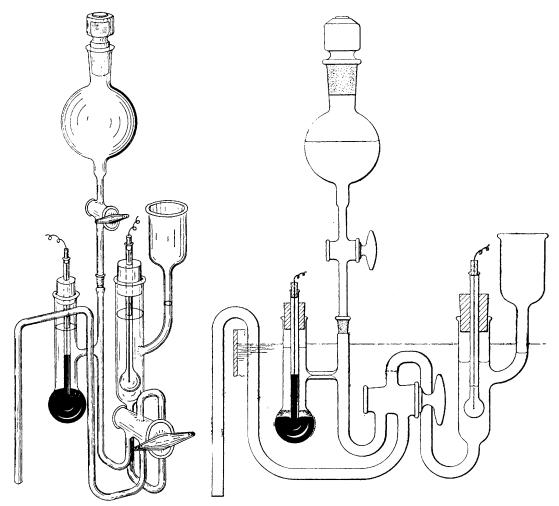
NOTES.

An Improved Glass Electrode Cell Assembly. By G. E. COATES.

The apparatus shown in the figure has been designed for the measurement of pH to \pm 0.01 unit with the minimum trouble. Numerous glass electrode cells have been devised but most of them have disadvantages in that unsatisfactory liquid junctions are formed and they are frequently difficult to use in a thermostat. Dole ("The Glass Electrode," Wiley, 1941, pp. 111—113), in a detailed discussion of liquid junctions, recommends "that wherever and whenever possible, the liquid junction be formed in a definite, cylindrically symmetrical way," and points out that fluctuations in liquid-junction potentials of this type would be less than 0.01 pH unit. Junctions formed in ground joints are particularly criticised. For accurate pH measurement, temperature control is essential, but it is very inconvenient, particularly when many determinations are to be made, to remove the cell from the thermostat repeatedly for cleaning and refilling. The apparatus to be described involves a cylindrically symmetrical liquid junction and can be cleaned and refilled rapidly and without being taken out of the thermostat; it has proved extremely convenient and reliable over a long period of use.



As shown in the figure, the glass electrode half-cell is provided with a filling side tube and may be connected by a three-way tap, either to the calomel electrode, or to the outlet siphon which leads over the side of the thermostat. The calomel electrode and the electrolyte reservoir are filled with 3.5m-potassium chloride. The bore of the three-way tap is about equal to that of the tubes to which it is joined. The operating method is as follows: 0.05m-potassium hydrogen phthalate solution (pH 4.00) is poured into the glass electrode half-cell until the liquid level in the side tube is higher than the top of the siphon; the cell is then connected with the latter and flushed out with this buffer solution, and finally the cell is filled to about the level shown in the figure and allowed to reach thermostat temperature. The calomel part, filled with 3.5m-potassium chloride (the tap below the reservoir closed), is put into communication with the glass electrode part by means of the three-way tap. The reservoir tap is then opened, and a sharply defined liquid junction is seen to rise slowly in the short vertical limb above the three-way tap. The reservoir tap is closed when the liquid junction is about 1 cm. above the three-way tap (broken line in figure) and the potential of the cell is measured (or the pH meter standard-ised). The three-way tap is then turned through 180°, and the glass electrode part flushed with water and refilled with the solution the pH of which is to be measured: the remaining operations follow the procedure described above.

The inset shows the compact arrangement of the cell as actually constructed. It is recommended that a.c. apparatus connected with the thermostat (e.g., stirrer and thermoregulator) should be disconnected during the few seconds required

for the potential measurements; with this precaution water may be used as thermostat liquid. The three-way tap should be of good quality and lubricated with a good grease such as Apiezon L or N (the latter for use at 25°).

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Some Derivatives of Eugenol and cis- and trans-iso Eugenol. By T. F. West.

The probable structure of the pyrethrolone side chain and the insecticidal properties reported for allyl phenols (Harvil and Arthur, Contr. Boyce Thompson Inst. 1943, 13, 79) led to an examination of the toxicity to house flies of solutions of corresponding derivatives of eugenol and isoeugenol (West, Nature, 1944, 154, 488). Ethers of cis-isoeugenol possessed a toxicity comparable with that of the corresponding eugenol derivatives whereas the trans-forms were noticeably less toxic. The cis-derivatives are more soluble in organic solvents than the trans-compounds and it seems possible that their greater toxicity may be due to their greater lipoid solubility permitting more effective penetration across that insect epicuticle (Läuger, Müller, and Martin, Helv. Chim. Acta, 1944, 27, 892). On the other hand, certain of the transforms of the isoeugenol ethers display a more lasting repellent action, and a comparison of the repellent properties of these compounds against Aëdes aegypti will be reported by Sir R. Christophers, F.R.S., in another place.

The constants of the new compounds prepared are given below. The O-alkyl derivatives were prepared by the usual method from the appropriate alkyl halide and the potassium salt of the phenol in aqueous alcohol or water (West, J. Soc. Chem. Ind., 1940, **59**, 275). The phenolic ether was extracted with light petroleum and purified by distillation or crystallisation. The trans-isoeugenol used was regenerated from the trans-acetate (m. p. 79°) and had m. p. 32—34°, b. p. 99—100°/0·5 mm., $n_D^{20^\circ}$ 1·5782; benzoate, m. p. 104—105° (Found: OMe, 11·1. Calc. for $C_{17}H_{16}O_3$: OMe, 11·6%). The cis-isoeugenol was regenerated from technical non-crystalline cis-acetate (Junge, Chem. Abstr., 1933, 27, 4530) and had b. p. 80—81°/0·5 mm., $n_D^{20^\bullet}$ 1·5686; benzoate, m. p. 65—66° (cf. Boedecker and Volk, Ber., 1931, 64, 61; Junge, loc. cit.) (Found: OMe, 11·2%). The m. p. was depressed to 47° (indef.) on admixture with eugenol benzoate, m. p. 68—70°.

				Foun	Found, %.	
O-Alkyl deriv.	М. р.	B. p./1—2 mm.	$n_{\rm D}^{20}$.	C.	H.	
Allyleugenol		$142 143^{\circ}$	1.5345	$76 \cdot 1$	8.6] 1	
Allyl-cis-isoeugenol		124 - 126	1.5553	77.0	8.6	
Allyl-trans-isoeugenol		130132	1.5670	$75 \cdot 6$	8.0)	
n-Propyl-cis-isoeugenol		117—118	1.5440	$75 \cdot 5$	8.6_²	
n-Propyl-trans-isoeugenol	50—51°	122 - 124		$76 \cdot 1$	8⋅8∫	
isoPropyl-cis-isoeugenol		112-113	1.5424	74.8	8.8) 2	
iso <i>Propyl</i> -trans-isoeugenol		117—118	1.5485	74.9	8.9∫	
n-Butyl-cis-isoeugenol		125126	1.5373	76.0	9.01^{-3}	
n-Butyl-trans-isoeugenol	26-28	130131		$76 \cdot 1$	8.9}	
n-Amyl-cis-isoeugenol		135140	1.5336	$77 \cdot 1$	9.77 4	
n-Amyl-trans-isoeugenol		152 - 155	1.5404	76.5	9∙0∫	
Glycoleugenol	3334	146147	1.5435	$69 \cdot 1$	7.7) 5	
Glycol-cis-isoeugenol		161 - 163	1.5654	$69 \cdot 3$	7.8	
Glycol-trans-isoeugenol	9192	_		$69 \cdot 6$	7⋅5∫	

Benzyl-cis-isoeugenol had m. p. $32-34^\circ$ (Found: OMe, $12\cdot2$. $C_{17}H_{18}O_2$ requires OMe, $12\cdot2\%$). Benzyl-trans-isoeugenol had m. p. $59-60^\circ$ after repeated recrystallisation from ethyl alcohol (Found: OMe, $11\cdot9\%$). Benzyleugenol had m. p. $30-31^\circ$ after recrystallisation from methyl alcohol (Found: OMe, $12\cdot0\%$); mixed with cis-benzylisoeugenol, the m. p. was $27-30^\circ$ (indef.). By the action of thionyl chloride, eugenol glycol ether gave the ω -chloro-compound, b. p. $137-142^\circ/2$ mm., $n_2^{20^\circ}$ 1-5410 (Found: Cl, $15\cdot8$. $C_{12}H_{15}O_2$ Cl requires Cl, $15\cdot7\%$). It was not possible to prepare corresponding derivatives from cis- and trans-isoeugenol with the found chloride under various conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivatives from cis- and trans-isoeugenol with the formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and Poblingor L $1041\cdot715$) by the derivative formulation of the conditions (cf. Hudson and $1000\cdot1000$) and $1000\cdot10000$ for the conditions (cf. Hudson and $1000\cdot10000$). and Robinson, J., 1941, 715), but the *trans*-isomer gave a low yield of a crystalline product, m. p. 99—100° after recrystallisation from light petroleum (Found: Cl, 24.5%), which was not identified.

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