generally the method may be used for measuring the surfaces of other catalytic materials.

BUREAU OF CHEMISTRY AND SOILS
U. S. DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.
STEPHEN BRUNAUER
P. H. EMMETT

RECEIVED APRIL 3, 1935

THE DIPOLE MOMENT OF ETHYL BENZOATE

Sir:

Recently Svirbely, Ablard and Warner [THIS JOURNAL, **57,** 652 (1935)] have determined the dipole moments of methyl and ethyl benzoates. They found for solutions of the normal concentrations (0.013 to 0.017) the values 2.01 and 2.14, respectively, using lower concentrations too (down to 0.000669) still higher figures (2.52 and 2.43). Even the former values are decidedly higher than the figures reported before in the literature [Estermann, *Z. physik. Chem.*, **B1,** 134, 424 (1928)] and higher than the values we have obtained in the case of ethyl cinnamate (1.84) and similar compounds, the dipole moments of which will be published shortly elsewhere [*J. Chem. Soc.*, in press (1935)]. We have therefore redetermined the dipole moment of ethyl benzoate in benzene solution (24.6°) and again found the moment to be 1.91. Some of our figures may be quoted (c molar fraction, $\overline{M}$ average molecular weight, ρ density, ϵ dielectric constant, η refractive index, determined on the solution, $P_{1/2}$ and $P_{E1/2}$ total and electronic polarization for the solution, P and P_E the same for the solute, P_0 orientation polarization).

c	0	0.02178	0.03648
$\overline{M}$	78	78.568	80.627
ρ	0.8732	0.8780	0.8813
ϵ	2.2747	2.3866	2.4601
n^2	2.2410	2.2410	2.2410
$P_{1/2}$	26.637	28.646	29.951
$P_{E1/2}$	26.118	26.497	26.750
P	...	118.88	117.48
P_E	...	43.52	43.46
P_0	$- >$	75.36	74.02

$P_0^\infty = 75.5$ cc. $\mu = 1.91\ D$

The dipole moment of methyl benzoate should hardly show any deviation from that value. We may suggest that the method adopted by the above authors is inadequate since they report at the same time for the hydrocarbons limonene and *d*-pinene dipole moments as high as 0.70 and 1.10 (ordinary concentration), 1.50 and 2.67 (using low concentrations too), against the value of about zero to be expected theoretically.

THE DANIEL SIEFF RESEARCH
INSTITUTE, REHOVOTH, PALESTINE
ERNST BERGMANN
ANNA WEIZMANN

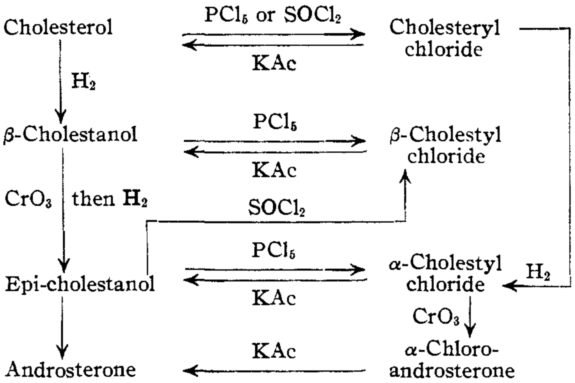
RECEIVED JULY 18, 1935

ANDROSTERONE

Sir:

In the preparation of androsterone in quantity from cholesterol by Ruzicka's method [*Helv. Chim. Acta*, **17,** 1389 (1934)] difficulty is experienced in the conversion of cholesterol into epicholestanol in large amounts. This reaction requires two catalytic reductions and an oxidation, which due to the small solubility of the compounds and the large amount of platinum oxide catalyst necessary is very expensive and time consuming. To overcome this, advantage is taken of the following reactions to produce the epi-form of androsterone and other sterols.

TABLE I



When cholesterol is treated with either phosphorus pentachloride or thionyl chloride, cholesteryl chloride is produced. This on reduction with platinum catalyst gives α-cholestyl chloride. This reduction can be carried out in quantity, fifty grams being reduced completely by 2 g. of catalyst in 500 cc. of ether in fifteen minutes. When beta-cholestanol is treated with phosphorus pentachloride, beta-cholestyl chloride is produced, whereas if treated with thionyl chloride α-cholestyl chloride is the product, one case giving a Walden inversion. The same is true for epicholestanol. This with phosphorus pentachloride gives α-cholestyl chloride and with thionyl chloride gives beta-cholestyl chloride.

If cholesteryl chloride is hydrolyzed with potassium acetate it gives cholesterol, whereas if