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Article: T.H. Saunders Sample Book: A Treasure Trove of 19th Century Papers

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Source: Book and Paper Group Annual 41, 2022

Pages: 34-42

Editors: Kimberly Kwan, Managing Editor, and Roger S. Williams, Assistant Editor

Editorial Office: [bpgannual@gmail.com](mailto:bpgannual@gmail.com)

ISSN: 2835-7418

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The *Book and Paper Group Annual* is published once each year by the Book and Paper Group (BPG), a specialty group of the American Institute for Conservation (AIC). It was published in print from 1982 to 2021, and transitioned to a digital publication in 2022. All issues are available online at <https://culturalheritage.org>.

Print copies of back issues are available from AIC. All correspondence concerning back issues should be addressed to:

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## T.H. Saunders Sample Book: A Treasure Trove of 19th Century Papers

### INTRODUCTION

In 1855, the English papermaker Thomas Harry (T.H.) Saunders represented England at the *Exposition Universelle des produits de l'agriculture, de l'industrie et des beaux-arts*, in Paris (*Paris Universal Exhibition 1855*, 214.). Specifically for the event, T.H. Saunders & Co. created and exhibited a paper sample book, *Illustrations of the British Paper Manufacture*, containing 151 paper samples divided into three categories: papers made by hand, papers made by machine, and special papers. T.H. Saunders & Co. was well known for producing watermarked papers that were used for banknotes, cheques, stamps, and other official records.

#### *History of T.H. Saunders & Co.*

From the 1830s to the time of his death in 1870, T.H. Saunders operated a well-known and prosperous paper manufacturing company with six papermills located throughout England. Beech and Rye Mills were located at High Wycombe in Buckinghamshire; Phoenix, Hawley, and Darenth Mills were located at Dartford in Kent; and Sunridge Mill was located at Sevenoaks (Cohen 1988, 3). By 1880, the Phoenix Mill was likely the largest paper mill in the country, and it was one of the major industrial buildings in southeast England at the time (Cohen 2004).

T.H. Saunders & Co. papers were prized for their high quality and the company was renowned for producing extraordinary watermarked “exhibition sheets.” The quality of the paper was recognized as T.H. Saunders & Co. was awarded 12 prize medals at international exhibitions between 1851 and 1881, including gold medals at the 1867 and 1878 Paris exhibitions (*The Paper Mill Directory of the World 1884*, 362; Cohen 2004).

Despite the company’s success, relatively little is known about T.H. Saunders & Co. today. According to Cohen (1998, 4), it appears that the T.H. Saunders & Co. 19th century

business and archival records were destroyed at some point between 1984 and 1985. However, the legacy of this company remains acutely visible in the *Illustrations of the British Paper Manufacture*. In addition to the vast array of paper samples (including papers for drawing, watercolor, photography, tracing, blotting, newspapers, security papers, colored papers, and artisanal “exhibition sheets” with extremely detailed “light and shade” watermarks), the book includes illustrated narrative pages where histories and descriptions of paper production are accounted. It is unknown how many sample books were produced for the Universal Exposition in Paris, but this lavish sample book would have been costly to produce. Munsell (1870, 127) claims that “the work could not have cost less than a thousand dollars.” It is unclear in this text if “the work” refers to a single volume or the overall sample book production. As of July 17, 2022, the CPI Inflation calculator listed on its website that the equivalent purchasing value of \$1,000 USD in 1870 is approximately \$22,500 USD.

#### *Illustrations of the British Paper Manufacture*

*Illustrations of the British Paper Manufacture* was produced as a three-volume set that was divided into five classes of papers. Volume One contained 151 paper samples and the first three classes of paper: Class A – papers made by hand; Class B – papers made by machine; and Class C – special papers (Saunders 1855) (fig. 1). These papers were all produced at the mills of T.H. Saunders & Co. (Cohen 2004). Volume Two included Class D papers containing samples that were the raw materials of other manufacturers, and Volume Three included Class E papers, containing samples of various packing and wrapping papers (Royal Society of Arts 1856, 295). There are currently 12 known copies of Volume One.<sup>1</sup> Volumes Two and Three are thought to be unique creations that are now housed at the National Art Library at the Victoria and Albert Museum in London (Cohen 2011, 11).

In 1972, the only known conservation treatment relating to one copy of the sample book was published in the *Bulletin of the American Group, International Institute for Conservation* by Paul Banks. The article describes an extensive conservation treatment to the Newberry Library copy where the book was

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Papers presented during the Book and Paper Group Session, AIC’s 50th Annual Meeting, May 13–18, 2022, Los Angeles, California

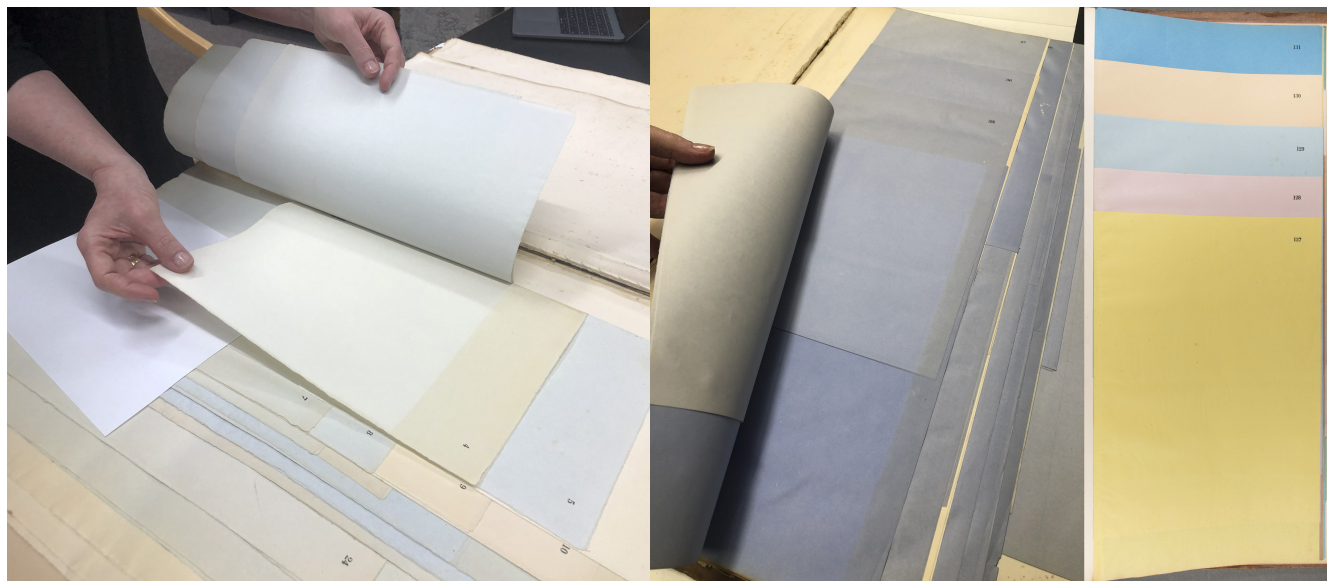


Fig. 1. Colored paper samples from Class A (left), Class B (middle), and Class C (right). From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105. S2.

disassembled, the papers deacidified with magnesium bicarbonate, and then rebound (Banks 1972, 88).

#### *The Queen's University copy*

The W.D. Jordan Rare Books and Special Collections at Queen's University (Kingston, Ontario, Canada) holds a copy of the first volume of *Illustrations of the British Paper Manufacture* (fig. 2). The book was donated to the university on June 23, 1879. This sample book is an untreated treasure trove of full-size paper sheets dating from approximately 1846 to 1855, as evidenced by the dated watermarks. It contains over 151



Fig. 2. Robin Canham examines machine-made paper samples numbered 43 through 46 in *Illustrations of the British Paper Manufacture*, at the W.D. Jordan Rare Books and Special Collections, Queen's University Library.

naturally aged and untreated full sheet samples, 40 of which have dated watermarks.<sup>2</sup>

The Queen's University copy is a compelling artifact that allows for the examination of paper production from a single, prosperous, Western paper manufacturer during the 19th century—a period of mechanization when both hand-made and machine-made papers were being produced. It is a time capsule of naturally aged paper samples and because the sample sheets are in a bound format, they were unaltered by light exposure. All sample papers are tipped-in to a guard along the left edge of the sheet or along the center fold line depending on the sample sheet's size.

The book is large, measuring approximately 69 cm tall, 50 cm wide, and 7 cm thick at the spine. The large format was likely dictated by the largest sample sheet—sample 124, which is designated as a “paper for newspapers” in the index. When unfolded, the newspaper sheet measures approximately 83 cm tall by 101 cm wide.

In addition to the paper samples, the book includes 23 leaves of text. The text is printed in English (in the left column) and French (in the right column) and is encircled in a floreated border that includes beautifully illustrated raw materials for paper and paper-like production including flax, cotton, hemp, palm, and papyrus. The text describes the history, materials, process, and machinery involved in the manufacture of hand-made and machine-made papers. The sample book was printed in London by Waterlow and Sons and bound by Pamphilon & Brookwell, located at 64 Berwick Street (Saunders 1855).

The Queen's University copy is almost complete. The volume is missing samples 115, 116, and 117, each of which are outline and shade watermarked papers. In addition, seven



sheets included in the colored paper section have been torn in half with the left side of these sheets removed.

#### THE T.H. SAUNDERS PROJECT

This remarkable paper sample book forms the basis for our multiyear T.H. Saunders Project. *Illustrations of the British Paper Manufacture* richly illustrates mid-19th century Western paper production during a period of mechanization and hand-crafted paper manufacture. The sample book contains textual and material information that illustrates a time of transition in papermaking materials and technology. The goals of this multiyear project will include a phased approach to the full technical examination, conservation, and digitization of the sample book. The objectives of the research project include:

- expanding our knowledge of 19th century paper production, leading to a more nuanced characterization of papers in order to understand their degradation mechanisms;
- producing a technically rich, digital reference tool to complement the digital surrogate and physical artifact; and,
- creating teaching opportunities by engaging conservation graduate students in the research processes.

The first phase of the research project commenced in 2021 and involved the digitization of each text plate and documentation of all watermarks to minimize handling and increase researcher access. Imaging of individual sample sheets has not yet been completed as the samples are tipped-in along the left edge or center fold. This makes useful imaging challenging. Descriptive and technical information was collected in a spreadsheet and includes detailed information about each paper sample, including the size, watermark, color, thickness, paper formation, condition, and more. In phase one, preliminary fiber identification began using a HIROX high-resolution digital microscope to identify paper fibers in both handmade and machine-made papers (fig. 3). This is a nondestructive method of examination, as no paper sampling is required.

Phase two of this project will include continued technical examination and conservation. At this point, minimal treatment is envisioned to maintain the artefactual value of the book. Development of metadata and the exploration of Islandora 8 and other open-source digital asset management tools to support an accessible digital sample book will be undertaken. The research team also plans to compare the Queen's University copy to as many of the other known sample books as possible. Comparison of sample condition, description of the unnumbered specimens in Class C, and provenance and storage history will enhance understanding of each sample book and the aging characteristics of mid-19th century English papers.

Phase three of this project is currently in development and will include the creation of a technically rich digital reference

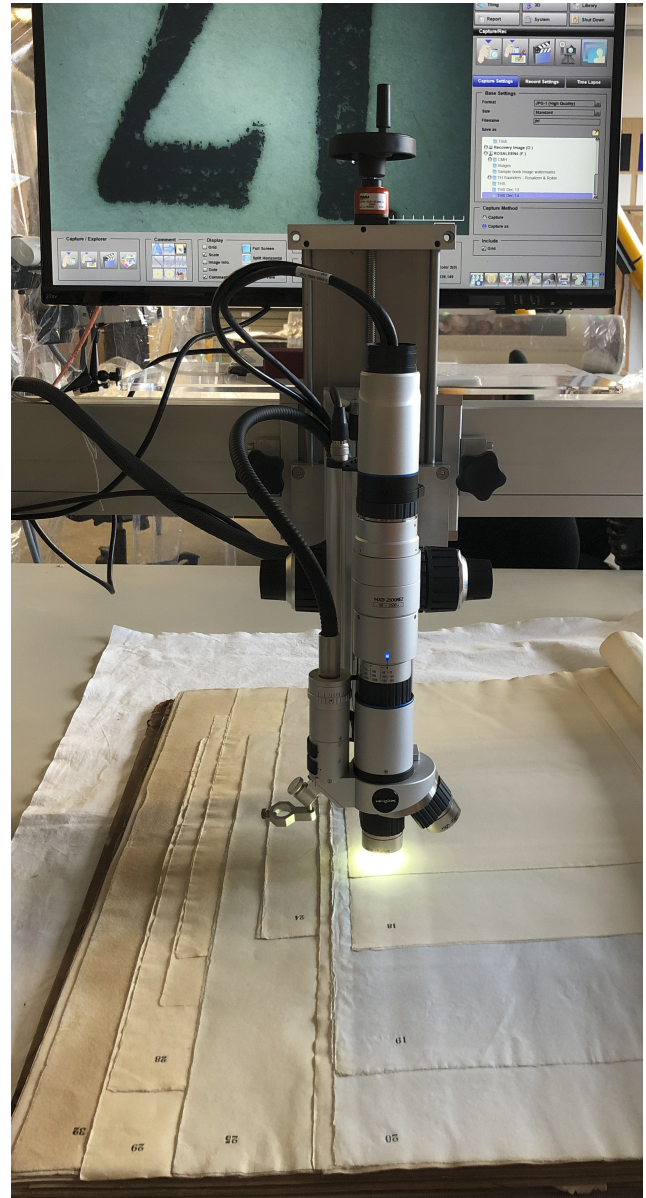


Fig. 3. A photograph detailing the setup of the HIROX digital microscope as handmade paper sample number 17 is examined.

tool to accompany the digitized sample book. Research into linked data opportunities will also be explored.

#### TECHNICAL INVESTIGATION

Our initial examination of technical information focused on an extensive research review of 19th century literature describing patent, cheque, and colored papers.

##### *Patent and cheque papers*

Patent and cheque papers were designed to thwart forgeries. Forgery appears to have been rampant in the mid-19th





Fig. 4. Transmitted light photograph of Glynn & Appel's Patent security paper, sample 103. From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105 .S2.

century in part due to the introduction of anastatic printing in 1841. Anastatic printing enabled reproduction of hundreds or thousands of copies of a wide range of paper objects including bank notes, cheques, bank drafts, and other financial papers. The November 1852 issue of *Scientific American* included an article written by the British Association for the Advancement of Science where the anastatic process was outlined and "patent papers for the prevention of piracy" (59) were discussed including Glynn & Appel's patent (fig. 4) and Stones' patent paper (fig. 5).

In the 1851 Great Exhibition, T.H. Saunders & Co. introduced papers designed to prevent piracy or forgery. *The Crystal Palace, and its Contents; Being an Illustrated Cyclopaedia of the Great Exhibition of the Industry of All Nations* notes that T.H. Saunders and Co. papers were awarded a prize medal for Stones' patent cheque paper, of which Saunders was the patentee



Fig. 5. Transmitted light photograph of Stones' Patent security paper, sample 102. From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105 .S2.

(1852, 143). Stones' patent paper was described as providing "great improvement" because it "render[ed] a paper perfectly resembling ordinary writing paper secure against the removal of inks by chemicals, as, on the application of the usual means for dissolving ink, the proof of its having been tampered with immediately becomes manifest, the paper becoming indelibly discolored" (*The Crystal Palace, and its Contents* 1852, 143). In *The Bankers' Magazine and Journal of the Money Market*, an article also describes Stones' patent paper and asserts "specimens we have tried, produce a curious effect on the application of the usual means of dissolving ink; a violent discoloration takes place, going completely through the paper, and a well-defined rim remains, indicating irradicably that the paper has been tampered with" (1851, 296).



Fig. 6. A selection of handmade papers in Class A. From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105 .S2.

The 1851 patent for Stones' paper outlines the manufacturing method which includes "impregnating the paper in the sizing process with ferrocyanide of potassium, iodide of potassium, and starch" (Barclay 1860, 312). Barclay, in the March 1860 *Journal of the Society of Arts*, notes that Stones endeavored to overcome the difficulties associated with other competing patent papers with his unique chemical formulation. Barclay (1860, 313) states that "on application of bleaching liquids containing chlorine, the blue compound, termed the iodine of starch, is formed, and a stain on the surface of the paper is the result. This may be completely washed away by a weak alkali, and the security is destroyed." This information is of particular interest to paper conservators, who may be considering chemical treatment of these types of patent papers. Further research is required to better understand their composition.

#### Colored papers

Colored papers are found in all paper classes. Class A, papers made by hand, contains 32 total samples, five of which are identified in the index as blue paper (fig. 6). However, when the research team began documenting the sample book, it

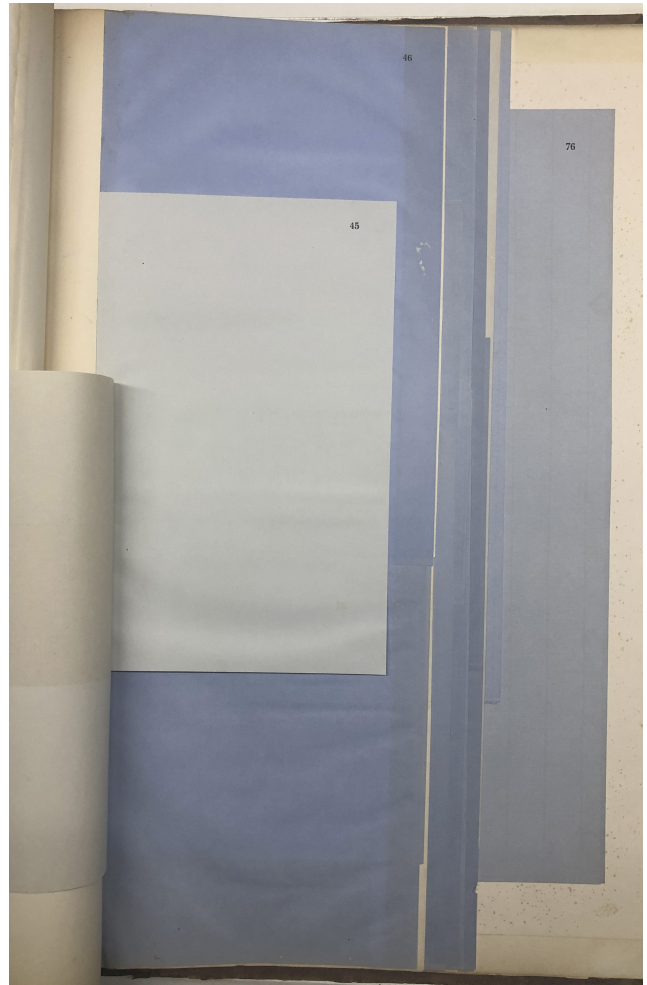


Fig. 7. A selection of blue colored machine-made papers in Class B. From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105 .S2.

was found that 11 of the handmade paper samples appeared to be blue. In the introduction to Class A handmade papers, it is noted that "writing papers are tinted blue by either smalt or ultramarine: the latter gives more intense and brilliant color, but it is not so permanent as the smalt, being more easily decomposed" (Saunders 1855).

Class B, papers made by machine, contains 54 total samples, 17 of these identified in the index as blue paper (fig. 7). The Class B machine-made papers introduction states that "the tinting of paper presents some especial difficulties, as the color must be imparted whilst the material is in the state of pulp, whereas other fabrics are dyed after the material is spun or woven. With the necessary modifications in this manner of application, the coloring matters employed are the same as used in the dyeing of calico" (Saunders 1855).

Class C, special papers, contains 65 total samples, 25 of which are identified as colored papers in the index. The index





Fig. 8. A selection of colored papers from Class C, including samples 93 to 112 (left), samples 127 to 131 (middle), and samples 148 to 151 (right). From *Illustrations of the British Paper Manufacture*, Queen's University, W.D. Jordan Rare Books and Special Collections, Rare Books Collection, FF TS1105 .S2.

does not identify specific colors for these samples, but they include blue, yellow, pink, purple, green, beige, and orange colors (fig. 8).

Nineteenth-century literature on papermaking describes paper color and manufacture and is a useful starting point for describing paper color, condition, and possible colorant identification. For example, Baddeley describes the difference between papers and their color:

*Laid paper is generally of a bluish cast, which is obtained by adding smalt (the powder blue of commerce) to the pulp while in the vat. Wove paper is of two kinds, — blue wove, and yellow wove; the former of which is made by working the pulp to which smalt has been added, on a wove mould; yellow wove, on the contrary, is the pure colour of the page, considerably heightened, however by the process of bleaching. Drawing papers are always the latter, and writing papers (emphatically so called, from imperial to demy) of the first named description. (1831, 123)*

In *Paper & Paper Making, Ancient and Modern*, Herring writes that:

*Common materials are frequently and very readily employed, through the assistance of colouring matter, which tends to conceal the imperfection. Indeed, it would be difficult to name an instance of apparent deception more forcible than that which is accomplished*

*by the use of ultramarine. Until very recently, the fine bluish tinge given to many writing papers was derived from the admixture of that formerly expensive, but now, being prepared artificially, cheap mineral blue, the oxide of cobalt, generally termed smalts, which has still the advantage over the ultramarine of imparting a colour which will endure for a much longer period. One pound of ultramarine, however, going further than four of smalts, the former necessarily meets with more extended application, and where the using is rightly understood, and the materials employed, instead of being fine rags, comparative rubbish, excessively bleached, its application proves remarkably serviceable to the paper maker in concealing for a time all other irregularities, and even surpassing in appearance the best papers of the kind. (1863, 80–81)*

Herring also notes that:

*In making writing or other papers where smalts, ultramarine, and various colours are used, considerable difference will frequently be found in the tint of the paper when the two sides are compared, in consequence of the colouring matter sinking to the lower side, by the natural subsidence of the water, or from the action of the suction boxes; and to obviate this, instead of employing the ordinary couch roll, which acts upon the upper surface of the paper, a hollow one is substituted, having a suction box within it, acted upon by an air pump, which tends in some measure to counteract the effect, justly considered objectionable. (1863, 91–92)*



In the next stage of technical examination, the T.H. Saunders Project will focus on the analysis and identification of colorants in the handmade and machine-made paper samples.

#### CONCLUSION

*Illustrations of the British Paper Manufacture* is a remarkable time capsule of mid-19th century English papers produced by T.H. Saunders & Co. and offers conservators a unique venue for ongoing research. The research team is excited to continue to share results as the T.H. Saunders Research Project unfolds.

#### ACKNOWLEDGMENTS

Thank you to Bader Philanthropies and the Jarislowsky Foundation for their generous gifts supporting the Queen's University Department of Art History and Art Conservation. Additional thanks to Kim Bell, Daniella Cruz, Brendan Edwards, Ken Hernden, and Jacques Talbot at the W.D. Jordan Rare Books and Special Collections.

#### NOTES

1. Institutions with known copies of *Illustrations of the British Paper Manufacture* include Dartford Library (UK), Harvard University (USA), Library Company of Philadelphia (USA), Library of Congress (USA), Newberry Library (USA), Queen's University (Canada), State Library of New South Wales (Australia), State Library of Victoria (Australia), St. Cuthberts Mill (UK), University of Oxford (UK), Victoria and Albert Museum (UK), and Yale University (USA) (thought to be the former NY Mercantile Library volume).

2. For additional detailed information on each of the 151 sample sheets included in the Queen's University copy of Volume 1 of *Illustrations of the British Paper Manufacture*, see the forthcoming paper "T.H. Saunders & Co. Watermarked Papers," which will be published online in the *Association Française pour l'Histoire et l'Étude du Papier et des Papeteries* (AFHEPP) *publications des journées d'étude* AFHEPP/HICSA (2021), <http://www.afhepp.org/spip.php?rubrique5>.

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