the lower or negative pole, — consumes the positive at double the rate of the negative, and consequently the distance between the points has to be continually readjusted by clockwork and a magnet, constituting the regulator or electric lamp.

By the side of the electric lamp with regulating apparatus for the carbon rods as they become consumed, Jablochkoff's candle has also become the material for electric lighting. M. Jablochkoff's light completely suppresses the regulator. His invention was presented to the Academy of Sciences in October, 1876. The carbons, instead of being opposed, are placed side by side, and are separated by an insulating fusible substance. When the current begins to pass, the voltaic arc plays between the ends of the carbons. The layer of insulating matter melts, volatilizes, and the double rod of carbon slowly consumes, exactly as the wax of a candle progressively exposes its wick. M. Jablochkoff now burns in his candles, as they are called, powdered asbestos. It seems as if the interesting labors of M. Jablochkoff will have practical result, and that they will increase the domain of electric lighting, for his lamps are now largely used. In Paris, besides numerous larger electric lamps, at the present time, there are burning many Jablochkoff candles, of which we may mention eight on the Place de l'Opéra, twenty-four in the Avenue de l'Opéra, eight on the Place du Théâtre Français, six at the Palais Bourbon along the front facing the Place de la Concorde, seventy in the Grands Magasins du Louvre, eight in the shops of the Belle Jardinière, sixty in the Concert de l'Orangerie des Tuileries, thirty two in the interior of the Hippodrome.

Returning to the Gramme machine, it appears that the first light machine constructed by M. Gramme fed a regulator of 900 Carcel burners; its total weight was over 2,000 pounds. This machine served for a long time for the experiments on the clock-tower of the Houses of Parliament at Westminster. The fault found with this machine was that it became heated, and gave sparks between the metallic brushes and the bundle of conductors on which the current was collected. This, however, has not given rise to any serious inconvenience during five years. M. Gramme's next machine was less powerful, of a power of only 500 burners, and consequently of smaller dimensions. When a current is sent into two regulators, each will give 150 Carcel burners. This apparatus has been introduced on board the Suffren and the Richelieu, of the French Navy; on the Livadia and the Peter the Great, of the Russian navy; it is employed by several Governments for service in fortified places. This machine is described as excellent, but its luminous intensity is slightly feeble when the atmosphere is foggy; its price, however, is somewhat high. The inventor has improved upon this machine, and constructed one which, when coupled in tension, gives a luminous intensity of 800 Carcel burners at 700 revolutions per minute, and, if coupled in quantity, 2,000 Carcel burners, with 1,350 revolutions per minute. It has been adopted by the French Ministry of War, by the Austrian navy and artillery, by the Norwegian, Turkish, and other Governments. By further simplification, M. Gramme has been able to introduce a machine most suited for industrial purposes, large workshops, and large, covered spaces.

As has already been remarked, the electric light may be advantageously employed in a large variety of works, for it admits of obtaining a great quantity of light at a small expense. By its means, the loading and unloading of cargoes, the mounting of machinery, carpentry, weaving, dyeing, and similar trades may be carried on by night just as well as in broad daylight. It is necessary, however, to

employ two machines, in order that the light of the one should counteract the shades thrown by the other. It has been found by experience that the naked light may be employed, the workmen themselves having asked for the removal of the opal globes which it was thought at first necessary to use. The electric light preserving the tints of colors, this property has been utilized with success by several dyers for standardizing their colors by night.

The electric light is most effective for high rooms; when ceilings are of a less height than 12 feet, its introduction becomes more difficult. As a rule, there may be conveniently lighted with a single apparatus about 5,000 square feet of fitters' shops, lathe-shops, tool-shops, and modelling-rooms; half that space in spinning-mills, weaving establishments, and printing-rooms; and about 20,000 square feet of yard, courtyard, dockyard, quay, and open-air works.

In a country like the British Isles, where the safety of the mercantile marine and the navy depends so very much upon the amount of security with which ships may enter ports, and the care bestowed upon keeping up an effective system of light-houses to warn the navigator against approaching dangerous coasts, the electric light would be sure to prove a welcome auxiliary in effecting those objects; and so in reality it has, being now employed at many of the stations. It renders visible at night, at distances varying from 2,000 to 6,000 yards, objects such as buoys, ships, coasts, etc. The electric light was first applied to light-houses in 1863. In that year trial was made with an Alliance machine at the light-house of La Hève, near Havre, the results being so satisfactory that no doubt all light-houses would have been provided with the new light if the question of expense had not stood in the way. It has been stated that the electric light is seen at least five miles farther than the oil light, and that in hazy or foggy weather the range of the light is twice as great with the former as with the latter.

In England, official opinion was at first against the introduction of the electric light in light-houses, on account of the peril of interruption; but this has been overcome. There are now electric light-houses, besides those of England and France, in Russia, Austria, Sweden, and Egypt. Everywhere their action is pronounced satisfactory. Hitherto machines of only 200 Carcel burners have been tried; but it is stated on good authority, that the French Administration of Light-houses are about to experiment with a Gramme machine of 2,000 burners. This machine probably will greatly enhance the advantages, already recognized, of electricity over oil, and will perhaps determine a radical change in the existing illumination of light-houses.

The lighting of works by night is highly interesting. The Spanish Northern Railway, after trial, used the light as early as 1862 in the works proceeding in the Guadarama mountains. The expense per hour for material consumed was 2.90 francs per lamp; the saving effected upon the use of torches was 60 per cent. The light has also rendered important services in the mines of Guadarama. The air became so vitiated in the workings by the explosion of charges and the combustion of the miners' lamps that the ordinary lamp would not burn. When a Serrin's regulator was sent down, a complete change took place, respiration "becoming as easy as in the open air," the lamps remaining alight. Amongst open-air works may also be cited, as executed by the aid of the electric light, those of Fort Chavagnac at Cherbourg, of the Chemin de Fer du Midi, the reservoirs of Ménilmontant, the building for the Moniteur Universel, and more recently, those of Havre harbor and docks, the Exhibition of 1878 in the Trocadéro, the Avenue de l'Opéra, the Grands Magasins du Louvre, and other establishments.

Very little attention has hitherto been bestowed upon the great service electricity will ultimately render in lighting up theatres and similar places of public resort. Besides the comparative cheapness of the electric light, its use will do away with the expensive fitting-up necessitated by gas. The great drawback to thorough enjoyment caused by the flare and heat of hundreds of gas-flames will be entirely removed. No longer broiled and heated up to almost fever-point, we shall be able to sit in comfort and, more than that, perfect safety against that most awful of all calamities, a fire in a theatre, or even a panic such as quite recently occurred at Liverpool. Panics will be avoided; for people will soon come to know that fire from electric light is impossible. We were forcibly reminded of the great danger to which audiences are now exposed during a recent visit, on a Saturday evening, to the Covent Garden promenade concerts. We pictured to ourselves the scene that would ensue if, during one of those crowded performances, the mass of inflammable material which has been piled up, in addition to what is already stored there, — with the evident endeavor to "decorate" the place, — were to catch fire: it required but a little fancy to conjure up a picture of an Inferno to which nothing was wanting. With the electric light, on the contrary, we should have, instead of a sweltering, gasping multitude, an audience able to enjoy the musical or dramatic fare set before it. As yet, however, little progress has been made in the employment of the electric light inside theatres.

But the electric light has not been a stranger to the stage for some time. It made its *début* in 1846, in the "Prophète," at the Opéra in Paris. At that early time, however, it was only employed to produce the effect of the rising sun. Its success was complete, and since that time it is rarely that a ballet or an opera has been mounted without the introduction of some effect of the electric light. Since 1855 a host of ingenious combinations have been realized by its aid,

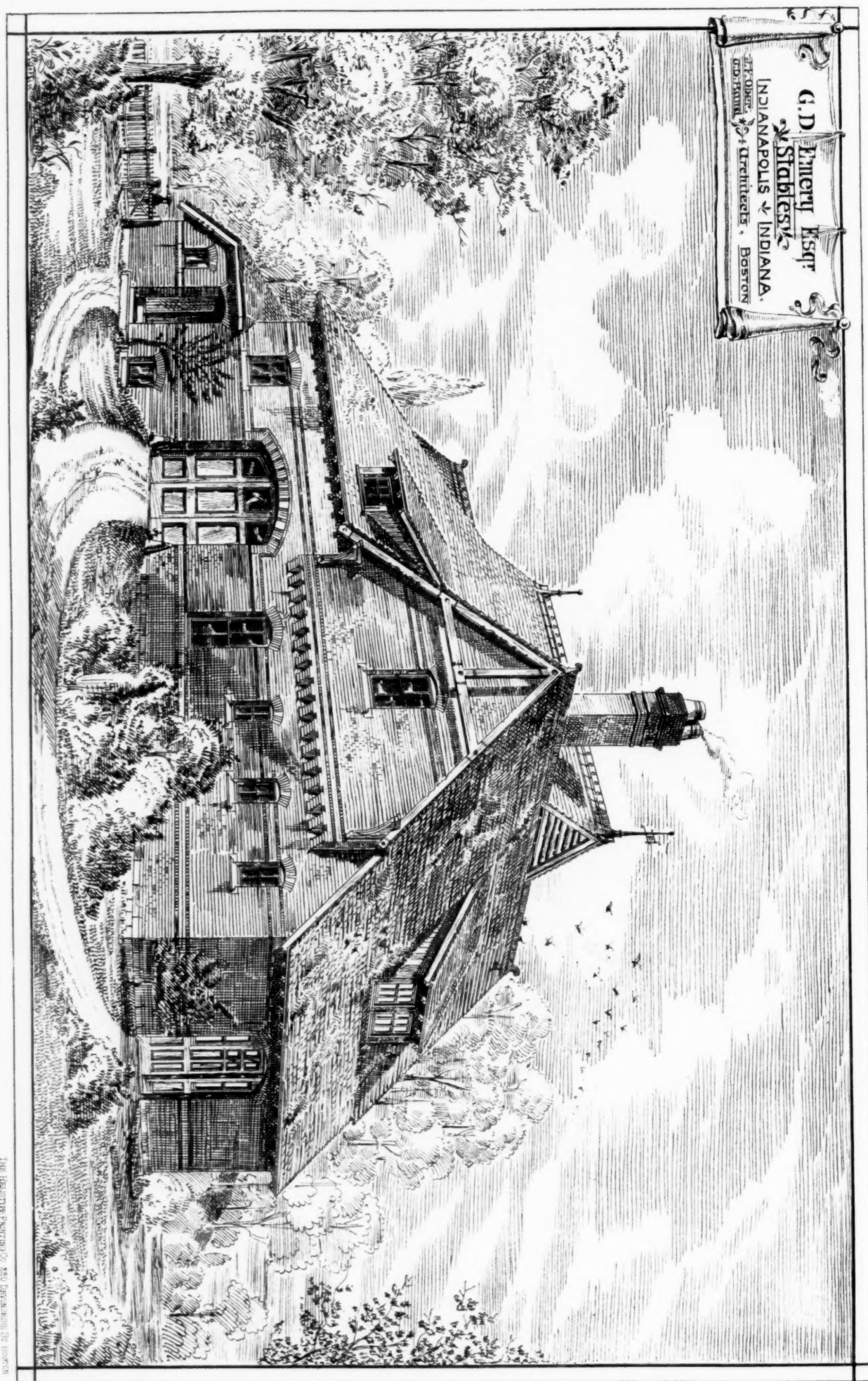
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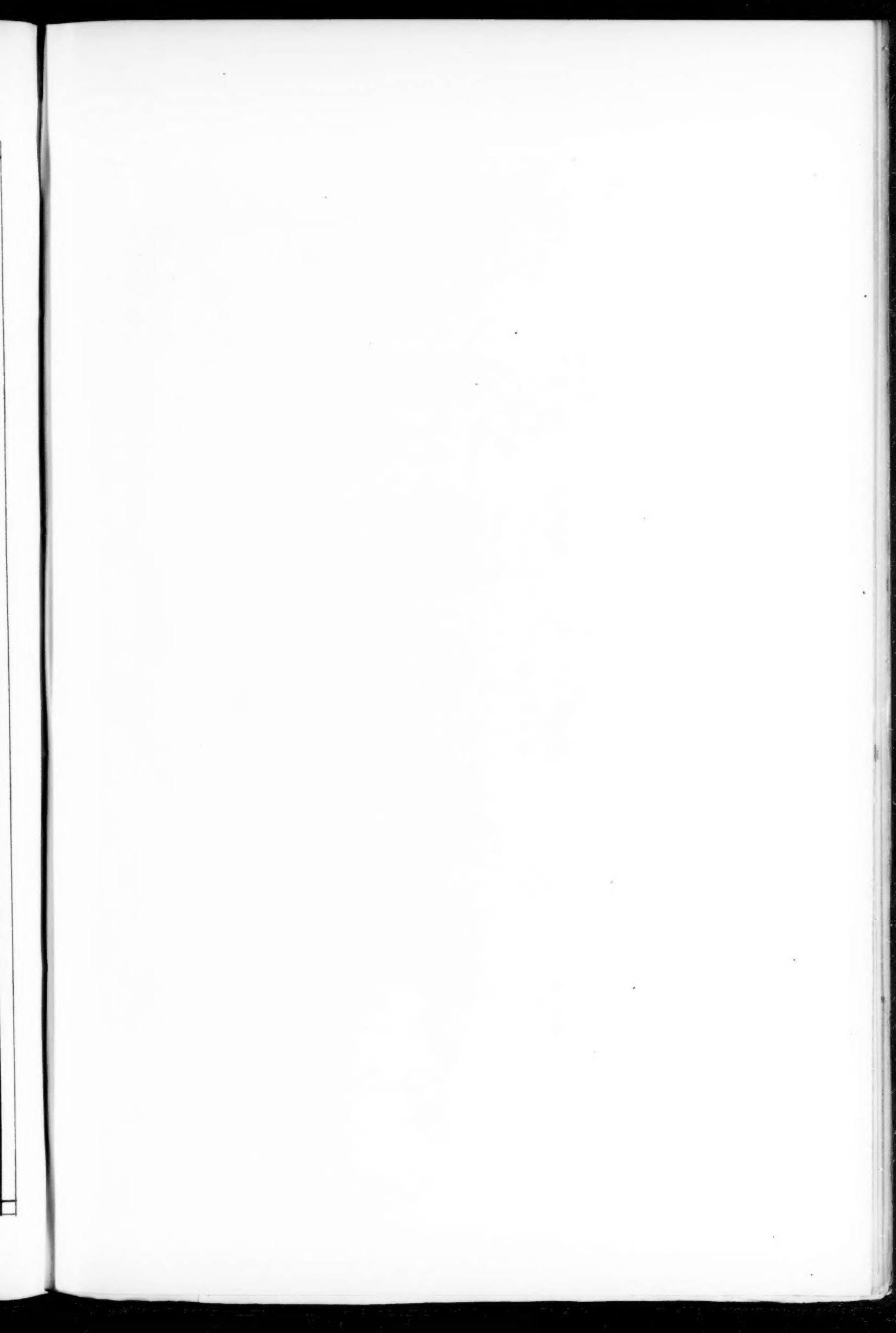
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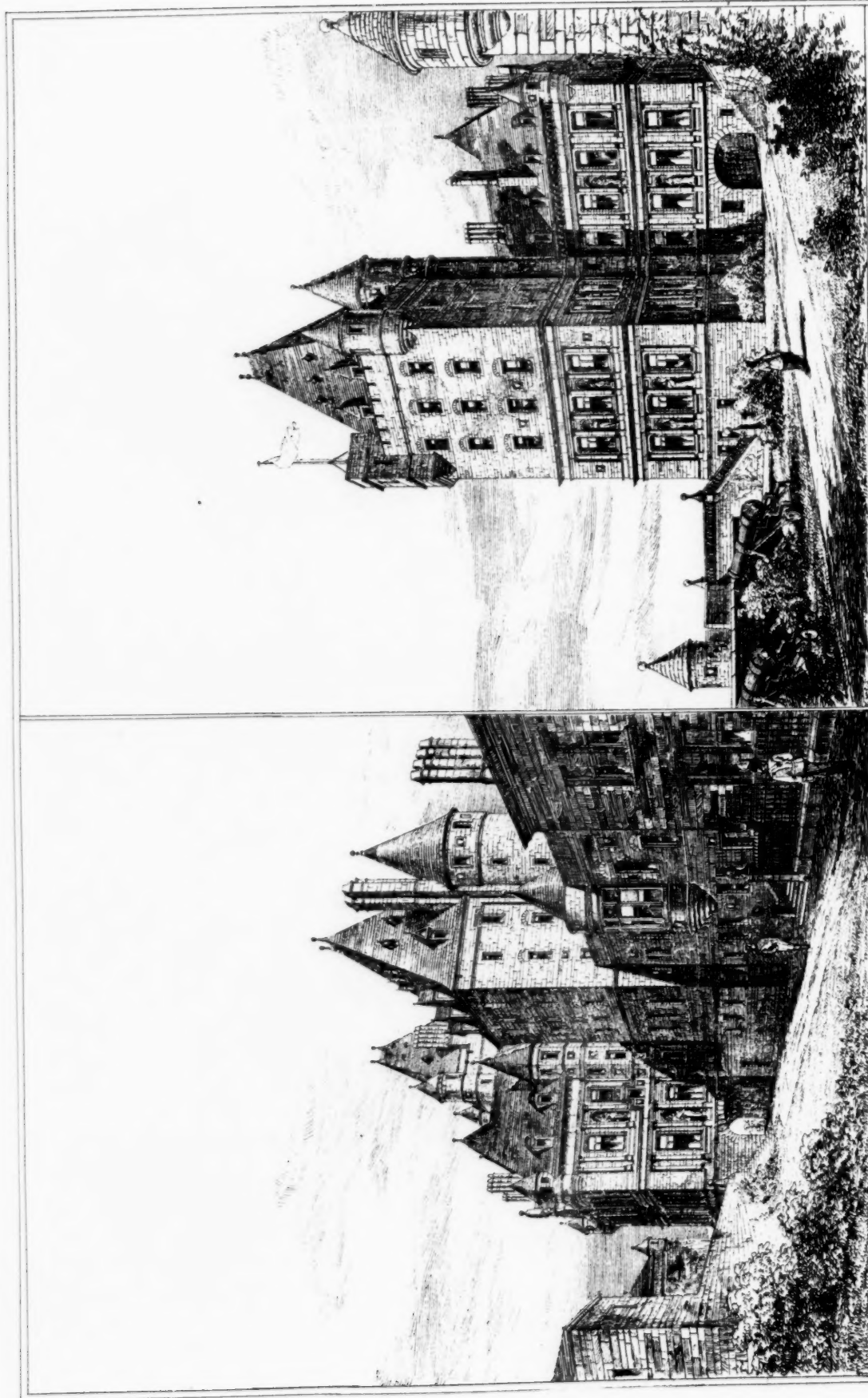
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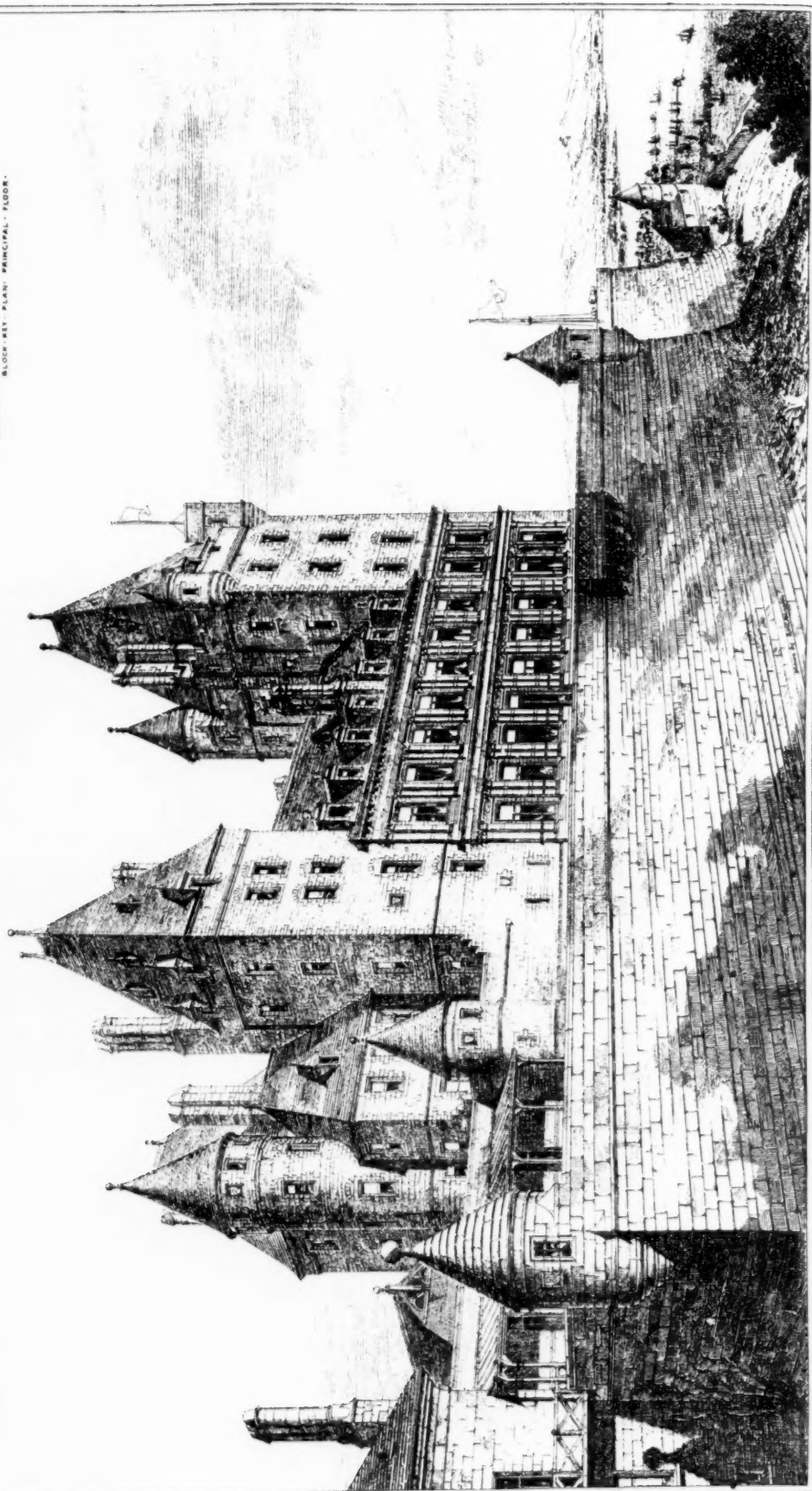
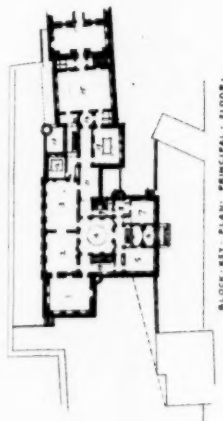




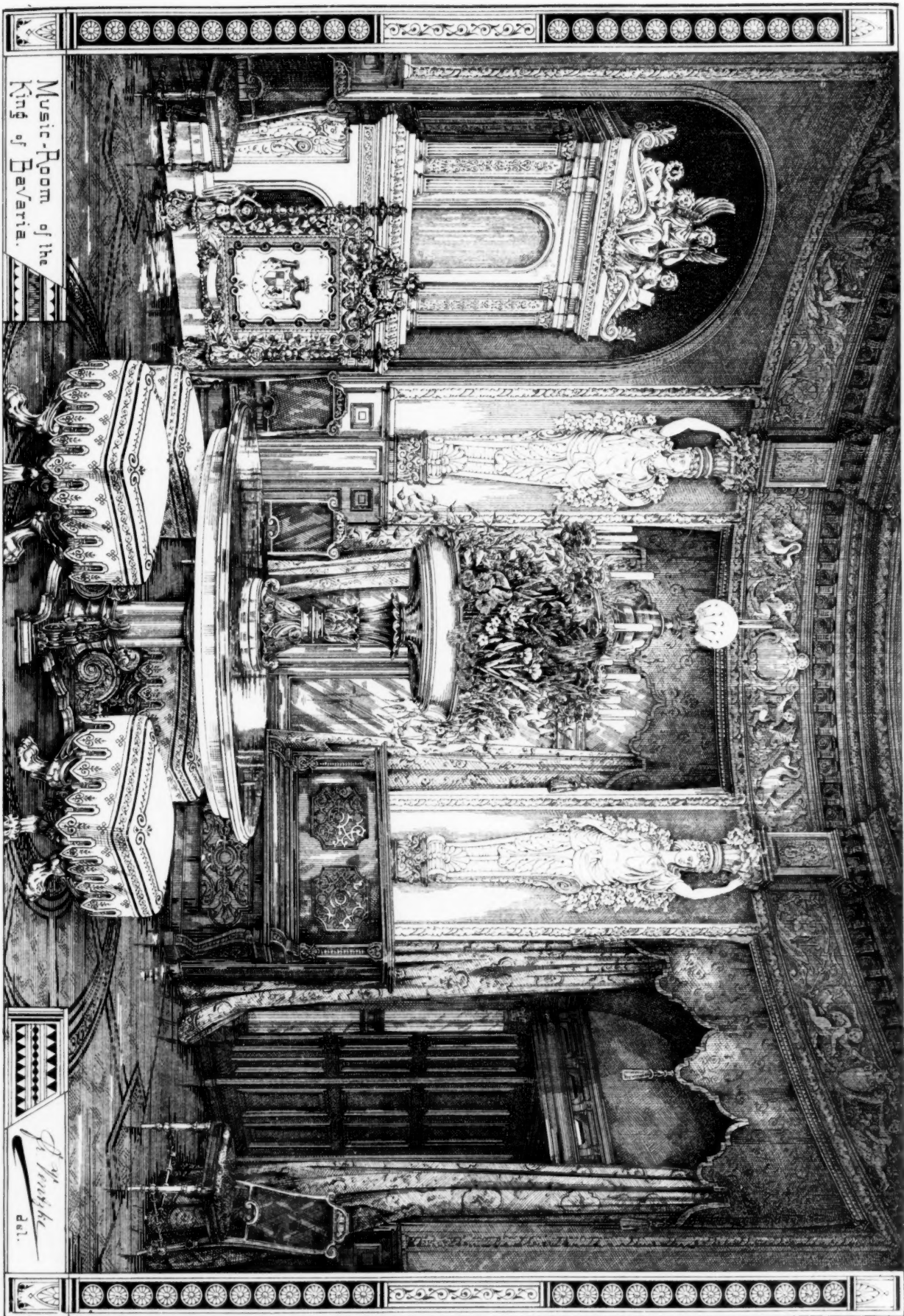
COURTYARD OF CITADEL

VIEW FROM THE KING'S BASTION

NEW CHATEAU ST LOUIS QUEBEC
 GENERAL VIEW FRONT TOWARDS THE RIVER
 W. H. LYNN R.H.A. ARCHITECT



THE ARCHITECTURE OF THE NEW CHATEAU ST LOUIS QUEBEC



—rainbows, lightning, reflections of the sun, etc. At the new Opéra at Paris, batteries are used, the architect not wishing to locate a steam-motor in any part of the building. At the Opéra in Vienna, where steam is employed throughout, use is made of a Gramme machine, which gives very good results.

The question of the cost of electric lighting is such a highly important one, and has given rise to so much discussion, that we recur to it, though we have examined it already at some length on a previous occasion, when it was shown that, even under the most unfavorable conditions, the electric light is certainly below the cost of gas for equal amounts of light. The electric light as used by the London Stereoscopic Company, who employ a Siemens machine, is stated to be three times cheaper than gas, light for light. M. Fontaine calculates the saving with a Gramme machine to be over 22 per cent. Mr. Sprague, who was recently sent to Paris by the Commercial Gas Company to report on the electric light, comes to the conclusion that gas is twice as cheap as the Jablochkoff light. Other gentlemen have given their opinion for or against electric light with regard to its cost. But any unbiassed man not a shareholder or interested in gas companies, who has taken the trouble to look into the matter, will have arrived at the conclusion that the evidence points in favor of the new light. Moreover, as improvements are introduced in the production of the electric light, its present cost will be still further reduced. In fact, it is one of the conditions of its success that the spirit of inquiry and invention should be turned in the direction of reducing the expenses.

The great problem which remains to be solved is that of dividing the light in such a manner as to split up its intense brilliancy into separate useful atoms, each of which fractions must be powerful enough to serve for illumination under the same conditions and at least with the same effect as gas. When that is done, but not until then, the electric light will have proved itself a powerful rival to gas. The startling announcement has just been made that Mr. Edison, the inventor of the phonograph, if not of the telephone, has succeeded, in conjunction with Mr. William Wallace, an electrical manufacturer of Ansonia, Conn., in perfecting a dynamo electric machine to such a degree as to make it the very thing wanted. As no details have yet been forthcoming, we prefer to suspend our judgment. — *The Builder*.

THE ILLUSTRATIONS.

NEW CHÂTEAU ST. LOUIS, QUEBEC, CAN. MR. W. H. LYNN,
R. H. A., ARCHITECT.

We reproduce from the *Building News* several views of parts of the new Château St. Louis at Quebec, the original sketches for which we published in our issue for April 14, 1877, together with a full description of the proposed work.

References to the Plan.

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|---------------------------------|-----------------------------------|
| 1. Drawing room, 25ft. X 32ft. | 10. Principal stairs. |
| 2. Ante-room, 31ft. X 24ft. | 11. Corridors. |
| 3. Dining-room, 37ft. X 24ft. | 12. Butler. |
| 4. Hall, 45ft. X 25ft. | 13. Billiard-room, 27ft. X 20ft. |
| 5. Library, 22ft. X 18ft. | 14. Ante-room. |
| 6. Porch. | 15. Armory, 42ft. X 32ft. |
| 7. Business-room, 18ft. X 18ft. | 16. Yard. |
| 8. Waiting-room, 12ft. X 12ft. | Officers' quarters beyond armory. |
| 9. Back stairs. | |

CARRIAGE HOUSE AND STABLE. MESSRS. I. F. OBER AND GEORGE D. RAND, ARCHITECTS, BOSTON.

This stable has been built for about \$4,000, for Mr. George D. Emery, in Indianapolis, Ind.

INTERIOR OF THE MUSIC ROOM OF THE KING OF BAVARIA, MUNICH. DRAWN BY MR. FR. VENTZKE.

The colors used in the decoration of this room are blue and white, the national colors of Bavaria. All sculptured work is in white marble except the frieze, which is moulded in stucco.

CORRESPONDENCE.

ENGLISH AND FRENCH SEA-SIDE ARCHITECTURE.

PARIS.

In lately writing about the new suburban houses in London, if I made some reservations in my praise of them it was chiefly because I criticised them from an English point of view, which may be taken as the highest standard of domestic architecture. Still more evident is this after a trip along the coast of Normandy, where fashion in the last few years has attracted many wealthy people to build. After seeing the houses of the English painters, of which I have spoken, it was peculiarly interesting to visit Etretat, recently brought to notice by the painters Isabey and Lepoittevin, and made celebrated by the works of Alphonse Karr, till now it has become the chief summer resort of the Parisian artistic world, including, besides artists in our acceptance of the word, composers, singers, actors, and literateurs. Offenbach, Faure, Diaz, Oudiné, and a score of well-known artists, have built there, so that one finds there the last expression of French rural architecture. The place itself is charming: a narrow valley breaks through the lofty plateau down to a pebbly beach between fine chalk cliffs, the sloping ground offers picturesque sites, and with its artistic population one might expect original and attractive

buildings. Yet from previous experience, I was really surprised to find but one or two houses which could be called picturesque or interesting. One large villa there is, however, which is strikingly picturesque in the half-timber style, and full of cosy corners and balconies looking upon the sea. This last consideration is neglected in the greater number of the houses, which are so placed as designed as to wantonly lose the view. Can it be they are too aristocratic to look out of their windows? as is the case with the Faubourg St. Germain people, some of whose hotels, facing the beautiful Luxembourg Garden and other fine views, are so purposely walled about, and the servants' quarters so placed that the master's rooms look only upon his own little court. In various other ways this feudal spirit of seclusion shows itself. In fact, in Paris no respectable people will be seen sitting by or looking from their windows. The majority of houses at Etretat are built of small, gray cubes of flint relieved with brick, which gives a neat but severe aspect. Roughly laid stucco mixed with something to give a time-stained look is used also with stone or brick finish. M. Faure, the celebrated tenor, has introduced into his brick façade large medallions of faience, but with this exception terra-cotta or tiles are hardly used. One in vain looks for a special sea-side character. Here and there an attempt is made to be rustic by trimming a thoroughly city house with wooden eaves and jig-saw work, but the effect is much that of a man in a winter surcoat wearing a straw hat.

At Trouville and Deauville, where there are many costly villas, the architecture is even more such as might be built in the heart of Paris. Fine, handsome stone and brick structures they are, if you will, but with no piazza or other characteristic of sea-side dwellings open only two or three months in the summer. Again, however, there is one intelligent exception. One of the largest villas at Trouville is framed with timber and filled in with diagonal brickwork. The design, with its bold gables and finely-carved details, is a clever adaptation of the sixteenth century style. Indeed the motives are easily traced to a fine old François I. house mouldering away in a narrow street of Lisieux, which, distant only a few minutes by rail inland, is filled with the best examples of timber-framed houses of various periods and designs. It is a perfect museum in this respect, yet the architects seem no more tempted, either by the desire of novelty or by that of perpetuating the style of the locality, to turn to it than a Parisian lady is to abandon her fashions for the Normandy cap. It is curious how uninfluenced by, in fact how utterly unconscious of, the mediæval mania of their neighbors almost in sight across the water, the Frenchmen are. Few French architects have ever been in England, and no illustrated journals from it find their way here; for in general, what the architects here cannot get from their own publications, — ample as they are there is never in them a line about England, — they are profoundly indifferent and ignorant about. A thoroughly French trait.

These two houses I have mentioned show, however, how a French architect can succeed if he seriously attempts picturesque architecture; but it does not come naturally to him, nor can distinctively rural architecture be said to exist in France. Attempts at it generally suggest Parisians on a picnic in the country, and though the provincial architect may have a more sincere appreciation of rural life than his city brother, his buildings do not show it. The ambition of the worthy bourgeois who builds in the suburbs of a city is to imitate a *maison-à-loyer*; he wants the same flat façade with its iron balconies. In imitation of the *mairie* it must be isolated from all shrubbery by as broad a gravel walk as may be, and there it stands, bare and square, as dreary to the Anglo-Saxon as if the architect had never carefully proportioned the windows and cornice, made the lines of quoins to exactly correspond with them, and carved some graceful little cartouche over the door. It is an interesting question why the French, with their sensitive taste and quick fancy, should be, in rendering the outside of their dwellings attractive, so far behind a less artistic nation; for superior as their public buildings are in breadth of composition and in monumental qualities, the veriest tyro in England will give a cosy, habitable character, surely essential to a dwelling, which they almost never obtain. A clue to this is suggested on noticing that the bare, box-like character becomes more apparent southward; for Italian classical influence is responsible for the theory that architecture should concern itself with monuments only. The Italians will lavish art on a fountain or a casino, but a small dwelling is not worth the thought. The training of the Frenchman is against him also; since the very habit of studying for symmetry and simplicity, by subordination of details, which gives such breadth to their large structures, prevents him from seizing upon the prettiness — pettiness to him — which is acceptable in dwellings.

On the other hand, the English, applying to their large buildings the same methods as to their dwellings, fail to give to the former the breadth necessary to make them grand or imposing. Details catch the eye on all sides, and there is no unity or tranquillity. English architecture may in fact be said to be at present confined to details, for there is little study of anything else. If a man has a town-hall to design he at once thinks of his sketch of the tower at Bruges, and, remembering a fine dormer window at Rouen, his chief aim then becomes to work in those two patterns at all costs. It is said for example of Mr. Street, that, after his first small sketch, he at once gives his attention to the full-sized details, and the want of subordination of secondary features to the main effect is unhappily illustrated in

his New Law Courts. The Frenchman, on the contrary, beginning with a free-hand sketch, studies his masses in plan and elevation; and when his plan is entirely fixed, he goes back to his small elevation, approximately fixes its proportions, then doubles its scale, which develops new defects to be corrected, repeats this process until he is satisfied, and then only he comes down to the details, which thus grow out of the requirements of the design; and it may be the building is up and the rough hewn blocks in place before the smaller details are decided on.

I believe the French forego an aid in not making perspectives of their houses; for misleading as a perspective may be in case of large structures where the distortions of foreshortenings are great, and which when built present façades seen almost in geometrical elevation, it is different with small buildings well in the plane of the picture, and which in nature, from their small size, generally show two sides at once. Apart, however, from all this, the French have not so keen an appreciation of the picturesque as the English. The latter, as a nation, have always been travellers and accustomed to sketch. In all lands a sketcher is at once set down as an Englishman. Thus the people at large, as well as the architects whose education aside from office work lies much in sketching, naturally seek and note "bits" which are picturesque. On the other hand the French rarely travel or sketch, and their theoretical education leads to the study of elevations and plans in books rather than of the real buildings.

In comparing these two nations, so utterly different, it is amusing to note the effect of their characteristics at the sea-shore. The one people spend their leisure in walking, the other in talking. Consequently at the English watering-places, such as Brighton, there are vast jetties running out into the sea, expressly built for "constitutional." Here, day and evening, both sexes tramp up and down. At the end of this walk is generally a wider place where the band plays, but where there is little or no shelter for seats. The French at all seasons like to sit in the open air and chat, and this, combined with their love for the theatre, accounts for their casinos, which at every watering-place are the centre of interest from the wide piazzas where they can sit. These casinos vary from the small chalet of a little-frequented place to the magnificent structures of the fashionable ones. In general, however, they front upon a wide terrace overlooking the bathing beach, and consist of piazzas, partly enclosed for bad weather, of a theatre in the middle into which can be opened dancing and concert halls on either side; and these are flanked by billiard, refreshment, and reading rooms. At many places there is a small theatrical company and orchestra.

We Americans by our traditions are peculiarly open to English influences, and our characteristics as a young, enterprising nation, eager to travel and assimilate from all sides, favor this sentiment for the picturesque; the recent results have certainly been encouraging. I truly believe that our finest Newport villas are, for comfort and elegance, within and without, superior to any dwellings of the kind here on the Continent, and surpassed by none in England, while our modern detached city and suburban houses also fairly rival any English ones. An Englishman may find them mere copies of his own designs, but I am confident a Frenchman can perceive in them a certain character of their own distinct from the borrowed motives. We must, however, remember that for a style to be progressive it must be modified according to its own requirements, and not by wholesale borrowing from others; and to this end the French and German methods of patient study at home should not be neglected.

In my recent letter about the building of the American church at Rome there appeared a typographical error which I desire to correct. It reads, "a Swiss archbishop" regulated the accounts and was clerk of the works; the reading of course should be "a Swiss architect."

R.

FRENCH CRITICISM OF ENGLISH WATER-COLOR PAINTING.¹

WERE it not that England, whose participation in our great Exhibition has been on so grand a scale, devotes a special gallery to water-color drawing, it would be superfluous to make this branch of art the subject of an article. The other nations, including France, are scarcely represented in this *spécialité*. Moreover, the English artists' treatment of water-colors scarcely differs from their method in oil painting; in fact, one passes from the galleries in which their canvases are hung to the one containing their drawings without being made aware of the fact by any novel impression. We find here the same soft tones of color, the same careful and somewhat hesitating manner, which seems to dread producing too brilliant an effect, and as it were to shrink from uttering a note pitched in a key that might disturb the general harmony of the composition. English painters, and most especially water-color artists, are perfectly indifferent to what we term *le morceau*; their dominant preoccupation is, that the idea of the picture should be conveyed to the mind as directly as possible; they consequently carefully avoid distracting the eyes of the spectator from the subject. Our artists take an opposite view; they paint for the sake of painting, considering the organ of sight sufficiently precious to merit every possible effort to gratify it.

If our neighbors do not indulge in the seductions of the palette they have other merits not less estimable. Their composition is admi-

nable; and if they obtain the sense of harmony by somewhat muffled tones, nevertheless they undoubtedly do produce harmony. It is, therefore, not too much to assert that if they may learn something from us, they can most easily return us the service; and they have an idiosyncrasy quite their own, whereas ours differs in nothing from that which is common to all the art schools of Europe.

English water-color art has lost much of its individuality since the Exhibition of 1867. It has become a serious art, which ranks with oil painting. Under these new circumstances one is tempted to inquire whether its origin has not been somewhat forgotten, and even we may go further, and contest its *raison d'être*. It undoubtedly matters not, when we see a work of art for the first time, whether it has been thrown on a canvas or on a sheet of paper, and it is a very secondary consideration what the exact quality of the colors employed thereon may be; but it is of importance to preserve a distinctness in the methods of procedure, for a similarity in these methods would deprive us of variety in art production and serve no useful end. It had been admitted that a certain freedom of execution and a liberty in method was granted to the water-color art which would not be tolerated in oil painting. The art was like a young sister, whose giddy pranks would be condoned by her youthful grace and freshness. But the English do not look on things in this light; stiff, ceremonious, and correct in their bearing, their water-colors are after their own image. And verily we have no right to reproach them with their peculiar type; but the critic may be allowed to regret that the special method of water-color study should be so entirely laid aside that it has lost its characteristic physiognomy, and this in the birthplace of water-colors, and in the country which has produced a Turner, a Bonington, and a Cattermole. These remarks, however, do not apply indiscriminately to all English artists; there are some among them whose works evidence careful research for the distinctive qualities of the art, and they paint accordingly; but they who do so are not the most popular, for the cleverest men are in the opposite camp. I shall give a rapid sketch of each.

Frederick Walker and Pinwell stand at the head of their school, in my opinion. Both artists terminated their brief career in 1875, and it is really hard to have to commence their eulogy by the announcement of their death. I shall, however, write of them as though they were here to enjoy the record of their successes.

Walker has everything in his favor. Equally remarkable for the delicacy of his coloring and the accuracy of his draughtsmanship, his composition moreover displays an exquisite sense of nature, and the English school does not possess a more careful observer of detail. These qualities are intensified by a gift peculiar to his own mind, and that is a strongly-developed sense of humor. His water-color paintings, as well as his drawings, fully justify the high position this artist has held in England, and his works have this peculiarity, that if they are frankly English in form and feeling they are first-rate works of art, no matter in what latitude they may chance to be. Mr. Walker has several styles,—the one airy, bright, and cleverly concentrated (this he applies to the illustration of books); the other more that of a painter, where every detail is finished with the utmost carefulness. This style precisely serves his purpose in the composition of the home scenes in which his countrymen delight. Of his first style are the smaller water-color drawings, of the freshness of coloring and rapid execution for which Johannot was remarkable, of which the most noteworthy example which recurs to me is the drawing for an illustration of one of Miss Thackeray's works. A whole drama is expressed in the size of a sheet of letter-paper; the scene conveys a powerful yet sweet emotion, of which the truthfulness to nature is notable, at the same time the sense of vision is gratified by the graceful and humorous manner of the artist. "The Health to Absent Friends" is the title of his water-color drawing; equal in merit is a wood engraving called "A Bouquet." The publisher has had the good sense not to hand over to the engraver the piece of box on which this delicious composition is designed. The scene is one of the every-day life of a laborer in his cottage, but the talent of the artist elevates the thoughts to a far wider sphere. A few touches of his pencil have sufficed to characterize the moral tone of his personages, their social position, and the feelings by which they are inspired.

Walker excels in his reproduction of children, as do most of his fellow-countrymen, but he does so with a freedom of drawing and a humor which no other English artist has attained, with the exception of Mr. C. Green, especially in his drawings on wood, for as a painter he is less forcible. Children are prominent in almost all Walker's water-colors; the types and attitudes of his tiny personages are as varied as nature itself, and so happily given one never wearies of them. In the very centre of his "Field of Violets" a child is the prominent figure. This work is a masterpiece, and as perfect as are any of the illustrations of which I have already spoken. With infinite gravity she holds the basket in which an aged woman piles the violets she has gathered in the meadow; her figure stooped, in an attitude which recalls our own Millet. His name is the only French one of which we are involuntarily reminded in the English art section; but it must be admitted that it often recurs to us. This water-color drawing of Walker constantly reminds us of a master who would infallibly have added lustre to our art school had he not, by inconceivable carelessness, been all but totally excluded from the exhibition. The gesture of the principal personage in it, and yet more the method of the artist in the composition of the work, recall Millet. There are the same incisive touches of tones at first opponent, but

¹ Translated from the *Gazette des Beaux-Arts*.

gradually blended with an infinite softness, and which convey rather more the impression of a crayon than that of a water-color drawing.

The great majority of English artists, be it said, make use of color in tubes, or else have color prepared on the palette, which facilitates the retouching of the work without this being apparent. Water-colors admit of no such transactions. We have already said that all is well that ends well, and we do not mean to reproach the artists who use these means with the fact, but we are authorized to assert that the tones of color obtained by these processes differ absolutely from the coloring of nature; that however tender may be the harmonies which result therefrom, they are based on a fiction and cost less work. Delacroix's ambition soared higher; he determined to conquer by a struggle with difficulty, and can one blame him? The English are afraid of color; they dread its destroying the idea of their picture by attracting attention and diverting it from the subject. They are right to frame their water-colors as well as their paintings; at the edges of the canvas or of the paper the reflected light from gilded frames raises the tone of the ambient atmosphere, which is much work gained, and the general harmony of a picture is not the worse for this. The indiscretions of our broad white margin are thus avoided, which so often proves a touchstone by which the local truth and freshness of the tones of color can be tested.

The death of Pinwell, in 1875, proved as great a loss to the English school of art. The author of the "St. James's Park" has at the same time more passion and more freedom of drawing than Walker. In his compositions the preconceived idea is clearly defined, and he never allows the technical part of his work to induce him to swerve from it. It would be waste of time to attempt to assimilate his diverse methods of painting with the rules of aerial perspective; he only recognizes gradations of light to a certain degree and in an arbitrary manner. When he has clearly expressed his thought, he stops short, and leaves the rest to mere indications. If I had to choose between what is distinctly given and what is left to the imagination, I should select, on account of the execution solely, those parts of the work indirectly hinted at, for in these the genius of the artist is most truly revealed. Conveying an idea by a few strokes requires adaptability, lightness of touch, and profound knowledge, — qualities which are not common in England, where usually a certain hesitation and heaviness of manner is predominant.

Pinwell is a painter, a philosopher, and a poet at the same time; he combines the two *genres* which are the distinctive feature of English art of the present day. At times he selects an abstraction — as, for instance, a fable — for his subject. He did this when he painted the "Pied Piper of Hamelin." At other times he paints life as it is, and relates its incidents with admirable truthfulness; but he generalizes more than do most of his countrymen, and he delights in painting a moral. "St. James's Park" afforded him an opportunity for painting modern London society. It is evident that when we study this group of the varied incidents in the every-day life of the great city we must carry our thoughts beyond what the artist actually puts on the canvas. This is more than a mere reproduction of the habits and customs of the epoch. That there is here a final and allegorical meaning we cannot for a moment discuss, if we will only study the general plan of the composition. The scene takes place on a bench in the park. The personage in the centre has a sinister aspect, — that of poverty in a black coat. He is either a broken-down gambler or the discoverer of some invention on which he has vainly spent his uttermost farthing; his features bear the stamp of his defeated life. In the fixed expression of his look one can see that he is on the brink of a fatal resolve. What is before him? crime or suicide? He has an honest look about him. One hand is gloved. The Thames may see the end of his history. On the right, a woman in a dark dress and a boy, — street singers both of them. The mother reckons their pennies. There is no doubt as to their story. They are clearly the victims of some heart-breaking misfortune. The boy is old enough to remember; the way in which he looks before him tells us he has seen better days. On the left is a young nursery-maid who blushes while she listens to the whisperings of a fascinating guardsman sitting by her side, and in front of them, a little girl dressed in velvet. While she pushes a baby along in a perambulator, with a pitiful expression she glances at the two poor musicians. Vaguely she feels they are her equals in rank. We have before us two children personifying the well-known types of rank and *décadence*. The bench on which this tragi-comedy is acted is, to use an architectural term, *accosté* in the background on the right by the figure of a woman whom we have a clear right to consider as typifying modern vice, and on the left by a man very comfortably dressed, who carries in his gloved hand a brace of partridges. The contrast is too striking for us not to perceive that he represents labor rewarded, *au-dessus ses petites affaires*, as Gavarni would have said. The outline of a policeman, seen in the distance, may be said to typify the law.

I cannot assert that when Pinwell composed this picture he meant to convey the ideas I have attributed to his personages, but it cannot be denied that his genius had a singular facility of impressing the most ordinary subjects with an elevated order of sentiment. He was, in common with the great majority of English artists, a refined analyzer. The superiority of his genius is made manifest by the conclusions his pictures force upon one. They are works of a rare degree of elevation of tone.

I shall only speak of the third water-color drawing of this remarkable artist — "La Grande Dame," a retrospective study of the habits

and customs of England — for the purpose of extolling the brilliance and powerful harmony of its tone. The blues and reds are graduated to a vinous tinge, somewhat displeasing to our French vision; but as soon as one has become acclimatized to the English galleries, where this tone predominates, one admits its exquisite beauty. There are certain portions of this work, and these the least finished, as I have before remarked, the execution of which is simply superb.

The east is brilliantly represented — perhaps, indeed, too brilliantly — in the water-colors of Lewis, who likewise died in 1875, a year so peculiarly fatal to English artists. By the clearness of his colors, which he used almost crude, Lewis seemed to enter a protest against the pale coloring of his fellow-artists. His water-colors have the appearance of a kaleidoscope; they are, however, admirable specimens of draughtsmanship and of singular elegance of design.

Let us, however, confess that this style is of a past date. He does not stand alone; the romantic drawings of Sir John Gilbert are likewise somewhat out of date, and their intensity of tone only proves this fact. In Mr. Linton's case this energy of tone is at least equal, but the form is more modern. His "Cardinal Minister" is a good historic painting, in the style of Delaroche; the execution displays knowledge and is worthy of the subject. Mr. Gregory exhibits two very remarkable works. His style is full of vigor, of freedom of touch; less, however, than he aims at. The title of one is "Sir Galahad," a knight of the days of romance, who is scarcely discernible in the shadows of night; the mystery which enshrouds him, however, adds considerably to the impression produced. "St. George" is simply the life-size bust of a man, broadly treated in water-colors on extremely rough paper, with scratched-in effects cleverly managed. The saint is of a somewhat ordinary type, but the hands are remarkable for beauty, and prove knowledge of form. This drawing appears all the more startling in effect inasmuch as the rest of the works of the English school are of a peculiarly subdued tone. It is like a trumpet call in the middle of a concert of rippling song.

I shall not dwell on the retrospective works of Messrs. Burne-Jones and W. Crane; they neither differ in style nor form from the oil paintings by those masters, already criticised by M. Duranty. "Love in Death" is nevertheless a curious work by Burne-Jones; but we ask in vain why this artist has drawn on paper instead of on canvas a work of such dimensions, for doing so was simply accumulating its difficulty. Its artistic value is incontestable. The artist has a perfect right to close his eyes to the progress which has taken place since the year 1500. I even consider this fact as the indication of a refined and original nature. The artists of mediæval ages had among other merits that of *naïveté*; but this quality is terrible, inasmuch as it does not admit of imitation. English pre-Raphaelites prove this by the inanity of their efforts. Nevertheless they succeed in interesting us in their works. Who, for instance, could pass by with indifference "The End of the Year," by Mr. W. Crane? Imagine the burial of a year. The body is borne along in a bier; a Christian priest leads the procession; the mourners defile — as in theatres — to the very edge of the grave, which yawns beneath a portico *à la Giotto*. Mr. W. Crane, in a charming little landscape which is the last of his exhibits, entitled "Almond Trees on Monto Pincio," in his adoration for *naïveté* has not kept to the primitive Italian school, but gone off to Japan, and the combination of these two styles has suited him to perfection. I leave to others the task of proving that in acting thus the artist has sacrificed nothing of æsthetic unity, and that if he has drawn from two different streams it is because both spring from the same fountain.

It is time to take leave of the English section. I shall not do so, however, without repeating once more, that the originality, the *naïf* charm, the humor, and the honest tone of the works it contains fully justify their success. Perhaps they lack purely plastic qualities, but we cannot have everything. Our art section is sufficiently rich in merit to admit of our unhesitating admiration of perfections in others of which we must confess ourselves somewhat lacking. — *The Architect*.

DR. SCHLIEMANN'S EXCAVATIONS AT ITHACA.

DR. SCHLIEMANN's late excavations at Ithaca, though they have not given him any such prizes as he has found elsewhere, have nevertheless afforded him much archaeological comfort, as appears in his communications to the *London Times*. Of Mount Aetos, where was the citadel of Ulysses, he says: —

"There can hardly be any doubt that, in the same manner as the Acropolis of Athens was widened by Cimon, who included a large portion of its northeastern slope, and filled up the lower space with stones and débris, the level summit of Mount Aetos was extended to the north and southwest by a huge Cyclopean wall, still existing, the space between the top and wall being filled up with stones and débris. Thus the summit forms a quadrangular, even platform, 168 feet 8 inches long by 127 feet 4 inches broad, so that there was on the summit ample room for a large mansion and courtyard. To the north and south of the circuit wall are towers of Cyclopean masonry, from each of which a huge wall of immense boulders runs down. But at a certain distance these two walls begin to form a curve, and ultimately join together. Two more Cyclopean walls run down from the top — the one in an easterly, the other in a southeasterly direction — and join the curve formed by the two first-named walls. Lastly, I have to mention a huge circuit wall about fifty feet below the upper circuit wall. This wall has fallen on the west side, but is in a marvellous state of preservation on the other sides. To increase the strength of the place the foot of the rock has been cut away so as to form a perpendicular rock wall twenty

feet high. In the walls are recognized three gates. Between all these Cyclopean walls once stood a city, which may have contained two thousand houses, either cut out of the rock or built of Cyclopean masonry. Of one hundred and ninety of these houses I have been able to find the ruins more or less preserved. I measured twelve of them and found them between twenty-one feet and sixty-three feet long, and fifteen feet to twenty feet broad. The usual size of the rudely cut stone is five feet in length, four feet eight inches in breadth, and two feet in thickness. The size of these stones by far exceeds that of the stones in the Cyclopean houses I discovered at Mycenæ and Tiryns. Some of the houses consisted of only one room; others had four or even six chambers."

He identifies the stables of Eumæus as follows:—

"Near the southeast extremity of the island, about four and a half miles from Vathy, are a number of stable-like rooms, averaging twenty-five feet in length and ten feet in breadth, partly rock cut, partly formed by Cyclopean walls of very huge stone, in which Homer must have seen the twelve swine stables built by the divine swineherd Eumæus. To the east of these stables, and just in front of them, thousands of very common but most ancient potsherds indicate the existence of an ancient rustic habitation, which Homer appears to have described to us as the house and station of Eumæus. This is the more probable, as at a very short distance to the east of this site, and near the sea, is a white cliff with a perpendicular descent of one hundred feet, which until now is called Korax, that is, the Raven Rock, to which Homer refers when he represents Ulysses as challenging Eumæus to precipitate him from the great rock if he finds that he is telling lies (Od. xiv. 398). Below the Korax, in a recess, is natural and always plentiful and pure water, which the tradition identifies with Homer's fountain of Arethusa, from which Eumæus' swine were watered. I excavated as well in the stables as in front of them, on the site of the rustic habitation; the stables I found filled with stones, but on the site of the house I struck the rock in a depth of one foot, and found there fragments of very interesting, most ancient, unpainted pottery, also of pottery with red bands, and masses of broken tiles. I found in my excavations at the foot of Mount Aetos two medals of Ithaca, having on one side a cock with the exergue $\Theta\Delta\Lambda\Upsilon\Upsilon\Upsilon\Upsilon$, and on the other side a Ulysses head with a conical cap or pilidium; also two coins of Agathocles of Syracuse. These latter coins are here frequently found and abundantly offered for sale. Also Corinthian and Roman coins are very frequent here."

The grotto of the nymphs, where Ulysses hid his treasures, he claims to have discovered, and thus describes:—

The Odyssey mentions a grotto of the nymphs, in which Ulysses, assisted by Minerva, hid his treasures. Dr. Schliemann thinks he has discovered this place in a stalactite grotto near the little port of Dexia. He found no treasure, but says:—

"The grotto is very spacious, and it exactly answers the description of Homer, who says that it has two entrances: one in the north side for men, and one on its south side for the immortal gods, for no man can enter by the divine door. All this is true; but by the entrance for the gods he means the artificially cut hole in the vault of the grotto, which must have served as a chimney to lead off the smoke of the sacrificial fires. From this chimney to the bottom of the grotto is fifty-six feet, and of course no man can enter by this way. But for ages the proprietors of the field seem to have utilized this chimney to get rid of some of the stones which abound here, for the grotto is filled five feet and six feet deep with small stones. From the vault of the grotto hang innumerable stalactites, which have given to Homer the idea of the stone urns and amphoras, and the stone frames and looms on which the nymphs weave purple-colored mantles and veils."

NOTES AND CLIPPINGS.

PENNSYLVANIA'S HEROES.—In response to the invitation of the commission entrusted with the selection of the sculptors of the statues of Robert Fulton and General Peter Muhlenberg, which are to represent Pennsylvania in the Hall of Heroes, several sculptors submitted models of the two statues, which have lately been placed at the Academy of the Fine Arts in Philadelphia. Among the competing sculptors were Messrs. Bailey, Storck, Murker, Manger, Ellicott, Kern, and Roberts, all of Philadelphia; Miss Nevin, of Lancaster, Penn., and Mr. Gould, of Boston. Apparently after the models had been submitted the commissioners decided that the work should be entrusted to native Pennsylvanians only, which at once ruled Mr. Gould and any other aliens out of competition. The award was finally made to Mr. Howard Roberts, of Philadelphia, who will thus have a chance to add the statue of Robert Fulton to his other works, among which are the figures of Hester Prynne, Hypatia, and La Première Rose. To Miss Nevin was entrusted the possibly easier task of representing in marble the "fighting parson" of the Revolutionary War.

STATUE OF KAMEHAMEHA.—The centennial of the discovery of the Sandwich Islands by Captain Cook in 1778 is to be commemorated by a bronze statue, heroic size, of Kamehameha, the conqueror and organizer of the islands. Kamehameha was an ancestor of King Kalakaua, who visited the United States in 1875. The legislative assembly of the Sandwich Islands at Honolulu voted unanimously in August last the sum of ten thousand dollars for a work of art to commemorate their country's hero and their centennial era. The chairman of the committee, Hon. Walter M. Gibson, member of the Hawaiian Parliament, who has charge of this commemorative monument, has placed the work in the hands of a Boston artist, T. R. Gould.

ELECTROTYPING ON CHINA.—An ingenious process has been recently introduced in France for electrotyping on a non-conducting material, such as china, etc. Sulphur is dissolved in the oil of lavender spica to a syrupy consistence; then chloride of gold or chloride of platinum is dissolved in sulphuric ether, and the two solutions are in this state mixed under a gentle heat. The compound is next evaporated until of the thickness of ordinary paint, in which condition it is applied with a brush to such portions of the china, glass, or other fabric as it is desired to cover, according to the design or pattern, with the electro-metallic deposit. The objects are baked in the usual way before they are immersed in the bath.

AUTOGRAPHIC TELEGRAPHY.—Among the ingenious electrical inventions at the Paris Exhibition is D'Arlington's autographic telegraph. It is designed for use on the battle-field, but there is no reason why it could not be made serviceable in time of peace. It can transmit a map, plan, or message exactly as it may be drawn or written, and if it can do that, it can also send far and wide the portrait of a runaway bank director or any other person who may be "wanted." A general idea of it may be gathered from a verbal description, but a diagram would be required to explain its details. At the transmitting and at the receiving end there are cylinders, each of the same size and driven by clock-work, so as to revolve and to move laterally at the same rate. Each cylinder has an earth connection. The despatch or plan is made with greasy ink on a piece of foil paper, which fits accurately the circumference of the transmitting cylinder. The oily parts of the surface are non-conducting, while the metallic part is conducting. On the receiving cylinder is a sheet of chemically-prepared paper. A platinum wire or "finger" is attached to each end of the wire; and these fingers are adjusted so as to move easily over the cylinders. The sending cylinder is connected with the battery, which is also in short circuit. Whenever the finger of the sending cylinder touches the non-conducting surface the current must go over the long wire and affect the other platinum point; but when it touches the conducting metallic foil it passes over the short circuit, and no electric action is felt at the receiving end. Every time the current goes over the long wire the platinum finger of the receiving cylinder makes a blue mark on the chemically-prepared paper. The result is that an exact counterpart of the plan or despatch is received when the work is done. Every military officer will appreciate the value of this invention. A modification of the same apparatus has been used for engraving, but the employment of it is not profitable unless a great many copies of the same design are required.—*N. Y. Times.*

CURIOUS CINERARY URNS.—In opening a burial mound at Cade's Pond, two miles northeastward of Santa Fé Lake, Florida, Mr. Henry Gillman found two instances of a peculiar kind of cremation. The skull of the subject in each case had been employed as the urn to contain the ashes of the rest of the body. Neither of the skulls showed any signs of having been subjected to the action of fire.

JAPANESE AND CHINESE ART.—One or two distinctive features in Japanese art, noted by Sir Rutherford Alcock, furnish evidence of its identity with that of China. The curious fancy for the discovery of human features and forms in rocks and trees and hills, observable in Japanese drawings, owes its origin to the imagination of Chinese artists. In some of the engravings which accompany the text of the "Imperial Compendium of Literature," this conceit is very conspicuous; and in most illustrated Chinese books of travel—such, for example, as the "Fan cha too"—it forms a noteworthy feature in the landscape. But the point which most nearly allies Japanese to Chinese art, and dissociates it from that of all other, and especially European countries, is the total neglect of the correct study of the human form. In China this arose from a consideration of decency, and it was noticed that when the Chinese ambassador visited the British Museum he walked straight through the galleries of Greek and Roman antiquities without turning his eyes to the right hand or to the left, though in all other departments he examined most carefully the objects on view. In Japan, on the contrary, the notions of decency are of quite another kind. As Sir Rutherford Alcock remarks: "Constant opportunities for studying the nude exist, or did exist until quite lately, in the bath houses, where both sexes bathed in common for hours together; and in the streets and on the roads in summer, it was the exception to see a workman with any clothing beyond a loin-cloth, — much too scanty to interfere with any artistic requirements." And yet he says, "Considering how well and vigorously they [the Japanese artists] can draw the human figure in action, one is disposed to wonder that they have never learned to draw both hands and feet with something like correctness." Here we have, then, two countries differing from all others in their neglect of the study of the human form. In the one, the oldest of the two, this neglect is a matter of principle founded on the established ideas of decency; in the other, which has notoriously borrowed much from its older neighbor, no such principle is known, and every opportunity is furnished by the habits of the people for the development of this branch of art. What greater proof can we have than this, coupled with the connection which we have shown to exist between the school of art in the two empires, of the obsequiousness with which Japanese artists have followed in the wake of their Chinese masters?—*Exchange.*

ACOUSTIC GALLERY AT BEX.—Prof. Ch. Dufour, during the last session of the Swedish Society of Natural Sciences at Bex, observed a remarkable echo in the church. The interior is of a rectangular form, with one end rounded. The pulpit is nearly in the middle of one of the large sides of the rectangle. Persons in front of the pulpit, at its foot and a little to the right, hear a speaker with great difficulty; but an auditor standing at two or three metres from the middle of the rounding part hears, with remarkable distinctness, the slightest words which are spoken at the foot of the pulpit. Dufour considers this effect more remarkable than the one in the dome of St. Paul's, at London, and than that in the halls of the Conservatoire des Arts et Métiers, at Paris.

INUNDATION FROM THE NILE.—The damage by inundation on the Damietta branch of the Nile is estimated at \$2,500,000. Two hundred and fifty lives have been lost. The Government is accused of neglecting all precautions against such a calamity.

EXCAVATING THE TEMPLE OF DELPHI.—It is said that the Athens Archaeological Society is in treaty for buying up the houses on the site of the Temple of Delphi, and transferring the village to a short distance off. Excavations will then be undertaken.

LACUSTRINE RELICS.—On the site of the lacustrine village near Estavay, laid bare by the lowering of the waters of the Lake of Neuchâtel, have been found amber ornaments belonging to the age of stone, and a beautiful golden buckle of the age of bronze. Four canoes are visible, but they have not as yet been raised to the surface.