Properties	(a) (Pr ₃ P) ₂ Pt ₂ Cl ₂ (SCN) ₂		(b) (Pr ₃ P) ₂ Pt ₂ Cl ₂ (SEt) ₂	
	α	β	α	β
Melting point °C.	144-152	173-174.5	125.5-127	156.5-157.5
Colour	yellow	pale yellow	yellow	v. pale yellow
Stability	labile	stable	stable	stable
Dipole moment (Debye units)	1.57	1.36	10.35	~0
Probable structures	IV	V	VIII	Corresponding to V

Dipole moments were calculated assuming $P_A = 18$ per cent P_Z ⁸

the stable β -isomer structure (V). The moment of 1.36 D. observed for (V) suggests that this isomer exists in solution as an equilibrium mixture of *cis*- and *trans*-(V). This conclusion is uncertain, however, because (Pr₃P)₂Pt₂Cl₄, which is known to have a symmetrical structure in the solid state⁵, has a moment of 1.6 D. in benzene solution (cf. the moments of the corresponding palladium compounds³).

(b) Evidence similar to that adduced for the position of the SEt in the similar palladium compounds⁶ shows that the SEt group must be in the bridge in both isomers. The α -isomer of zero moment must be the symmetrical type (I) isomer, corresponding to (V). A moment of about 10 D. would be expected for the type (II) complexes. The structure of the β -isomer must therefore be (VIII), in which the Et groups are probably in *trans* configuration about the Pt₂S₂ ring.

Full details of this isomerism will be published elsewhere.

J. CHATT
F. A. HART

Butterwick Research Laboratories,
Imperial Chemical Industries, Ltd.,
"The Frythe",
Welwyn, Herts.
Nov. 30.

¹ "Anorganische Chemie", 56, 170.

² Chatt and Mann, *J. Chem. Soc.*, 1622 (1939).

³ Mann and Purdie, *J. Chem. Soc.*, 873 (1936).

⁴ Mann and Wells, *J. Chem. Soc.*, 702 (1938). Wells, *Proc. Roy. Soc., A*, 167, 169 (1938).

⁵ Chatt, *J. Chem. Soc.*, 652 (1951).

⁶ Chatt and Mann, *J. Chem. Soc.*, 1949 (1938).

⁷ *J. Chem. Soc.*, 1668 (1930).

⁸ Jensen, *Z. anorg. Chem.*, 229, 225 (1936).

Minimum Infiltration-Rates to Underground of Rain water in South Africa

In a previous communication I have discussed the importance of the determination of the infiltration-rate to underground of rain-water. I also indicated the difficulties to be overcome in the determination of this element of hydrology¹.

Using the du Toit method, I have now calculated the minimum infiltration-rates of the average annual rainfall, to underground, for certain catchment areas (Table 1). The values are of the same order (11 per cent) as those quoted by du Toit for the dolomite near Johannesburg².

The first four catchment areas of Table 1 are all in the Transvaal; they have a summer rainfall and are in rolling dolomite country. The dolomite is highly cavernous, and in many places small under-

Table 1

Catchment area	Average annual rainfall (in.)	Pumpage (acre-feet per square mile per annum)	Proportion of total average annual precipitation (%)
Olifantsfontein	25	88	6.5
Olifantsfontein	25	111	8.2
Zuurbekom	27	59	4.0
Maloney's Eye	26	140	10.0
Halseton	26	28	2.4

ground lakes can be mapped, notably at Sterkfontein, the site of many prehistoric human or humanoid remains. The Halseton catchment is in very rocky dolerite mountainous country, with rains rather late in the summer.

Detailed mapping and geophysical field work has been carried out in each of these areas, and the pumpage or spring flow is fairly accurately known. From various results it is known that not all the underground water is recovered, and hence it is considered that these figures are to be regarded as a minimum value, rather than as an average.

It is interesting to note that rather higher values have been obtained in the United Kingdom, using the same method of calculation³.

In the United States the values are rather nearer the United Kingdom values than those of the Union of South Africa⁴. It is probable, therefore, that the extraction in our not completely developed water schemes is only a fraction of the total underground flow. Using data from various sources, I have calculated the water balances for the Okavango Delta and Linyanti Swamps (Table 2).

Table 2. WATER BALANCES OF OKAVANGO DELTA AND LINYANTI SWAMPS
(All quantities in acre-feet per annum)

Element	Okavango Delta (swamps only)	Okavango Delta plus Lake Ngami	Linyanti Swamps
Total river flow	10,000,000	10,000,000	3,000,000
Precipitation at 18 in. per annum over evaporation area	4,400,000	4,800,000	520,000
	14,400,000	14,800,000	3,520,000
Net evaporation at 60 in. per annum	14,800,000	15,000,000	1,735,000
Infiltration to underground	Nil	Nil	1,785,000

Both the evaporation areas are closed drainages, and hence can be considered as gigantic lysimeters. MacKenzie calculates the total evaporation loss in the Okavango Delta at 72 in. per annum over 3,000 square miles, giving a total of 11,448,000 acre-feet per annum⁵. This would mean an infiltration-rate to underground of 2,952,000 acre-feet, or about 20 per cent of the total annual water in the swamps. MacKenzie considers that the entire flow of the Linyanti is dissipated by evaporation.

V. L. BOSAZZA

Petrologgia,
39 Barkly Road,
Parktown,
Johannesburg.
Nov. 11.

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² du Toit, A. L., "Geology of South Africa", 486 (1939).

³ *J. Inst. Water Eng.*, 2, 97 (1948).

⁴ *Trans. Amer. Soc. Civ. Eng.*, 2, 97 (1948).

⁵ Report Kalahari Expedition, 1945 (Irrigation Dept., Union of South Africa).