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MEMORANDUM REPORT NO. M-505:

NOT FOR CIRCULATION

METALLIC GOLD COATING ON PIGMENTS

Purpose:

Since colloidal gold suspended in an aqueous solution is known to give a range of colors depending on particle size, interesting optical effects might be obtained by depositing a fine layer of gold on pigments.

It was found that certain experimental conditions gave a purple deposit on W-28 which approximated the tint used in refrigerator enamels. Thus the purpose was reduced to an attempt to determine the amount of gold required to obtain this commercial tint and to find the best conditions for reducing the gold.

Conclusions:

Two methods were tried of reducing a gold salt ($\text{AuCl}_3 \cdot \text{HCl} \cdot 3\text{H}_2\text{O}$): (a) evaporation onto a pigment in a vacuum, and (b) reduction in an organic medium. The evaporation technique was discarded largely because no method was found of spraying the pigment through the gold vapor at a slow enough rate to allow satisfactory deposition of the gold on the pigment. If the gold chloride was mixed thoroughly into W-28 and if this was then ground into RC-905 (50/50 normal-isobutyl methacrylate solution), a purple gold was deposited on the pigment which gave a reflectance curve almost identical with the tinting color used for refrigerator enamels. Various other solvents were used, such as acetone, diacetone alcohol, formaldehyde, etc., in place of RC-905, but only diacetone alcohol gave a purple color; which was not as intense as was that obtained using RC-905. The purple coated pigment in RC-905 was added to an untinted refrigerator enamel until the proper reflectance curve was obtained. The cost of the gold chloride needed per gallon of enamel to give this curve was \$1.04. This is much too expensive and cannot approach the present cost of tinting.

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Action Taken:

The program was dropped because of the prohibitive cost of the gold color.

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9/30/52