## ABSTRACTS *

**Abbot, C. G. Energy spectra of stars.**

The author recounted his former measures of the distribution of heat in the spectra of the brighter yellow and red stars.

He described two instruments: (1) a combination prism, to give nearly uniform dispersion from 3400 A to 24,000 A; (2) a new radiometer having triple vanes, with each of the pair 0.2 mm high, 0.45 mm wide, and a total weight of suspension 0.8 mgr, of which 0.5 mgr is platinum wire added to lower the center of mass.

He proposes to observe the distribution of heat in the spectra of stars of the principal classes, at Mount Wilson in 1946, and hopes to include third magnitude stars.

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**Adel, Arthur. A possible source of atmospheric $N_2O$.**

The existence of nitrous oxide ($N_2O$) in the earth's atmosphere has been established by the discovery and analysis of an absorption band at 7.77 $\mu$ in the solar spectrum.[1,2] The origin of this gas in the atmosphere is still in doubt, for its presence is not readily explained by the photochemistry of the air. It is the intention, in what follows, to call attention to an apparently plausible and interesting means of accounting for the phenomenon.

In recent examinations of soil air for hydrocarbon content, M. W. Kriegel of the Carter Oil Company, Tulsa, Oklahoma, has found a hitherto unreported component; and on the basis of careful investigation of its properties, he suggests that the gas is very probably nitrous oxide.[3] Kriegel points out that,

"Nitrous Oxide in the soil is not surprising when it is remembered that the element nitrogen in the form of ammonium salts, nitrites or nitrates is present in fertile soils; and that one method of preparation of pure Nitrous Oxide is according to the equation:

$$NH_4NO_3 = N_2O + 2\,H_2O.$$

It is also probable that the slow decomposition of commercial fertilizers might account for some of the Nitrous Oxide in farming areas. In connection with the studies of decomposition of vegetation under aerobic conditions, it has been shown by this laboratory that a gas having properties similar to Nitrous Oxide forms a large portion of the condensed fraction."

If, as appears to be the case, it is indeed true that soil air contains $N_2O$, is it not reasonable to assume escaping soil air to be one source, perhaps the principal one, of the atmospheric nitrous oxide layer?

1. Arthur Adel, *Ap. J.* **90**, 627, 1939.
2. *Ibid.* **93**, 509, 1941.
3. *Geophysics* **9**, 447–462, 1944.

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**Aller, Lawrence H. A comparison of the atmospheres of 10 Lacertae and $\tau$ Scorpii.**

Approximate line intensities measured on a Coudé plate of 10 Lacertae taken at the Mount Wilson Observatory provide data for a preliminary investigation of the atmosphere of this star by the method of Unsöld. From the Stark broadening of the hydrogen lines and the ionization equilibrium, the electron pressure, temperature, and surface gravity are estimated, viz., $\log P_e = 2.80$, $T_e = 29{,}600°\mathrm{K}$, and $\log g = 4.44$. The relative abundances of *He, C, N, O, Ne, Mg,* and *Si* turn out to be the same as in $\tau$ Sco to well within the limits of error for the approximate 10 Lacertae data. The provisional abundances expressed as relative numbers of atoms are:

| Element | No. Atoms | Element | No. Atoms |
|---|---|---|---|
| *H* | 2000 | *O* | 0.8 |
| *He* | 130 | *Ne* | 0.7 |
| *N* | 0.2 | *Si* | 0.07 |
| *C* | 0.2 | *Mg* | 0.05 |

There is some suggestion that the proportion of hydrogen estimated from the Balmer discontinuity and the higher members of the Balmer series may be greater in 10 Lacertae than in $\tau$ Scorpii. The discrepancy in the $Ne/O$ ratio between the planetary nebulae and these hot stars remains; the comparable amounts of neon and oxygen in the stars recall Nova Persei which exhibited strong neon lines shortly after maximum.

If the mean absorption coefficient for the stellar atmosphere is computed in the manner indicated by Chandrasekhar, Unsöld's blanketing effect correction may be greatly reduced in size if not actually eliminated. The effective optical depths of the photosphere calculated from the central intensities of the lines and the assumption of local thermodynamic equilibrium

* Of papers presented at the Seventy-fourth Meeting of the American Astronomical Society, New York, N. Y., February 1 and 2, 1946.