

THE SHRINKAGE OF PHOTOGRAPHIC PAPER.

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In mounting some spectrograph prints I was very much chagrined to find that they were at different lengths, as if they had been taken on different spectrographs. These prints had been printed on developing paper, developed, washed, dried and then soaked and mounted wet. It had happened that the paper used came in quite large sheets and in cutting down to size it was economical to cut some pieces lengthwise of the paper, while other pieces were cut crosswise. Several prints were made and the best were selected for mounting. In this chance selection some were lengthwise and others were crosswise of the paper. The expansion and contraction in the process of developing and washing was different in the different directions and it was necessary to make a new set of prints, care being taken to have the paper all cut the same way. The mounting was done before drying, to prevent excessive expansion.

I thought it might be of interest to experiment with several brands of paper to determine if this fault was found in all brands of paper or in this particular brand alone.

An 8x10-inch plate was exposed to sunlight and then developed, giving a very dense film. On the edges millimeter scales were ruled with the dividing engine. A space of 20 centimeters was ruled on the long edge and a 15 centimeter space on the short edge of the plate. Thus by printing and developing I had a photograph of the scale, and measurement would give the amount of shrinkage or expansion. Five different papers were used. All were printed, developed, fixed, and washed in the usual manner. After washing, a sample of each brand was mounted on cardboard. The others were stuck back side to glass and allowed to dry. When dried measurements were taken of the length and breadth. Then samples of each brand were selected from the unmounted photographs, soaked in water and mounted on cardboard. After drying, these were also measured.

The accompanying table will give the results:

PAPER.	Dried on Glass.		Mounted Wet on Cardboard.		Dried, Soaked and Mounted Wet on Cardboard.	
	Length.	Breadth.	Length.	Breadth.	Length.	Breadth.
Darko-Matt.	-.55%	-.51%	2.3%	.23%	2.6%	.5%
Velox C.	-.32%	-.45%	.52%	1.4%	.8%	1.8%
Velox S.	-.2%	-.31%	1.6%	.3%	1.9%	.7%
Azo C.	-.075%	-.18%	1.8%	.3%	2.1%	.66%
Azo E.	-.06%	-.23%	.28%	1.5%	.52%	1.8%

The results show that all brands act very much alike. When dried on glass there is a trifle shrinkage. The mounted photographs show considerable expansion and in every case a larger amount in one direction than in the other. In some cases the per cent. of expansion is ten times that in the other direction.