loose terminology in some expositions of man's evolutionary origin has evidently been the cause of much profitless controversy. Terms such as 'gorilloid', 'anthropoid', 'tarsioid', and 'lemuroid', are constantly being used by different authors with different connotations. It is not permissible, for example, to talk of the 'gorilloid heritage' of man, for the term 'gorilloid', unless specifically defined otherwise, can only be interpreted as an adjectival form of the word 'gorilla' which refers to an anthropoid ape with specialisations such as few anatomists can believe to have been features of the precursor of the human stem. The term 'anthropoid ape', also, by its common definition, implies an arboreal animal showing certain adaptive specialisations which would presumably be absent from any form ancestral to man. Unless, therefore, the term 'anthropoid ape' be given a wider application than it is usually accorded, it is highly questionable whether it is legitimate to say that man has ever evolved from a form which can be strictly called an anthropoid ape. Opponents of the theory of the 'anthropoid' origin of man may, in this case, be justified in their criticisms even though they may be derided for basing the latter on what appears to be a verbal quibble. Similar criticisms apply to the terms 'lemuroid' and 'tarsioid'.

As Mr. Tate Regan implies, the interpretation of the available data in regard to the classification of the Primates is a matter of great difficulty, and largely depends upon the taxonomic value accorded to different anatomical characters by different authorities. But the problem is rendered the more difficult by the lack of a precise definition of the nomenclature commonly employed in its discussion.

W. E. LE GROS CLARK.

Anatomical Department,
  St. Thomas's Hospital
    Medical School,
      London, S.E.1.

A Relation between Ultra-violet Absorption Spectra and Heats of Combustion.

THE ethylene linkage in the aliphatic hydrocarbons is characterised by two ultra-violet bands; an intense one 1800-1900 A., and one of low intensity between 2200 and 2600 A. (Stark et al., *Jahr. Rad.*, **10**, 139; Luthy, *Zeit. Phys. Chem.*, **107**, 285; Carr, *J. Am. Chem. Soc.*, **51**, 3041). The thermal equivalents ($Nh\nu$) of the two middle positions are 154·0 and 118·8 Kcal. and the difference is 35·2 Kcal.; this is almost identical with the difference in heats of combustion between a saturated hydrocarbon and the corresponding olefine, which for the first five members of the series is 36·8, 36·1, 36·2, 39·9, 37·2 Kcal. (Kharasch, *Bur. Stand. Jour. Research*, **2**, 359). The average value for the thermochemical characteristic of the C–C and C–H linkage in the liquid state is 52·1 Kcal. The heat of combustion of an hydrocarbon (liquid state) containing m double bonds can be represented by

$$Q = (3n+1)52\cdot1 - m(Nh\nu_2 - Nh\nu_1)$$

where ν_1 and ν_2 are the centres of the absorption bands. For example, Q, calculated from Stark's data for diallyl, is 926·7 Kcal.; experimental, 921·1.

The only spectral measurements of acetylene hydrocarbons for which thermal data are available are those of Henri for acetylene and Stark and Lipp for acetylene and dipropargyl which are summarised as follows:

	λ max.	$\Delta Nh\nu$	$Q_1 - Q_2$
HC≡CH	2631		
	2040	31·4	$60\cdot1 = 2 \times 30\cdot0$
(HC≡C–CH₂–)₂	2450		
	2010	25·5	$114\cdot4 = 4 \times 28\cdot6$

The general formula would be:

$$Q = (3n+1)52\cdot1 - 2m(Nh\nu_2 - Nh\nu_1)$$

where m is the number of triple bonds in the molecule.

On the assumption that the band in the short ultra-violet is related to the activation energy of the C–C or C–H linkage, calculations were made for the aliphatic alcohols. In ethyl alcohol Leifson (*Astrophys. Jour.*, **63**, 73) found six equally spaced bands between 2039 and 1892 A. with the centre at 1952 A. For alcohols in a homologous series the band is shifted 20 frequency units for each CH₂ (Henri's results). For the first four alcohols $\Delta Nh\nu$ (calculated from Bielecki and Henri's measurements) is 18·8, 18·3, 18·8, 20·4 Kcal.; $Q_1 - Q_2$ is 37·8, 37·0, 38·3, 39·8, therefore $Q_1 - Q_2$ is equal to $2 \times \Delta Nh\nu$.

By assuming for the aldehydes and ketones an analogous band near 1900 A., the value of $\Delta Nh\nu$ for seven ketones is 48·2 Kcal.; $Q_1 - Q_2$ is 96·6 or $2 \times 48\cdot3$; in three aldehydes $\Delta Nh\nu$ is 46·3 Kcal. and $Q_1 - Q_2$ is $87\cdot5 = 2 \times 43\cdot8$. For compounds containing three different types of linkage the calculated values compared with experimental (in parenthesis) are, in Kcal.: allyl alcohol 435·8 (442·4); croton aldehyde 537·7 (542·1); mesityl oxide 844·3 (846·7); allyl acetone 869·0 (856·7); citral 1439·3 (1437·0).

A more extended treatment together with the theoretical interpretation of the relationship will appear shortly elsewhere.

EMMA P. CARR
(A.A.U.W. Fellow).

Physikalisch-chemisches
  Institut der Universität,
    Zürich, Jan. 16.

Raman Effect with Optically Active Substances.

IT is already known from various investigations that the different isomeric forms of organic molecules give strikingly different Raman spectra. A noteworthy case is that of the cis- and trans- forms of dichlorethylene, which have been studied by Bonino and Brüll (*Zeit. für Physik*, **58**, p. 194; 1929). These investigators have found that the most striking differences appear in the characteristic molecular
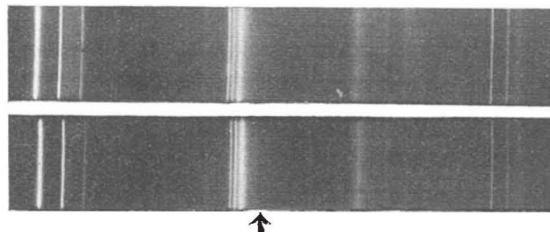

FIG. 1.—Raman spectra of lævo- (upper) and dextro-pinene (lower).

frequencies lying in the remote infra-red and made so readily accessible to observation by the Raman method.

It is evidently of great theoretical importance to ascertain whether optical isomers, that is, the dextro and lævo rotatory forms of the same molecule, give spectra which differ in any respect. To test this question, the two optically isomeric forms of pinene were examined. The materials as supplied by Kahlbaum were carefully purified by fractionating at constant boiling point (154° C.). All the numerous Raman lines which appear in the scattering by the dextro isomer are also observed with the lævo form and vice versa, and in identically the same positions, as we should expect. There are, however, appreciable differences in the relative *intensities* of some of the lines. This is particularly conspicuous in the case of