ES.033 GRAPHICS EXERCISE

The objective of this exercise is to introduce the importance of visual impact in graphics and the relationship between text and graphics.

Figure 7 needs help on two counts:

- Conventions for formatting graphs have been violated—for example, the Y axes are not the same; one is volume adsorbed, the other volume per gram of adsorbent. And Figure 7b is referenced before Figure 7a. Cleaning up these "punctuation level" problems is an important step, but doing so contributes little to the reader's ability to "see."
- The real offence is the lack of visual impact and clarity.

Your objective is to provide this visual impact and clarity. In the next 15 minutes, work with two or three other students.

- Identify the message that ought to be conveyed in Figure 7.
- Devise an improved graphic to better convey this information.

Do not hesitate to edit the paragraph as you adjust the figure. For the purposes of this exercise, assume that the data obtained by the two researchers (Titoff & Homfray) are consistent, so the CO_2 N_2 lines would be the same on both graphs if the Y axes were normalized.

RELATION BETWEEN ADSORPTION AND PHYSICAL CONSTANTS

It is frequently stated as a first approximation that a gas or vapor tends to be adsorbed more readily the easier it is to condense or the higher its boiling point. Some data of Titoff [24] shown graphically in Fig. 7 support the rule, the adsorption increasing with increasing boiling point of the several gases in the order: $NH_3 > CO_2 > N_2 > H_2$. No such regularity is to be found, however, with the series of gases studied by Homfray,[25] data for which are also shown in Fig. 7. Thus the order of adsorption at 0° is: $C_2H_4 > CO_2 > CH_4 > CO > N_2 > Ar$, whereas the order of boiling points is: $CO_2 > C_2H_4 > CH_4 > Ar > CO > N_2$.

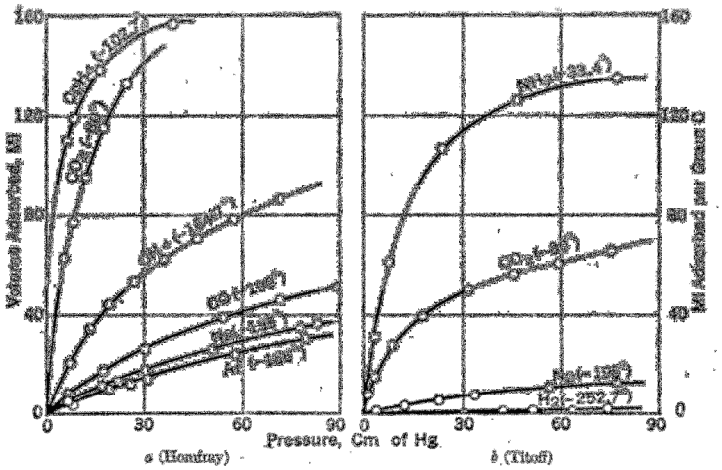

FIG. 7. Adsorption isotherms at 0° for various gases by wood charcoal.

Another form of the relationship between adsorption and condensability of vapors, suggested by Arrhenius,[26] connects adsorption with the constant, a, in the van der Waals equation, and the critical temperature. This is illustrated in Table IX compiled by Arrhenius, for adsorption data of Titoff and Homfray on cocoanut charcoal at a pressure of 10 cm Hg and 0°. The adsorption tends to be greater the higher the a value and the higher the critical temperature; but there are exceptions.

[24] *Z. physik. Chem.*, 74, 641 (1910).
[25] *Z. physik. Chem.*, 74, 129 (1910).
[26] "Theories of Solutions," Yale University Press (1913).

From *Colloid Chemistry,* H.B. Weiser, Wiley & Sons, 1939