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Effect on Sensitivity of Blue Cutoff Filter to Eliminate Bioluminescence.

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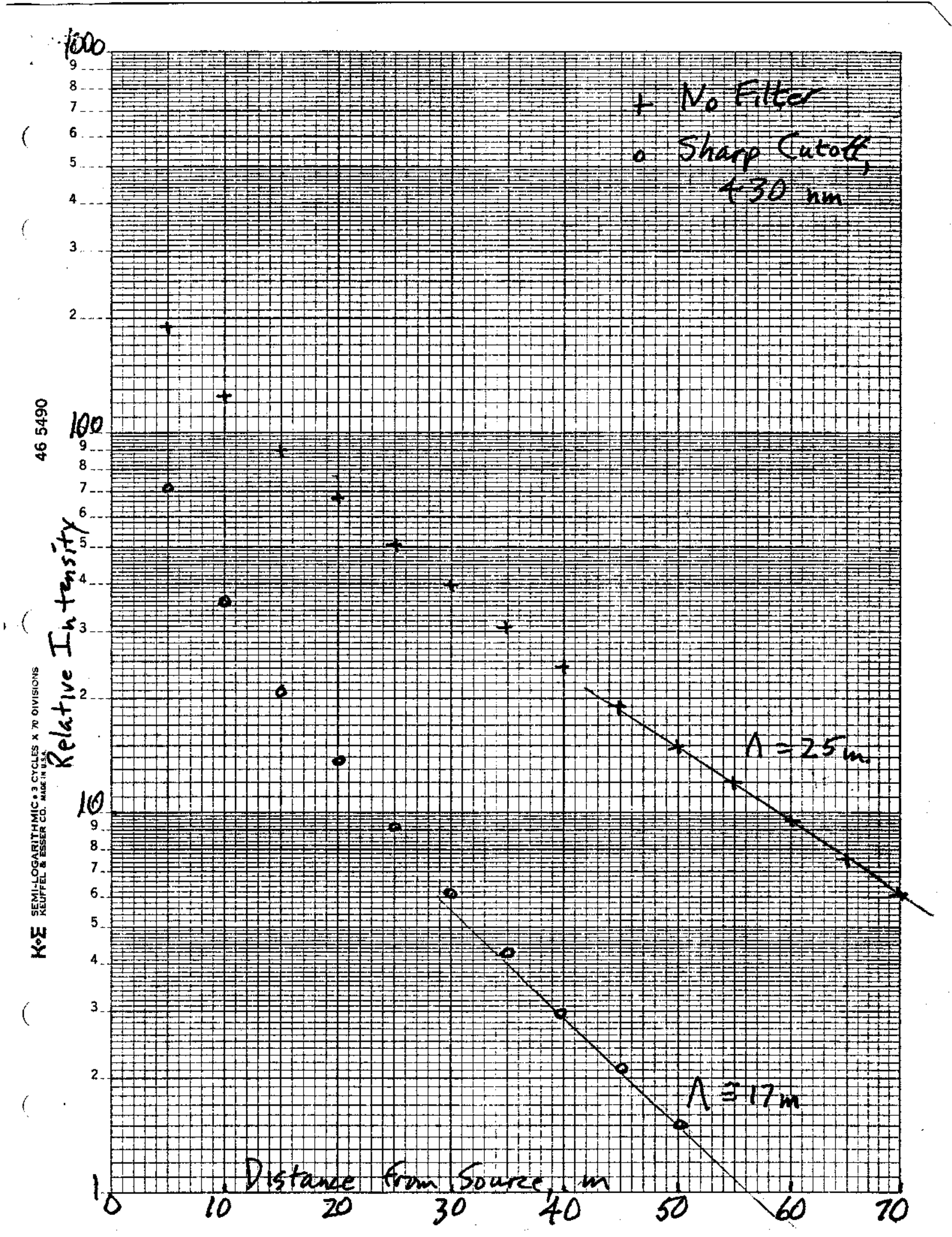
This brief note is written to document the disastrous effect on array performance of using a filter to cut out bioluminescent light. It is not a detailed calculation; the data were obtained from the ATTEN program, which prints out, for any given attenuation length, the number of quanta observed as a function of distance from the source and of wavelength.

To simulate the effect of the filter, a sharp cutoff at 430 nm was assumed, and the remaining light compared with the original. The results are shown in Fig. 1. The effective attenuation length at distances over 30m is decreased from 25 to 17m, and the residual intensity at 50m is what it was previously at 100m.

A detailed calculation would of course be possible; but it seems clear from these data that to duplicate present performance would result in increasing the number of modules by at least a factor of 10 for the same volume.


+ No Filter
o Sharp Cutoff, λ=30 nm
Λ = 2.5 m
Λ = 1.7 m
Relative Intensity
Distance from Source, m
1000
100
10
1
0
10
20
30
40
50
60
70
46 5490
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