ionization stages. For metals of the iron group we should investigate Ti, V, Cr, Mn, Ni, and Cu for both the neutral and singly ionized stages. It is urgent that the *f*-values be measured by more than one technique and every effort be made to eliminate systematic as well as accidental errors.

14*b*. SOUS-COMMISSION DES SPECTRES MOLECULAIRES D'INTERET ASTRONOMIQUE

Report of Meeting, 16 August 1961

PRESIDENT: P. Swings.
SECRETARY: J. G. Phillips.

The *Draft Report* of the Sub-Commission was adopted without amendment.

At the invitation of the President J. G. Phillips described the current status of the program of molecular band analysis being carried out on the Berkeley campus as a joint endeavor of the Physics and Astronomy Departments. After about a year and a half of extensive development, the program went into full production during the spring of 1960. The development consisted of the modernization of the 21-foot concave grating spectrograph of the Department of Physics by the purchase of a new grating from Bausch and Lomb, replacing and re-mounting the slits, and re-aligning the Paschen circle. An extensive series of tests resulted in the determination of observational procedures that would result in the production of spectrograms of the highest possible quality. The thorium halide electrodeless discharge excited by micro-waves was adopted as the source of comparison spectra. In addition, a semi-automatic measuring machine of the Tomkins and Fred type was constructed to aid in the measuring of the plates. Digitizing equipment on the measuring machine and the rental of an IBM 526 Summary Punch made it possible to punch the measurements and central line densities directly onto IBM cards for subsequent processing by the IBM 704 computer. Several programs were developed for the computer for the automatic reduction and analysis of the molecular bands on these spectrograms.

As of June 1961, the status of the production of band analyses is as follows:

1. *CN*. The analysis of the red system is nearing completion. Two sets of exposures were made, with a relatively low excitation discharge-tube source, and with a higher temperature enclosed arc. In all, 23 exposures have been made, comprising 100 plates, in addition to numerous test exposures. The spectral region covered runs from 4500Å to 12000Å. In this interval, 41 bands are suitable for measurement and analysis. The analysis of the low temperature discharge-tube plates is complete, and the analysis of the arc plates is nearing completion. On the discharge plates each of the eight resolvable branches of the bands can be followed, on the average, to the rotational quantum number $N=20$. The higher temperature arc source is making it possible for the majority of the branches to be extended to at least $N=60$.

A limited number of pre-publication copies of the discharge-tube results have been made available to those who can make immediate use of them. Negotiations are under way with the University of California Press for the publication of the complete table. They propose a volume with a page size of $8\frac{1}{2}\times 11$ ins., and suggest an initial printing of 1000 copies, 500 of which would be bound with hard covers.

2. *HgH*. An electrodeless discharge tube source has been developed and used to photograph two band systems comprising 30 bands, 16 of which have been observed and analysed for the first time. An initial set of 60 plates have been measured, reduced, and completely analysed. A second set of plates will be photographed by the end of July, and added to the study.

3. C_2. A discharge-tube source has been studied extensively for optimum production of the Swan bands free of bands belonging to impurities. An initial set of three exposures comprising 15 plates has been made. These will be followed by additional exposures with the discharge-tube, and a complete series with a higher temperature enclosed arc. Measurement and analysis of these plates will start as soon as the study of the red system of CN is completed early in the fall.

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