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# (Im)mortal Photographs

## Air pollution adversely affects the state of preservation of old photographs.

The Kórnik Library of the Polish Academy of Sciences houses magnificent historic collections, which include numerous old photographs. Most of these are silver prints on paper substrates. The dominant photographic technique used by nineteenth-century photographers was albumen prints (the “printing-out paper” technique, POP), while silver-gelatin prints (the “developing-out paper” technique, DOP) were predominant among twentieth-century photographers. For years, the Kórnik Library has been making efforts to protect its collections through continuous cooperation with conservators – including with our team from the Department of Conservation and Restoration of Paper and Leather at the Nicolaus Copernicus University in Toruń.

Photographs are a type of historical object that is extremely sensitive to a variety of destructive factors. These first and foremost include excessive daily fluctuations in humidity and temperature, biological factors (insects, microorganisms), improper use and storage, and air pollutants. From a conservator’s point of view, “air pollutants” are understood as any undesirable solid, liquid, or gaseous substances that may have a negative effect on the durability and permanence of a historical object. Objects created on paper substrates may be harmed by various chemicals present in the air: acidic oxides, volatile organic compounds – VOCs (especially acidic VOCs), substances that accelerate the oxidation process (peroxides, ozone), and hydrogen sulfide. Many of these were the subject of research we carried out between 2011 and 2016, where indicator tubes were used to draw in air

and elicit a color reaction expressed on a scale in terms of parts per million (ppm).

Many chemical pollutants in the air have a negative effect on the durability and permanence of photographs. The effects of hydrogen sulfide on a silver photographic image are particularly noticeable, as it causes an irreversible fading. Such damage can also be caused by the residue of unwashed fixer remaining in a photographic print.

The story is quite different for settled dust and dirt resulting from use, or from the presence of mold. Practice has shown that conservation and restoration work on the Kórnik collection is able to significantly improve the aesthetics of many photographs by reducing such surface contamination. This often involves a set of long-term treatments, some performed under a microscope. One way to reduce the impact of airborne contaminants on photographs is to use of four-flap envelopes made of pure cellulose, PAT (Photographic Activity Test) certified, as well as the use of air pollution filters. The library is gradually working to protect each individual photograph with such a certified wrapping, as well as protective folders and boxes. In turn, the use of protective cotton or plastic gloves (powder-free) is required so as to prevent soiling of photographs and dangerous chemical interaction between the skin of the hands and the surface of the prints. For photographs that have already faded, there is still a good chance that the photographic image can be read using certain research techniques (e.g. UV-induced fluorescence). ■

Examples of albumen photographs – ranging from well-preserved (left) to increasingly poorly preserved and faded (right)

