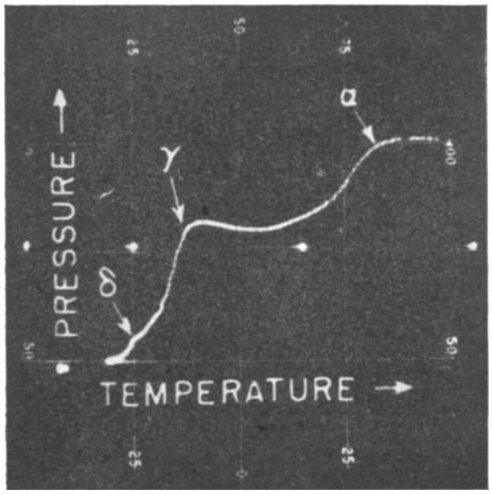

Fig. 2. Desorption of nitrogen from tungsten filament initially at 80° K. Temperature range 80°–750° K.

wire sample is heated in a flash-filament cell. Since the variation of electrical resistance of tungsten with temperature is known, the flash filament can be used both as adsorption sample and resistance thermometer.

In our system the pressure is monitored by an inverted ion gauge, the ion current from which is amplified with a vibrating-reed electrometer and displayed as ordinate on a cathode-ray oscilloscope. The adsorption filament is made one arm of a 10-kc./s. bridge, so that a change in filament temperature results in an unbalance which can be recorded on the abscissa of the oscilloscope[2]. Fig. 1 shows the resulting pressure vs. temperature plot for nitrogen adsorbed on a tungsten filament initially held at 298° K.; here the increase in the pressure (above the base line) corresponding to a given temperature is proportional to the total number of molecules evolved up to that temperature. Two regions over which desorption occurs are very clearly defined. After an initial evolution of gas only slightly above room temperature (the α-peak), desorption stops; for the initial stages of adsorption the material in the chemisorbed β-peak only begins to be evolved at 1,400° K., and is completely removed at 1,900° K. Fig. 1*b* gives an enlarged view of the low-temperature region of the burst, showing the α-peak alone, desorption of which appears to be complete at 650° K.

The details of adsorption in states of low binding energy are revealed in Fig. 2, showing a pressure vs. temperature trace for a filament cooled with liquid nitrogen to an initial temperature of 80° K. It appears that in addition to the α- and γ-peaks previously reported[1], a fourth level, δ, contributes significantly to adsorption at this low temperature. The temperature-ranges over which evolution of gas occurs are: level α, 300–650° K.; β, 1,400–1,900° K.; γ, 140–250° K.; δ, 100–140° K. We estimate a heat of desorption of approximately 85 k.cal. for nitrogen in state-β; the interactions in the other levels are significantly lower, and for γ and δ are presumably of the same order as commonly found in physical adsorption.

It has already been shown that nitrogen in state-α does not appear to participate significantly in the increase in population of state-β which can be observed with time[1]. Preliminary measurements, which will be reported in greater detail at a later date, indicate that at $T = 80°$ K. there is no significant exchange between levels γ and β, but that exchange between δ and the other levels does occur.

Gert Ehrlich
T. W. Hickmott

General Electric Research Laboratory,
Schenectady,
New York.
Dec. 14.

[1] Ehrlich, G., *J. Chem. Phys.*, **23**, 1543 (1955); and in the press.
[2] An adsorption spectrometer, utilizing a d.c. bridge circuit, has been described by Hagstrum, H. D., *Rev. Sci. Instr.*, **24**, 1122 (1953)

The Prefix 'Nor' in Chemical Nomenclature

In his review of the new edition of "The Extra Pharmacopoeia" (Martindale), Vol. 2, Prof. J. H. Gaddum (*Nature*, Feb. 25, p. 350) states, "surely *nor* means 'N ohne Radikal' and not 'the next lower homologue' ". I have seen this explanation of the prefix 'nor' given several times in medical publications but never in a chemical text-book, and I suspect that "N ohne Radikal" is a mnemonic invented by a German pharmacologist to assist his students to remember the constitutions of *nor*adrenaline, *nor*ephedrine and similar compounds. However this may be, the fact remains that the prefix *nor* is used for many compounds which contain no nitrogen at all; for example, *nor*pinic acid, *nor*œstrone, *nor*equilenin, etc. The statement made in Martindale is therefore perfectly correct.

It might be, of course, that this is simply an extension of the original use of the prefix 'nor', which certainly does not appear to be derived from Latin or Greek.

A. M. Woolman

Eichenstrasse 7,
Arlesheim.

The first use of the prefix 'nor' appears to be in a paper by Matthiessen and Foster[1] published in 1868. They were studying the nitrogen-free substance opianic acid formed by the oxidation of narcotine and obtained evidence that it contained two methyl groups. They had used the term 'normal opianic acid' to mean the completely demethylated compound, and they then used the contraction 'methyl-noropianic acid' for the monomethyl derivative. Since that time the prefix has generally been used to denote the replacement of one or more methyl groups by H, or the disappearance of CH_2 from a carbon chain, but its use may leave the resulting structure in doubt. I apologize for supporting a false etymological theory.

J. H. Gaddum

Pharmacological Laboratory,
University,
Edinburgh 8.

[1] Matthiessen, A., and Foster, G. C., *J. Chem. Soc.*, 358 (1868).