Articles related to John Larson and the creation of the polygraph

Goddard, Calvin H. 1976. "Some Reminiscences on Early Days of the Lie Detector." *Polygraph: Journal of the American Polygraph Association* 5 (3): 252-266. https://www.polygraph.org/assets/docs/APA-Journal.Articles/Vol.5.1976/polygraph%201976%20053.pdf

Article in which shellac is identified as the varnish!

"Some months ago...we ordered apparatus to be made which will take the place of the cumbersome smoked and shellack [*sic*] method." (Article quotes this line from a letter written by Larson)

Article includes other pertinent information about the device and its creation, and the relationship between Larson and Keeler.

Grubin, Don and Lars Madsen. 2005. "Lie detection and the polygraph: A historical review." *The Journal of Forensic Psychiatry & Psychology* 16 (2): 357-369. https://doi.org/10.1080/14789940412337353.

Information about Larson, not so much about the machine.

Linehan, John G. 2002. "Collaboration of Psychiatrist and Polygraph Examiner: John A. Larson and Robert P. Borkenstein." *Polygraph* 31 (1): 15-19.

Some information about the location of Larson's papers and who contributed to the collection. No information about the creation of the polygraph, smoked paper, or varnish.

Smith, Burke M. 1967. "The Polygraph." *Scientific American* 216 (1): 25-31. https://www.jstor.org/stable/10.2307/24931371.

Biographical information about Larson and Keeler, and the term "polygraph." Not really useful for developing a treatment protocol, but interesting background information.

Synnott, John, David Dietzel & Maria Ioannou. 2015. "A review of the polygraph: history, methodology and current status." *Crime Psychology Review* 1 (1): 59-83. https://doi.org/10.1080/23744006.2015.1060080.

Includes citation for Larson's publications about his polygraph - not digitized but need to find to inquire about getting it scanned.

Articles related to smoked paper

Ambrose, A.M. and Floyd De Eds. 1945. "Norelac - A Substitute for Shellac in the Preservation of Smoked Paper Records." *Science* 102 (2642): 179-180. https://www.jstor.org/stable/1672021.

"Even when shellac is plentiful the preparation of a suitable coating for smoked records is something of a nuisance, and can not be done in a short time. A rather voluminous alcohol-insoluble residue must be allowed to settle and the supernatant solution decanted."

This makes me think that a large amount of shellac would've been prepared so that the smoked paper could be dipped into it.

Khilnani, Gurudas, Rekha Thaddanee, and Ajeet Kumar Khilnani. 2013. “The smoked drum.” *Indian Journal of Pharmacology* 45 (6): 643-645. https://doi.org/10.4103/0253-7613.121394.

Information about fuel source for making smoked paper - “benzene or kerosene fumes in a chamber specially made for it and called smoking cabinet or chamber.”

Also references shellac as the fixative.
“For a permanent record one had to ‘fix’ the tracings. This was carried out by carefully separating the smoked paper from the drum carrying the smoked paper in both hands and passing slowly moving the paper in a puddle of fixing solution consisting of alcoholic solution of shellac, colophony resin, or other varnishing solution.”

Articles related to the Zumbühl System

Zumbühl, Stefan. 2014. “Parametrization of the solvent action on modern artists’ paint systems.” *Studies in Conservation* 59 (1): 24-37. https://doi.org/10.1179/2047058413Y.0000000099.

Articles related to smoked paper and sound recordings *(These articles don’t enhance our knowledge of how smoked paper was prepared or varnished, but it is interesting to learn about how smoked paper is being used in other industries.)*

Blake, Clarence J. “The Graphic and Photographic Illustration of Sound-Waves.” *The American Journal of Otology* 1: 3-9. *Nineteenth Century Collections Online*. https://link-gale-com.smithsonian.idm.oclc.org/apps/doc/LGKKDN907685337/NCCO?u=smithsonian&sid=NCCO&xid=c6fd8df2. Accessed July 22, 2020.

Feaster, Patrick. 2019. “Enigmatic Proofs: Archiving of Edouard-Leon Scott de Martinville’s Phonautograms.” *Technology and Culture* 60 (2): S14-S38. https://doi.org/10.1353/tech.2019.0062

Los Angeles Times. 1925. “New Apparatus Pictures Voice: Sound Vibrations Recorded on Smoked Paper.” *Los Angeles Times,* October 25. B3.

Patents

Bristol, William H. 1904. Record-sheet for recording instruments. US Patent 748,918, filed September 21, 1903 and issued January 5, 1904.

One of the only patents that I could find which specifically discusses the creation of smoked paper.

“...in practice, I prefer to form the surface by smoking the base in a manner similar to that in which glass is smoked - that is, by holding the same over a smoking oil-burner.” Discusses how the paper was covered in soot.

"...although it is preferable to first fix the removable surface. This may be accomplished by spraying thereon a usual fixative such as is employed by artists in fixing crayon or carbon drawings. The ordinary commercial fixative answers this purpose very well."

Marti, Pierre Auguste Daniel. 1927. Apparatus for recording the duration of very brief phenomena. US Patent 653,557, filed July 24, 1923 and issued January 4, 1927.

Device uses smoked paper. No mention of how the record is made permanent.

Keeler, Leonarde. 1931. Apparatus for recording arterial blood pressure. US Patent 46,986, filed July 30, 1925 and issued January 13, 1931.

Ink pens drawing lines on unprepared paper. No longer using smoked paper.

Treatment Articles

Holden, Maria S. 1984. "The Development of Lithographic Cartography and the Conservation Treatment of a Large Varnished Map." *Book and Paper Group Annual* 3: 3-8.

Treatment-focused. Tape and varnish removal. Varnish is not identified, but is soluble in ethanol. Tape is insoluble in water and ethanol, no tape residue remaining following tape removal.

This article made me think about when the techniques were developed to identify varnishes. This was published in 1984, was the analytical capabilities not yet developed to identify the varnish? Why don't treatment articles identify the varnish type?

Owen, Linda. 2008. "Fire and Paper: An Examination of the Materials and Techniques of Lee Bontecou's Soot Drawings." *Book and Paper Group Annual* 27: 47-53.

Some discussion regarding the properties of soot. Minimal discussion of fixatives used - based on dates, the varnish on the smoked paper is not synthetic.

Good information about the components of soot.
"The fuelstock will effect [*sic*] the composition of the soot."

Petukhova, Tatyana. 1992. "Removal of Varnish from Paper Artifacts." *Book and Paper Group Annual* 11: 11-32. http://cool.culturalheritage.org/coolaic/sg/bpg/annual/v11/bp11-32.html.

Information about shellac and other varnished used on paper. Case studies are included of varnish removal treatments, but the varnishes that were removed were not identified.

Used a gel (Carbopol) to remove the varnish.

Rodgers, Sylvia. 1985. "A Method for Temporarily Facing a Varnished Map During Aqueous Conservation Treatment." *Book and Paper Group Annual* 4.

Treatment of a varnished map - not very helpful as the varnish and solvent used are not identified in the article. Goal of the treatment was to remove the varnish.

Smith, Merrily A. 1984. “Pressure-Sensitive Tape and Techniques for Its Removal from Paper.” *Journal of the American Institute for Conservation* 23 (2): 101-113.

Good information about solvents and their use in tape removal. Includes a section about solvent selection.

“The most effective solvent in a given situation is the one whose solubility parameter matches the solubility parameter of the materials to be dissolved.”

Discusses the use of poultices. I think using a poultice would be tricky for our treatment. The inability to see what is happening could be detrimental.

Stanley, Ted. 1998. “A Tool for Pressure Sensitive Tape Removal: The AirPencil.” *Book and Paper Group Annual* 17: 111-112.

Verborg, Maria. 2013. “Technical Study and Conservation Treatment of Roy Lichtenstein’s Screen Print on Plastic, *Sandwich and Soda*, 1962.” *Book and Paper Group Annual* 32: 54-57.

Used warm water to soften the carrier of Filmoplast tape and then sprinkled cellulose powder onto remaining adhesive. Removed the cellulose powder and adhesive mechanically.

Performed treatment under the microscope to ensure treatment wasn’t scratching the surface.

Varnish

Ellis, Margaret Holben. 1996. “The Shifting Function of Artists’ Fixatives.” J*ournal of the American Institute for Conservation* 35 (3): 239-254. http://www.jstor.org/stable/3179784.

Nothing specific about shellac.

Dates for spray-applied varnish are after Larson’s polygraph.

Sources in bibliography may be useful, but are not digitized and could not access while working from home.

Jones, Rees. 1962. “Science and the Art of Picture Cleaning.” *The Burlington Magazine* 104 (707): 60-62. http://www.jstor.org/stable/873592.

Focuses on removing varnish from oil paintings.

Includes good, general information about properties and applications of solvents in treatment.

Includes a good reminder that whatever cleaning method is chosen will not work uniformly across the surface of the object - good reminder when working with the tape.

McGlinchey, Chris and Karl Buchberg. 2009. “The Examination of Drawings by Georges Seurat Using Fourier Transform Infrared Micro-Spectroscopy (Micro-FTIR).” *e-Preservation Science* 6: 118-121.

Information about shellac that Seurat used to fix his drawings - mainly the analytical techniques that were used to identify the varnish as shellac (beyond the usual visual ID with UV)

Gels

Galatis, Panagiotis, Stamatis Boyatzis, and Charis Theodorakopoulos. 2012. “Removal of a Synthetic Soiling Mixture on Mastic, Shellac & Laropal® K80 Coatings Using Two Hydrogels.” *e-Preservation Science* 9: 72-83.

Maheux, Anne F. 2015. “Cross-Disciplinary Uses for Gellan Gum in Conservation.” *Book and Paper Group Annual* 34: 69-79.

Soot Formation

DOE/Sandia National Laboratories. 2018. "Cracking the code to soot formation: Scientists unlock mystery to help reduce hazardous emissions." ScienceDaily. www.sciencedaily.com/releases/2018/09/180906141629.htm (accessed September 8, 2020).

Johansson, K.O., M.P. Head-Gordon, P.E. Schrader, K.R. Wilson, and H.A. Michelsen. 2018. “Resonance-stablized hydrocarbon-radical chain reactions may explain soot inception and growth.” *Science* 361 (6406): 997-1000. DOI: 10.1126/science.aat3417.

Understanding soot formation isn’t critical to developing a conservation treatment, but it is interesting to learn more about.

Martin, Jacob, Radomir Slavchov, Edward Yapp, Maria Botero, Jethro Akroyd, Sebastian Mosbach, and Marcus Kraft. 2018. *How does soot form in a flame?* Department of Chemical Engineering and Biotechnology, University of Cambridge. Published on YouTube September 4, 2018. Video, 1:53. https://www.youtube.com/watch?v=7q86zEEI3jc.