Preservation and Care of Philatelic Materials

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Taggants and Chemical Additives

During the early 1960's, an electronic machine was developed in Ottawa, Canada, for the automated processing of mail. Known as SEFACAN, it was installed in the Winnipeg post office in 1962. In order for this machine to operate it was necessary to use a phosphorescent taggant on the stamps. The stamps for use in Winnipeg were overprinted in one of two ways: with a 4-millimeter phosphorescent band set vertically in the center of the stamp, and with 4-millimeter phosphorescent bars set vertically and centered over the vertical perforations of the stamp. Short wave ultraviolet radiation caused the phosphorescent tagging to glow, and this glow was detected by the machine, which activated automatic facing and cancelling mechanisms for the handling of the mail.

By 1966, the Pitney-Bowes Corporation had developed a new machine, known as the MK-11 facer-canceller. It worked on a reflected light principle. A light beam reflected from the moving letter into the machine's electric eye sensors activated the mechanism. The machine was installed in several Canadian post offices in the late 1960's.

A third facer-canceller detection system was developed and installed in the Ottawa post office. It operated on a Central (Ottawa) phosphor tag recognition system. For this system, two 3-millimeter phosphor bars set vertically on the perforations on each side of the stamp were used. The phosphor glows when exposed to short wave ultraviolet radiation, but only while it is exposed.

During 1973, all existing machines were converted to this system. The stamps, produced by lithography, were tagged with a type of phosphor known as OP-2. A similar phosphor, but with a slightly different formula and known as OP-4 was used on stamps produced by gravure. General Electric Chemical Products of Cleveland, Ohio, produced both phosphors. The OP-2 taggant did not migrate, but the OP-4 migrated to such an extent that it traveled through layers of paper. It was completely unsatisfactory, since the storage life of the stamps was reduced, and the phosphor transferred itself from tagged to untagged stamps. Due to the hazards encountered by using the OP-4 taggant, its production was suspended. By 1973 Canada Post began using a modified OP-4 taggant, where the phosphor was formulated with an alcohol reduced acrylic resin. This reduced the migration problem very significantly. The phosphor tagging ink, supplied to the security printers by Canada Fine Color Ltd., consisted of 20% General Electric Phosphor pigment plus a resin solution made up of about a dozen other components.

The U. S. post office began experiment with mail processing equipment as far back as 1957. In the 1960's, they began using automated equipment that required the postage stamps to be coated or tagged with a phosphorescent material, zinc-ortho-silicate, suspended in a varnish. The varnish created a number of problems. It dulls the brightness of the inks as well as the paper. The varnish also acts as a barrier to the cancellation ink, making it easier to wash off cancellations.

Soon the idea of phosphor materials led to the development of phosphor papers. No longer was it necessary to print tagged bars on stamps. The result was stamps that again looked sharp and bright.

Before we go deeper into this subject, we should understand the meaning of some words associated with tagging:

Some terms associated with tagging:

Luminous
: Stamps that glow when they are exposed to ultraviolet light.

Fluorescent
: When a stamp glows under an ultraviolet light but ceases to glow when the ultraviolet light source is removed.

Phosphorescent
: When a stamp continues to glow after the ultraviolet light source is removed.

In 1957, Great Britain started to use p-hydroxyl diphenyl dispersed in cured urea-formaldehyde polymer resin for tagging stamps. This did not prove very satisfactory since dampness and moisture caused swelling. The result was that the British post office then used Lettalite B-1 pigment, as above, but dispersed it in carbazole-3-silifonic acid for printing the tagging bars on their stamps.

Some of the materials used in the United States during the early 1960's for tagging were Activated Zinc Sulphide (ZnS) or zinc sulphide in small amounts of copper (ZnS[Cu]). The principal tagging agent was a pigment using zinc silicate activated with small amounts of copper (Zn_2SiO_4[Cu]). All of these were developed by Sylvania Electric Products Company.

>From 1963 to 1978, U. S. airmail stamps were tagged with a calcium silicate pigment activated by manganese.

Under ultraviolet light, some stamps will fluoresce blue. Generally, this is due to optical bleaching agents in the stamp paper. When zinc silicate is added to the paper, stamps will fluoresce from tan to white. Germany used an optical bleaching agent, Lumogen, manufactured by BASF of Ludwigshafen, Germany. Under ultraviolet light, these stamps fluoresce a bright gold color.

To improve appearance and compensate for paper yellowing, some postal administrations add an optical bleaching agent, Blankophro, a solution of a salt of stilbene sulfonic acid. High concentrations of optical bleaching agents will produce what is referred to, by philatelists, as a "high brite" stamp. It should be explained that bleaching agents can be added within the paper or as a coating.