galaxies. The morphological types, $H\ I$ masses, $H\ I$ mass to total mass ratios, $H\ I$ mass to luminosity ratios, and other $H\ I$ parameters of the galaxies are discussed.

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A New Photographic Developer for Astronomical Work. J. D. FERNIE, *David Dunlap Observatory*.—Experiments applying a new, commercially available developer, Acufine, to astronomical spectroscopic plates are described. Sensitometric measurements indicate that this developer effectively increases the emulsion speed by half a magnitude, compared to development in D-19, while simultaneously producing a finer grain. Contrast is moderate, and developing times are about 6 min at 70°F. When used with its replenisher, Acufine appears to be stable and have a long life. Costs, while slightly higher than for D-19, are negligible compared to the saving in telescope time.

Density of the Solar Flare Plasma. E. L. FIREMAN, *Smithsonian Astrophysical Observatory*.—Solar-flare outbursts produce cosmic-ray particles with energies of hundreds of Mev; however, these particles arrive at the earth after several hours corresponding to velocities of 1000 km/sec (energies of a few kev). This and related facts have led to the view that the sun accelerates particles to high energies only during a short time and that the particles are stored in a plasma cloud that travels at the speed of approximately 1000 km/sec. Little is known about the density of this solar plasma cloud. Very recently Ogilvie *et al.* (*J. Geophys. Research* **67**, 929, 1962) measured the solar-proton spectrum down to 0.2 Mev during the November 12, 1960, flare. Since the spectrum at all times had a similar form, the stopping power of the plasma places an upper limit of approximately 10^5 particles/cm³ for the plasma density of this flare.

What Can 1500 Observations Provide Us with? SERGEI GAPOSCHKIN, *Harvard College Observatory*.—It is shown that under certain circumstances, with the appropriate materials available (in this case, the photographic plates on the Magellanic Clouds at Harvard), and using a method developed by the author, some 1500 observations on 15 variables can be made in less than two hours. The accuracy is not inferior and may even be superior to the usual determination from photographic plates using the unaided eye. As a result, an investigation of which a third was finished within the last 50 years, may be renewed and entirely completed in less than five years.

The Polarization of the Sunlit Sky and of the Poles of Jupiter. THOMAS GEHRELS, *University of Arizona*.—The polarization of the clear daytime sky, in the sun's vertical and near 90° from the sun's direction, has a maximum near 5500 Å, a slow decrease towards shorter and a steep decline towards longer wavelengths. The decrease in the ultraviolet is caused by multiple scattering, while in the infrared it is mostly due to ground reflection, which is especially strong when green plants are present. The maximum was found near 75% polarization. The agreement of the Rayleigh–Chandrasekhar theory with the observations is good. The difference of the above 75% with 100% polarization appears due to molecular anisotropy (6%), multiple scattering (6%), ground reflections (5%), while a discrepancy of 8% is presumably due to aerosols.

Strong wavelength dependence was also found for the anomalous polarization at the poles of Jupiter (Lyot discovered up to 8% polarization always present at the poles). The agreement with the theory of molecular scattering again is good; scattering by gaseous molecules fully explains the polarization effects.

Krook's Iterative Procedure for the Temperature Distribution in Model Stellar Atmospheres. OWEN GINGERICH, *Smithsonian Astrophysical Observatory*.—The computer program for non-gray stellar atmospheres in use at the Smithsonian Astrophysical Observatory has been modified to incorporate a powerful new variational procedure suggested by Max Krook. Although similar to the Krook–Poincaré–Lighthill perturbation method (Gingerich thesis, Harvard, 1961), the new scheme can improve an arbitrary initial temperature distribution. Thus it possesses a highly desirable iterative ability.

The new scheme requires roughly one-third as many iterations as the alternate use of the Stromgren–Swihart and lambda-operator methods formerly employed (see Gingerich thesis). It can achieve a flux constant to about 0.2% in three to five iterations. The time required per iteration with the IBM 7090 electronic computer is approximately three minutes for a non-gray model stellar atmosphere with continuous opacity sources.

Krook's iterative procedure has been used to establish the well-known gray temperature distribution, temperatures in gray "picket-fence" models and in solar-type model atmospheres both with continuous opacity sources and with simulated absorption lines. We are also beginning to use this program in studies of convective solar models.

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