

THE COLOR TREATMENT OF THE PAN-AMERICAN EXPOSITION.

BY EDWARD HALE BRUSH.

In determining to give color treatment to the buildings of the Pan-American Exposition the management well understood that to create an exposition whose outward aspect should be essentially different from anything of the kind created heretofore would be a task of exceeding difficulty. Indeed, it was felt to be well nigh an impossibility to attain success unless the buildings could be colored. There could not be another "White City." To create one would simply challenge comparison with Chicago's supreme achievement in the Columbian Exposition of 1893, and occasion unfavorable comment rather than the reverse. Color there must be, but how was it to be accomplished? The practical difficulties in the way of giving suitable and artistic coloring to the temporary staff without consuming all the funds of the Exposition in the purchase of paint seemed almost insurmountable. But persistent and intelligent study of the problem has won the day, and in this respect, as well as others, the Pan-American Exposition now bids fair to be a signal success.

The selection of the Spanish Renaissance style of architecture for the buildings of the Exposition was a fortunate one in view of the need to make unique in appearance and give the exteriors of the structures color. To prepare a color scheme suitable to classic architecture would have been a dubious task, indeed. But with buildings in the Spanish style color is a natural and fitting adjunct and rich, warm tints may appropriately be used in abundance, for they but enhance the beauty of form the structures themselves possess; and with courts and fountains and floral and horticultural effects, such as the Pan-American Exposition will have in profusion, the charm of a setting tropical in its richness is attained. Having determined upon giving the Pan-American Exposition buildings color, the next thing was to find a man capable of putting it on. From the very first the aim of the creators of this Exposition has been to make it on the artistic side a complete and harmonious ensemble. To this end there has been the closest co-operation between every department. Every effort has been made to avoid haphazard work and jarring contrasts. The avoidance of the incongruous and inartistic in the laying on of the color was of especial importance and also of unusual difficulty in view of the fact that there were few precedents to follow, so that he who would achieve success must possess in a marked degree the creative instinct.

In Charles Y. Turner, N.A., president of the Art Students' League, of New York, and a leading member of the National Society of Mural Painters, the Exposition management found an artist who has proved equal to the task. Mr. Turner has had the assistance of other mural painters of national reputation, and the problems to be solved have been studied with the greatest care on both the practical and the artistic side. The accompanying views give the reader some idea of the work that has been going on in Mr. Turner's studio at No. 35 West Fourteenth Street, New York city.

As will be seen from these pictures, a large corps of artists has been engaged in working out from models of the buildings the color scheme of the Exposition in detail. In the first place, the general character of the color plan was determined upon. This was not left to chance or mere fancy, but was studied out with especial reference to the purposes and situation of the different buildings and the character of the whole Exposition.

The Spanish Renaissance architecture is especially adapted to convey the impression of joyousness and

festivity. It lends itself readily to enrichment by ornate sculptural adornment and fantastic treatment in both form and color. It gives an opportunity for decorative enrichment of pinnacles and minarets, of arches and colonnades, of dome interiors and the frames of doors and windows, and all this profusion of color, provided it is harmonious and artistic, heightens the pleasing effects, gives striking contrasts, and is in keeping as a whole with the feeling of gayety, of buoyancy of spirits



MAKING WATER COLOR DRAWINGS AS GUIDES FOR PAINTING THE PAN-AMERICAN EXPOSITION BUILDINGS.

which is characteristic of the pleasure-seeking multitude of a great Exposition.

These colors as laid on at the Pan-American will, in many places, particularly in the pavilions, arches over doorways, and colonnades, give the impression of mosaic work. Other pleasing effects will be produced, as, for instance, the grill work over the main entrances to the Machinery building, which will be colored to resemble bronze. Similar effects will be produced in the principal entrances to other structures.

The color is now being applied on some of the buildings, and some idea can therefore be obtained already of the artistic effects which will be produced. Experiments have been made with all kinds of paint, and an especially prepared oil paint has been adopted which is found, after sufficient trial on the staff work, to hold its color well and stand drying like any other paint. As I have said, the general chromatic scheme is planned with reference to the purposes of the buildings, their situation and the general character of the group. The

and the blue sky above reflected in the interspersed lagoons Mr. Turner calls his primary colors. In this large and comprehensive effect is to be the great picture of the Exposition. The smaller pictures will be discovered in studying the detail.

In general the plan is to have the coloring of the buildings progress in intensity as one enters the Triumphal Bridge in the southern portion of the grounds, where one gets the first comprehensive view of the Exposition as a whole and where one's first impressions of its grandeur are obtained.

In the Transverse Court, the profile of which faces one at the approach of the grounds, there will be the richest coloring. To the left the walls of the Mines, Horticulture and Graphic Arts building will be a warm buff color; the roofs, a medium dark terra cotta. On the right the walls of the Government buildings will be more yellowish. Together these buildings will be the lowest in key in the main vista. In comparison with the rest of the coloring, Mr. Turner calls this crude and strong. From there the buildings on the sides of the Court of Fountains, the main court running directly away from the entrance, will be lighter and more refined in coloring, changing from yellows into grays, the roofs being in hues of lighter reds. First the buildings of Machinery and Manufactures and Liberal Arts will have walls of light yellow and drab or gray, then the Electricity building and the Agricultural building opposite will be of a warm light yellow and French gray. The architectural climax of the Exposition, the Electric Tower, by John Galen Howard, standing at the head of the Court of the Fountains, will strike the highest key of all, being of ivory white with the open work panel on the shaft a broken mass of delicate green, blue and gold. The figure surmounting the tower at a height of 375 feet, the Goddess of Light, will be gilded, and in the rays of the sun will be a dazzling object, visible many miles away.

The accompanying views show how the work of putting on these colors has been studied. Mr. Turner has models prepared of the different buildings, so as to give in miniature an exact reproduction of the entire Exposition. These twenty carefully finished architectural models, each about 15 inches high and on a scale of about one-sixteenth of an inch to the foot, were grouped according to the plan of the Exposition, and upon them and upon other models in plaster, some of which were worked out in most elaborate and perfect detail, the colors are being tried. By comparing the effects of the color upon the models inharmonious results are avoided. Preliminary color studies and experimental treatment of the models prepared the way for the filling in of the details of the general plan and the making of water-color drawings to be used as guides in laying the colors on the staff of the buildings themselves. I say "guides" advisedly, because they cannot be followed precisely, various conditions requiring change in some details when the paint is tried upon the staff in the open air.

In Mr. Turner's studio the blue sky was represented by a painted scroll 8 feet high, and even green shrubbery and trees were reproduced in miniature, so that none of the effects and contrasts of the real Exposition might be lost.

Take as an instance of the color scheme in detail one of the entrances to the Machinery building. These entrances are elaborate in their sculptural and mural enrichment. The general principle followed in laying on the color is to give the columns and relief work light tints and obtain contrasts and a rich effect by darker and warmer hues in the background. Thus, in this entrance the pillars are given an ivory tint, the ornamental bases and capitals of the fluted columns are enriched with golden



GROUPING THE MODELS OF THE EXPOSITION BUILDINGS—MODEL OF ELECTRIC TOWER IN THE CENTER.

same is true of the sculpture, produced under the direction of Karl Bitter, and the landscape settings, under the supervision of Rudolf Ulrich.

Mr. Turner's scheme has been to follow out the main ideas of the composition, as the architects and sculptors have been doing. The roofs, as a whole, will be in red, the staff walls tinted in yellows and grays and delicate tones of ivory at varying hues. These light walls and red roofs with heavy foliage banked below

background and the main wall at the back is a light soft red, while the arches of the doorways are treated in red, blue, yellow, and other tints to give a mosaic work effect. The cornice of the hood over the entrance will be of brownish wood color. Passing through the entrance and coming to the vestibule, the color will assume an exceedingly rich tone, and the same will be true of the pavilions, which will have elaborate and even gorgeous hues, the colors heightening the effect of the richly ornamented architecture.

Realizing that color is a delicate thing to experiment with, many had expressed the fear that the new departure which has been made in coloring the buildings of the Pan-American would not be a success. From a careful study of what has now been accomplished, it is safe to predict that in this as well as other respects the Exposition which is springing into reality here on the Niagara frontier is going to give the appreciative and discriminating public a most agreeable surprise.

ATLANTIC STEAMSHIPS—PRESENT AND FUTURE.

(Continued from first page.)

the companies which have given up the construction of abnormally fast vessels that they do not, and in the nature of things can not, pay; yet we find on the other hand that the North German Lloyd Company, who have had sufficient experience with the "Kaiser Wilhelm" to judge intelligently of the question, are planning and building vessels that are to surpass in speed and size anything afloat. To assist our readers in drawing their own conclusions, we present drawings and comparative data of the two types of vessels above mentioned.

While the representatives of the companies are naturally reluctant to give exact figures, the data contained in the accompanying table may be relied upon as sufficiently accurate for all purposes. To show how nearly we have in the "Deutschland" reached the limit of economical speed, we have calculated the proportions and leading particulars of a four-day express steamer of 30 knots; and it will be at once evident to our readers that unless some radical change is made in the present methods of producing and utilizing steam as a source of motive power, the 30-knot liner is not likely to get beyond the paper stage.

IVERNIA.—The "Ivernia" is the latest representative of a type of huge vessels, half cargo, half passenger, which of late years has become very popular, both with the steamship companies and the traveling public. The first of these to visit the port of New York was the "Pennsylvania." She was followed by such vessels as the "Cymric," "Pretoria," and "Grosser Kurfürst," the latest representatives being the "Ivernia" and "Saxonia" of the Cunard Company. As these vessels are of moderate speed, it is possible to give them very full lines, and they are all of great moulded depth, the "Ivernia" measuring 49 feet 6 inches from the keel to the shelter deck.

The speed being only from 14 to 16 knots, comparatively little space and weight has to be sacrificed to motive power; and as the daily coal consumption is only from 100 to 150 tons, a bunker capacity of from 1,000 to 1,250 tons is found to meet all requirements. These vessels are enormous cargo carriers, the "Ivernia" having four cargo holds forward and three aft of the engine room, while above these are two decks, also entirely devoted to cargo. When fully loaded she can accommodate 11,610 tons of actual dead weight, while her measurement capacity at forty cubic feet to the ton is 24,000 tons.

The type is so deep and stable that it is possible, by carrying up the structure of the vessel amidships to an unusual height above the water line, to provide unusual passenger accommodations, the "Ivernia" being provided with seven decks in all. Above the hold and the orlop and lower decks, which are given up to cargo, there are three other decks, known as the main, the upper and the shelter decks, which extend entirely from stem to stern. The main and the upper decks are given up to third-class passengers, while the shelter deck is devoted mainly to first and second-class passengers. For a distance of over 300 feet amidships there are two other decks, called the bridge and promenade decks, on which first and second-class passengers are accommodated. There is provision altogether for 160 first-class passengers, 200 second-class and 1,600 third-class, so that in addition to carrying a paying load of 11,610 tons of cargo, this vessel provides for about 2,000 passengers. She burns but little coal, requires but a small engine and boiler-room staff, and hence the running expenses in comparison to her size and earning capacity are very low.

By the courtesy of the managers of the various steamship companies, we have been enabled to compare the average receipts and expenses for several of these big freighters, and we find a remarkably unanimous opinion that the greatest receipts for a single passage of a ship of the type of the "Ivernia" are about \$50,000; the revenue from the westward voyages being derived mainly from passengers, and that from the eastward voyages from freight. We have estimated the average cost of one passage at \$20,000; figures which go a long way to explain the popularity of these vessels with the shipowners.

	Displacement in tons.	Horse power.	Speed.	First cost.	Coal burnt per day, tons.	Bunker capacity, tons.	Cargo capacity, tons.	Passengers.			Crew.	Estimated maximum receipts for full ship, one passage, exclusive of mails.	Cost of one passage.
								First.	Second.	Third.			
"Ivernia".....	21,000	10,500	16.50	\$1,825,000	150	1,250	11,610	160	200	1,600	250	\$50,000	\$20,000
"Deutschland".....	23,000	37,000	23.36	3,300,000	572	4,500	600	450	300	300	550	\$143,000	50,000
Four-day liner.....	40,000	110,000	30.00	6,200,000	1,710	9,550	None.	800	450	350	750	225,000	80,000

* Actual value of passenger fares on a recent westward trip.

"DEUTSCHLAND."—In the "Deutschland" we see the latest development of the high-speed liner. From whatever point of view she is regarded, she has been such an unqualified success that she lends herself admirably to the present comparison. She is not only the fastest and the most powerful, but, by virtue of her coal consumption of 1.45 pounds per horse power per hour, including auxiliaries, she is considerably the most economically-driven big vessel afloat. Compared with the "Ivernia," she is 86 feet longer, has 2 feet 6 inches more beam, and 5 feet less moulded depth. Her working draught of 29 feet is probably about a foot less, and on this draught, in spite of her much larger dimensions, she displaces only 2,000 tons more than the former vessel, the comparatively small increase in displacement being due to her yacht-like lines. The diagram which we herewith present of the ship shows more strikingly than any mere description at what an enormous sacrifice we obtain a speed of over 23 knots an hour; for here we find that the cargo space, which in the "Ivernia" has a capacity of over 11,000 tons, is in the "Deutschland" entirely appropriated by the engines, boilers, coal bunkers, machine shops, and stores which go to make up a motive equipment of 37,000 horse power capacity. The comparison preaches an eloquent sermon on the text that in the same vessel "resistance increases as something more than the cube of the speed." The larger displacement of the "Deutschland" is partly compensated for by her finer form; yet in raising the speed from 16.5 to 23.36 knots, the horse power has to be increased from 10,500 to 37,000, while the coal consumption runs up from 150 to 572 tons per day. So completely does the motive power fill up the hold that the cargo capacity is reduced to 600 tons, this amount being the maximum that she can carry. As a matter of fact, the "Deutschland" usually carries no cargo, ten tons being, we believe, the most she has ever taken aboard. To keep the enormous aggregate of machinery in motion requires the services of 240 engineers, oilers, stokers, etc., and the whole ship requires a crew, including the engineer's staff, of 550 men. The carrying of cargo being out of the question, the four decks above the boiler room are given up entirely to passengers, of whom she can carry 450 first-class, 300 second, and 300 third-class.

The running expenses of such a vessel are necessarily enormous. To take one item alone, the coal, we find that the cost, for the six days from New York to Hamburg, assuming an average price of \$4.50 per ton, is about \$15,500. In addition to this, and even more costly, are the fixed charges against the vessel, the most serious of which are the depreciation and the interest on first cost, which cost in the case of the "Deutschland," amounted to \$3,300,000. It is customary to reckon depreciation in the case of these fast boats at 10 per cent of the first cost, and this for the reason that as soon as they are exceeded in speed by other vessels, they quickly lose their popularity and therefore their earning power. Moreover, the hard driving to which they are subjected induces a more rapid deterioration than occurs in slower vessels. Probably the fairest way to reckon depreciation on such high-speed vessels is to assume it as 10 per cent until half of the cost has been covered, and then reduce the rate to five per cent. Depreciation and interest, coal, wages of the crew, cost of provisions, dockage, tonnage dues, insurance and other items will bring up the total cost of one passage of the "Deutschland" to \$50,000.

Does such a vessel pay? Popularly, it is supposed that she does not; but the experience of the "Deutschland" during this her first season gives reason to suppose that she is certainly not a losing investment. The popularity of these very fast boats enables the companies to realize correspondingly higher prices for accommodation. As a matter of fact, we know that on a recent westward run of the "Deutschland" the total passenger fares taken in amounted to \$143,000, and the fares on the return passage brought up the total for the round trip to over \$200,000, this sum representing the receipts from passengers alone, without taking into consideration what was received for carrying the mails. Since the cost of running the boat for one round trip, including fixed charges, is \$100,000, we see that a profit of about \$100,000 was realized in the space of three weeks. It must be remembered, however, that these figures represent the best voyage, and the receipts will not be so high throughout the rest of the summer season. Judging from these figures, it is likely

that while for six months of the season she shows a profit, for three months of the year the "Deutschland" will only about make her expenses, while for the other three months she will probably be in dry dock and refitting for the next season's traffic, during which period the fixed charges will be accumulating against her. Altogether, it is likely that if only a moderate proportion of the heavy subsidies earned be taken into account, placing the boat in this respect on the same basis as her English and American competitors, the "Deutschland" will show a creditable margin of profit in the year's service. Over and above this there is to be reckoned in the world-wide prestige which undoubtedly accrues to the line which owns the fastest vessel.

FOUR-DAY LINER.—As to the possibilities of the future, it is evident that with our present form of hull and type of motive power, we have nearly reached the limit of economical speed. To drive the "Deutschland" at 30 knots would require about 83,000 horse power, two and a quarter times as much as she now possesses. The accompanying diagram proves that if Scotch boilers and slow-revolving engines were provided in the design of a 30-knot "Deutschland," it would be impossible to put into her shell more than one-half of the necessary amount of power. Evidently to secure 30 knots a larger boat would be required, and a larger boat means increased power to drive the increased weight. The increase in power, however, would not be directly proportional to the increase in the displacement, the longer ship being ton for ton easier to drive, because of the refinement of her lines due to her greater length. Nevertheless, by the time we have designed a boat large enough to carry the power corresponding to a speed of 30 knots, we shall have upon paper the mammoth ship represented in our drawings. She will be 930 feet over all, 87 feet in beam, and 30 feet in draught, and will displace about 40,000 tons. Engines of 110,000 horse power would be required, and even if triple screws were used, it would be necessary to develop 37,000 horse power on each shaft—a task that would stagger the best of the world's engine builders of to-day. Forty-four double-ended Scotch boilers would be required to supply the steam, and during each day's run of twenty-four hours 1,710 tons of coal costing \$7,700 would have to be fed into the 352 furnaces. It would require 7,300 tons of coal to carry the vessel to Plymouth and 8,550 tons to take her to Hamburg, the cost of the fuel alone being \$38,000. The ship would have to stow 9,550 tons of coal in her bunkers for a single trip across the Atlantic.

To anyone who has watched the reverse bending strains to which a ship like the "Deutschland" is subjected when she is being driven across the Atlantic seas, it is evident that we have come to a point where it will be necessary to give increased longitudinal strength to any vessel that exceeds the present length of 700 feet. In a four-day liner this might be provided for by running a longitudinal stiffened bulkhead, extending from the keel to the promenade deck, through the vessel between the after engine-room and the forward boiler-room bulkheads. The vessel might be further strengthened by carrying up the side plating to the promenade deck, which is placed one deck higher than in the "Deutschland," and by doubling the plating at the bilges and at the promenade deck, as shown in the midship section of the ship.

In conclusion, it is safe to say that such a vessel as this will never be built. We shall cross the Atlantic in four days, but not with a vessel of this type. The higher speed will be attained, not by multiplying engine and boiler weights, but rather by multiplying pressures and speed, and utilizing every refinement in the way of economizers, superheaters and feed-water heaters, as is being done by Mr. Mosher in his 40-knot craft, the "Arrow," described in our last issue of the SUPPLEMENT. If a 30-knot transatlantic steamer makes its appearance within the next few years, it is safe to say that it will be driven by the combination of water-tube boilers, using hot, forced draft, with fast-running reciprocating engines, using superheated steam, or with turbines of the Parsons type. So great will be the reduction of weights and saving of space achieved by this change, that it will be quite within the possibilities to produce on a displacement not much greater than that of the "Deutschland" a 30-knot ocean steamer that shall have equal accommodations for passengers.

At Italian of Pinerolo has succeeded in reaching the top of Colle di Sestrieres, 6,670 feet above the sea.