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NOTES ON PERMANENT COLOUR TYPES IN MOSAIC.

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NOTES *on* PERMANENT COLOUR TYPES *in* MOSAIC.

By F. GALTON, M.A., F.R.S., President.

DURING a brief stay in Rome, I recently made such inquiries as I could, into the suitability of the material used in the manufactory of mosaics, for affording permanent specimens of standard colours for the description of tints of skin. The original paintings by Broca, as well as the lithographs from them, have already changed colour, and some more permanent standard is needed; this I have little doubt, could be best obtained by means of the material used for making mosaics. The general result of what I am about to describe is that about a dozen identical slabs should be made, each containing six small pieces of mosaic material, lettered respectively, A, B, C, D, E, and F, and severally brought into relation with corresponding tints on Broca's scale. These slabs which need not be larger than letter-weights, could be distributed among the existing Anthropological Institutions and Museums, and would form practically unalterable standards of reference whence painted copies might be made from time to time, as often as desired, for the use of travellers.

The mosaic material is glass rendered opaque by oxides of tin and lead, and is manufactured in flat cakes, circular or otherwise, of usually about six inches in diameter, and a quarter of an inch thick. Each cake is a hard vitreous mass, from which pieces are chipped, of approximately the required shape, and which are then ground on a lapidary's wheel to the exact size; next they are polished on the exposed side, and are afterwards cemented into their proper places. Each cake is of uniform tint throughout, except in rare cases where, possibly from over baking, I noticed a rind of a lighter color. The material is inexpensive, costing a very few shillings per pound weight. If I am not mistaken, it is a very difficult matter to produce an exact tint to order. The method employed appears to be to make a large number of trial tints, and to sort and classify according to results.

There are upwards of forty thousand bins in the Vatican manufactory, containing the proceeds of different attempts. Out of these no less than 10,752 are classified; they occupy 24 cases in each of which are 16 rows of 28 samples. The flesh tints appropriate to European nations (such as those which are found in the second of the two pages of selections from Broca's tints, which appear in the "Anthropological Notes and Queries") are about 500 in number. We may therefore conclude, that a superabundance of material exists in the Vatican manufactory,

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whence a series of standard tints, such as anthropologists desire, admit of being selected.

There can be no question as to the persistence of the colours of mosaic. I examined carefully some in St. Peter's that were more than a century old, and was astonished at their freshness throughout. They seemed to be brand-new. If the surface of mosaic is dirty, it can be freely washed. If stained in any way, the stain can be ground off. If the surface is roughened it can be repolished.

M. Topinard informs me that as the original tints of Broca have already changed colour, he is engaged in preparing a new and much smaller series of only five or six tints, for hair-color to serve as a fresh departure. These will of course be correlated with Broca's numbers. I have written to M. Topinard, explaining about the mosaics, and inviting him to send me the five or six tints that he provisionally selects, in order that I may ascertain how nearly they may be matched by existing mosaic material, and I hope that if the difference is in no case considerable, it may be found possible to make a compromise by adopting the mosaic tints as the final standards. I would willingly charge myself with the trouble and such small cost as there may be in obtaining the mosaic material. At the same time I fear it is possible from some former experience that an application to the Vatican may not prove successful; that experience, which I may as well put upon record is as follows:

Many years ago, having been much impressed by a visit to the Vatican manufactory, and being equally impressed by the then faulty nomenclature of colour, I wrote to the authorities at South Kensington, suggesting that they should make application to the Vatican for samples of their large collection of mosaic material, and select therefrom a considerable scale of standard tints. Also that a small and second selection from these tints should be supplied to schools of art. This scheme, which I need not now describe more minutely, was taken up by the South Kensington authorities, and the late Lord Ampthill, then Mr. Odo Russell, our semi-official representative at the Papal Court, was asked to inquire into the feasibility of bringing it into effect. It was perfectly feasible in all respects save one, namely, that the price asked by the Papal government was altogether excessive, and so the matter dropped. Now, however, resulting not improbably from my then abortive suggestions, I find that such samples are being produced. I saw one set in process of being made.

If it should not be found easy to procure samples from the manufactory in the Vatican, it may be possible to obtain them from private dealers in mosaics, but after my inquiries at Rome,

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I doubt if any of the private dealers possesses a collection of tints comparable in variety and quantity to that in the Vatican, and it might prove difficult to obtain from them the exact tints that will be required. Anyhow, I propose to try what can be done towards putting anthropologists in possession of standard sets of permanent tints, and I shall of course communicate the results, if they prove favourable, to the Anthropological Institute.

Discussion.

Mr. Rudler exhibited some cakes of Roman and Venetian enamels, and called attention to the permanence of their colours. The enamels may be regarded as opaque varieties of glass, consisting of various silicates, borates, and boro-silicates. The opacity of an enamel is commonly obtained by the use of stannic oxide ("putty powder," or binoxide of tin), which, being infusible, is mechanically suspended in a finely comminated condition through the substance of the glass, producing, if the vitrified base be colourless, a dense white enamel. Colour is obtained by the use of various metallic oxides, some of which remain suspended in the vitreous vehicle, while others enter into chemical combination with some of the constituents of the glassy flux and form metallic silicates and borates. Many of the colours which are of interest to anthropologists, such as the browns and reds, used to denote tints of skin and hair, belong to the former class, being due to the presence of peroxide of iron; while the blue tints for eyes, being furnished by the oxides of cobalt or of copper, belong to the latter group. In either case the stability of the colours is beyond doubt, fugitive pigments being quite unable to withstand the temperature necessary for the fusion of the enamel.

Professor Meldola suggested that if, on account of expense or other difficulties, it was not found convenient to get the mosaics from abroad he had no doubt that some of our English manufacturers, such as Messrs. Doulton of Lambeth, might be found willing to take the matter up.

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