

## REMARKS ON T-GRAIN TECHNOLOGY APPLIED TO ASTROPHOTOGRAPHY

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If T-grain Technology can be used to manufacture emulsions of astronomical type, it will provide a better Detective Quantum Efficiency than any existing plate. As Dr. Millikan explains us, this increase in D.Q.E. can result in an increase in Signal to Noise ratio (i.e. increase in contrast or decrease in granularity) or in an increase of plate speed. As Kodak and we, their customers, don't have a lot of money to spend for three or more new emulsions, we have now to choose for a new emulsion, which might be a harder one (more contrast), a finer one (better granularity), or a faster one. Let us now examine these three possibilities:

### HIGHER CONTRAST

As demanded by Dr. Malin, this could be an interesting solution for showing easily extensions in galaxies or in nebulosities, but my point of view is that it's the only advantage that higher contrast provide. It limits the useful photometric range, giving something like a direct isophote of the night sky (only one magnitude between plate fog and plate saturation!!). In these condition it's to be feared that some new problems of inhomogeneities occur ; so it might be an interesting solution for making some types of discoveries, but not for general use in Schmidt Astronomy.

### FINER GRANULARITY

It seems that emulsion technology makes finer grain go with high contrast. This solution is nevertheless a better solution than the first one: high contrast amplification is feasible and photometric range might be conserved. But this solution can give a real improvement only during the ten best nights per year because of seeing effects and telescope quality. It might also give something very hard to measure with our actual measuring machines.

### FASTER SPEED

I think this is the way in which this new technology will give the most important benefit in astronomical photography.  
- Increase of plate quality in less time on high quality Schmidt telescopes due to a limitation of photometric change of the atmosphere during

the exposure, and also limitation of field rotation due to differential atmospheric diffraction as pointed out by Dr. Cannon.

- Short exposure also implies a greater probability of good exposure with telescope which suffers from flexure or other mechanical problems.

- If it's true that a two time increase in sensitivity, you can't take twice more plates, it's also true that in these conditions, you can take maybe between 40 to 80 percent more plates (depending on the operating facilities of your telescope). Two plates taken on the same field produce roughly a 40 percent increase in S/N ratio and a 99.9 percent increase in the chances of discovery of moving objects and discrimination of plate defaults.

- Faster speed also give new possibilities in the use of narrow band filters combination (U or B band photography with J type emulsion).

- This will also give more efficiency on some fields which are available during the short summer nights.

- Faster speed changes only the condition of exposures (Shorter exposure time or same exposure time with less hypering giving better signal to noise ratio). It doesn't change the condition of measuring: If astronomers have to change their detection system every decade, no reliable work can be produced.

#### CONCLUSION

Let's wait the "T-a-J".