TABLE 1

R_F VALUES OF INORGANIC ANIONS

(I. I. M. ELBEIH AND M. A. ABOU-ELNAGA, *Anal. Chim. Acta*, 23 (1960) 30)

Solvent: Ethanol–pyridine–water–conc. ammonia (60:20:16:4).

Anion	R_F	*Anion*	R_F
Fluoride	0.01	Carbonate	0.10
Ferrocyanide	0.01	Iodate	0.10
Arsenate	0.03	Arsenite	0.12
Chromate	0.03	Sulphite	0.20
Dichromate	0.03	Bromate	0.41
Sulphide	0.03	Nitrite	0.43
Phosphate	0.03	Chloride	0.45
Cyanide	0.06	Bromide	0.50
Sulphate	0.07	Nitrate	0.56
Ferricyanide	0.08	Chlorate	0.60
Borate	0.09	Iodide	0.61
Thiosulphate	0.09	Thiocyanate	0.66

TABLE 2

R_F VALUES (RELATIVE) OF 2-(4-AMINO-4-CARBOXYBUTYL)-THIAZOLE-4-CARBOXYLIC ACID

(J. D'A. JEFFERY, E. P. ABRAHAM AND G. G. F. NEWTON, *Biochem. J.*, 75 (1960) 216)

Solvents: S_1 = Butan-1-ol–acetic acid–water (4:1:4, by vol.).
S_2 = 80% (w/w) phenol in an atmosphere saturated with 50% (v/v) acetic acid.
S_3 = Butan-1-ol saturated with aqueous 0.1 *N* HCl.
S_4 = Butan-2-ol saturated with 3% aqueous NH_3.
S_5 = Propan-1-ol–water (7:3, v/v).

Paper: Whatman No. 1.

Detection: Ninhydrin.

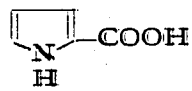
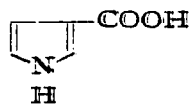
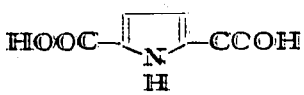
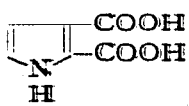
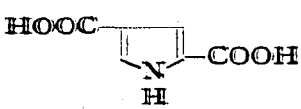
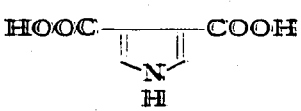
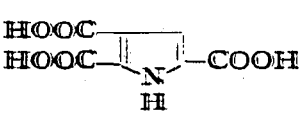
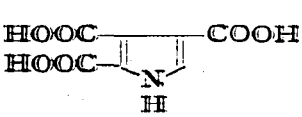
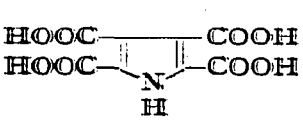
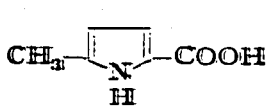
Compound	R_{Gly}*					
	S_1	S_2	S_3	S_4	S_5	
2-(4-Amino-4-carboxybutyl)-thiazole-4-carboxylic acid	1.76	1.37	3.5	0.56	2.12**	0.73***

* $R_{Gly} = R_F$ relative to that of glycine.
** Applied in *N* HCl.
*** Applied in aq. 3% (w/v) NH_3.

TABLE 3

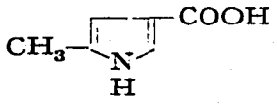
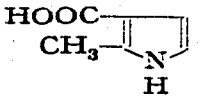
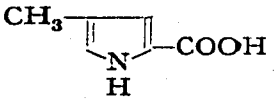
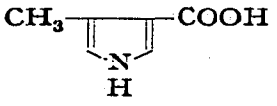
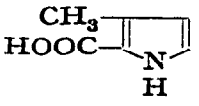
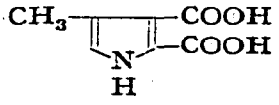
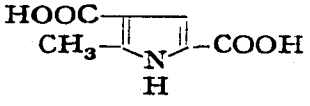
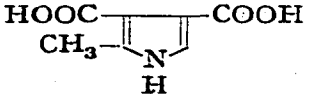
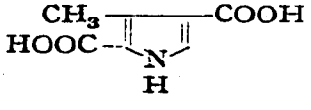
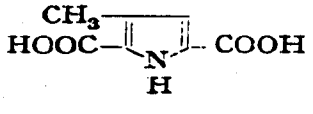
R_F VALUES OF SOME PYRROLIC ACIDS

(R. A. NICOLAUS, *Rass. med. sper.*, 7 (1960) suppl. No. 2)

Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (10:10:1:4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1:5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
	0.12		0.65	0.89	
	0.04	0.29	0.60	0.80	0.48
	0.00		0.47	0.79	
	0.17		0.72	0.43	
	0.00	0.07	0.35	0.72	0.23
	0.11	0.44	0.67	0.52	0.58
	0.00	0.46	0.54	0.36	0.29
	0.00		0.12	0.40	
	0.00	0.02	0.15	0.49	0.06
	0.18		0.64	0.86	

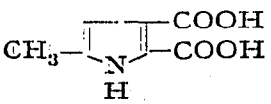
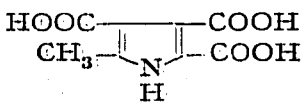
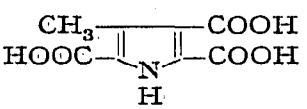
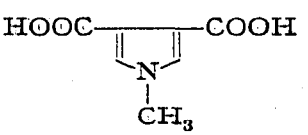
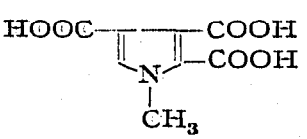
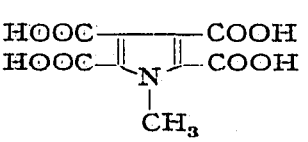
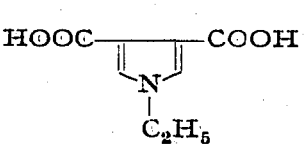
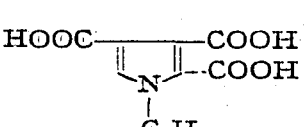
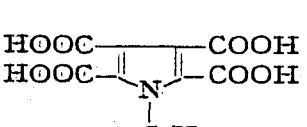
(Continued on p. D3)

TABLE 3 (*continued*)

Pyrrolic acid	R_F				
	1-Butanol–2N-NH_4OH (1:1)	*1-Butanol–ethanol–33% NH_3–H_2O (40:10:11:4)*	*2-Ethanol–33% NH_3–H_2O (80:4:16)*	*1-Butanol–acetic acid–H_2O (4:1:5)*	*1-Propanol–33% NH_3–H_2O (60:30:10)*
	0.09	0.11	0.56	0.84	0.56
	0.08	0.39	0.57	0.85	0.58
	0.18	0.55	0.65	0.85	0.72
	0.08	0.40	0.59	0.84	0.69
	0.19		0.64	0.68	
	0.24	0.60	0.71	0.57	0.40
	0.00	0.01	0.37	0.78	0.30
	0.15	0.52	0.67	0.71	0.69
	0.00		0.33	0.79	
	0.00	0.18	0.44	0.81	0.44

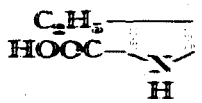
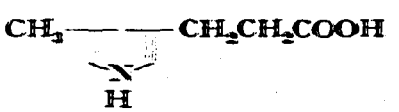
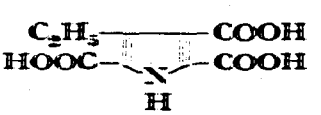
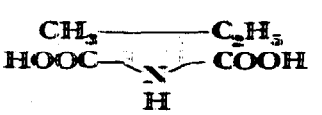
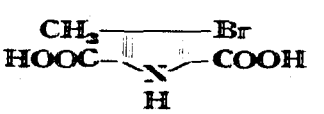
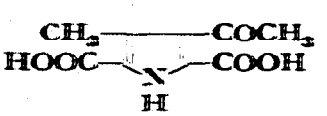
(Continued on p. D34)

TABLE 3 (*continued*)

Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (10:10:1:4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1:5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
	0.00	0.59	0.37	0.78	0.75
	0.00	0.04	0.23	0.34	0.14
	0.00	0.15	0.46	0.30	0.24
	0.12	0.46	0.63	0.50	0.66
	0.00	0.06	0.16	0.44	0.15
	0.00	0.01	0.05	0.15	0.08
	0.22	0.59	0.70	0.64	0.75
	0.00	0.13	0.28	0.54	0.25
	0.00	0.02	0.09	0.23	0.10

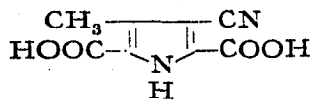
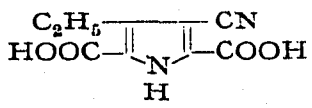
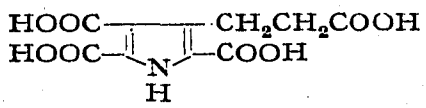
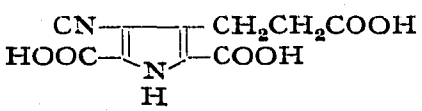
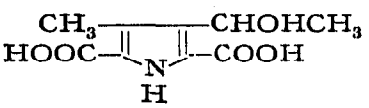
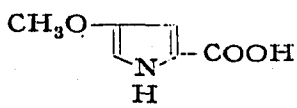
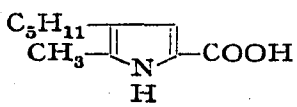
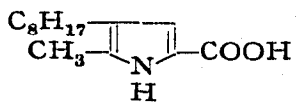
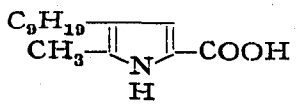
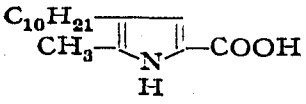
(Continued on p. D5)

TABLE 3 (*continued*)

Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (10:10:1:4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1:5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
		0.69	0.72	0.91	
		0.15	0.39	0.88	
		0.29	0.48	0.87	0.56
	0.00	0.05	0.28	0.86	0.67
			0.73		
	0.00	0.24	0.51	0.54	
	0.05	0.49	0.59	0.94	0.28
	0.02	0.29	0.44	0.84	
	0.02	0.28	0.46	0.79	0.57
	0.00	0.01	0.06	0.58	0.19

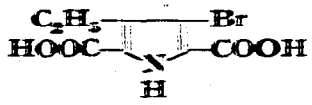
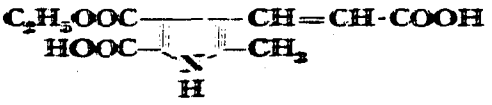
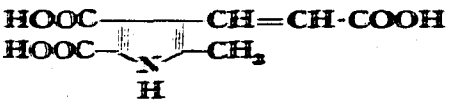
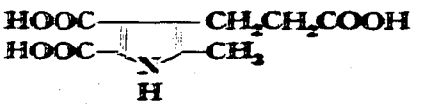
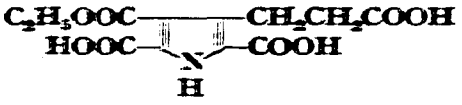
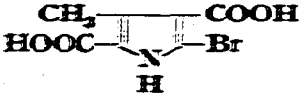
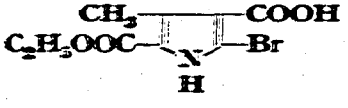
(Continued on p. D6)

TABLE 3 (*continued*)

Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (10:10:1:4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1.5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
	0.01	0.26	0.53	0.74	0.58
	0.05	0.32	0.54	0.82	0.67
	0.04	0.03	0.24	0.46	0.13
	0.00	0.06	0.46	0.70	0.33
		0.35	0.49	0.81	
			0.46	0.70	
	0.50		0.84	0.94	
	0.67	0.82	0.85	0.96	0.92
	0.72	0.83	0.86	0.96	0.92
	0.73	0.82	0.86	0.96	0.92

(Continued on p. D7)

TABLE 3 (*continued*)

Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (100:100:11.4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1:5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
	0.03	0.40	0.55	0.88	0.71
	0.36	0.68	0.82	0.90	0.80
	0.00	0.20	0.54	0.81	0.55
			0.27	0.44	
	0.00	0.23	0.52	0.91	0.55
	0.00	0.41	0.51	0.63	0.44
	0.05	0.20	0.70	0.90	0.74
	0.00	0.09	0.36	0.83	0.36
	0.00	0.11	0.28	0.88	0.35
	0.49	0.65	0.75	0.93	0.82

(*Continued on p. D8*)

TABLE 3 (*continued*)

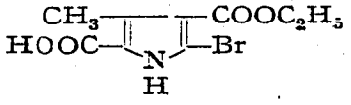
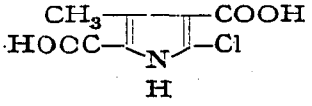
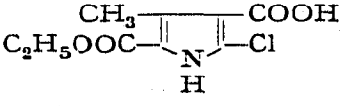
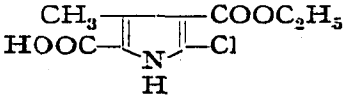
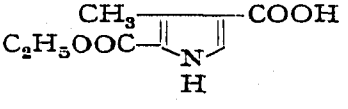
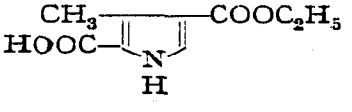
Pyrrolic acid	R_F				
	Butanol–2N NH_4OH (1:1)	*Butanol–ethanol–33% NH_3–H_2O (10:10:7:4)*	*Ethanol–33% NH_3–H_2O (80:4:16)*	*Butanol–acetic acid–H_2O (4:1:5)*	*Propanol–33% NH_3–H_2O (60:30:10)*
	0.65	0.72	0.76	0.93	0.87
	0.00			0.89	
	0.47	0.68	0.76	0.94	0.82
	0.60	0.74	0.76	0.94	0.87
	0.35			0.92	
	0.47	0.69	0.72	0.92	0.85

TABLE 4

R_F VALUES OF 2,4-DINITROPHENYLHYDRAZONES OF AROMATIC KETONES

(E. BREUER, H. LEADER AND S. SAREL, *Bull. Research Council Israel*, 9A (1960) 43)

Paper: Whatman No. 1 impregnated with a 25% solution of N,N-dimethylformamide in 96% ethanol.
Solvent: Cyclohexane–carbon tetrachloride–dimethylformamide (20:4:1).
Temperature: 25°.

2,4-Dinitrophenylhydrazone of:	R_F	*2,4-Dinitrophenylhydrazone of:*	R_F
Isobutyrophenone	0.90	1-Acetylnaphthalene	0.53
Butyrophenone	0.86	2-Acetylnaphthalene	0.52
Benzophenone	0.80	Propionaldehyde	0.70
Propiophenone	0.75	Benzaldehyde	0.35
Cyclopropyl phenyl ketone	0.75	Formaldehyde	0.30
Acetophenone	0.58	2,4-Dinitrophenylhydrazine	0

TABLE 5

R_F VALUES OF SOME FATTY AND HYDROXY-FATTY ACIDS

(W. P. SKIPSKI, S. M. ARFIN AND M. M. RAPPORT, *Arch. Biochem. Biophys.*, 87 (1960) 259)

Solvents: S_1 = 95% acetic acid.
S_2 = 65% acetic acid.

Paper: Whatman No. 1 (ascending); washed with 95% acetic acid or glacial acetic acid – 30% H_2O_2 (9:1), depending on the solvent system, then with distilled water.

Temperature of run: 40° (reduce gradually to 35° after 8–10 cm to prevent drying out of front).

Length of run: 17–25 cm.

Time of run: 7–10 h (at elevated temperatures); 15–23 h (at room temperature).

Impregnation: Paraffin oil in benzene; 12 %(?) (for S_1); 11 %(?) (for S_2).

Detection: Carried out at 60–70°. Distilled water wash (three times; 5 min each); submerged in saturated aqueous bismuth subnitrate solution (30 min); distilled water wash (twice; 5 min each); submerged in 0.01 % ammonium sulphide (10 min); rinsed in distilled water (modified from ALIMOVA AND BOLGOVA (1957)). Sensitivity 0.5 μg palmitic acid (for all fatty acids). 1 %, I_2 in $CHCl_3$ followed by 0.5 % starch solution (for unsaturated fatty acids).

Fatty acid	R_F S_1	*S.D.**	R_F S_2	*S.D.**
Myristic	0.80	0.04		
Palmitic	0.72	0.05		
Stearic	0.59	0.05		
Arachidic	0.44	0.05		
Behenic	0.31	0.05		
Lignoceric	0.21	0.04		
Oleic	0.72	0.05		
2-Hydroxymyristic	0.94	0.02	0.89	0.04
2-Hydroxypalmitic	0.93	0.02	0.82	0.04
2-Hydroxystearic	0.93	0.02	0.64	0.04
2-Hydroxylignoceric (cerebronic)	0.92	0.02	0.00	—

* S.D. = Standard deviation.

TABLE 6

R_F VALUES OF SOME HIGHER FATTY ACID METHYL ESTERS

(B. P. SMIRNOV, V. A. POPOVA AND R. A. NISKANEN, *Biokhimiya*, 25 (1960) 368)

Solvent: Acetic acid–acetone (3:1).

Paper: Slow type filter paper (Volodarsky Factory, Leningrad).

Impregnation: 5% petroleum jelly in CCl_4 (to give 8–12 % by weight in paper).

Time of run: Up to 36 h.

Detection: By autoradiography (as $R{\cdot}COO^{14}CH_3$) with Agfa-Röntgen-Duro film.

Acid	R_F
Lignoceric	0.03–0.08
Behenic	0.08–0.18
Arachidonic	0.19
Stearic	0.35
Palmitic	0.48–0.47
Oleic	0.57–0.57
Linoleic	0.65–0.67

TABLE 7

R_F VALUES OF SOME AMINO ACIDS

(R. Y. SHKOL'NIK AND N. G. DOMAN, *Biokhimiya*, 25 (1960) 276)

Solvent: S_1 = Propanol–0.88 ammonia–0.5% Trilon B soln. (60:30:10, by vol.) (LOUGHMAN AND MARTIN, 1957).
Paper: Leningrad Chromatography Paper No. 2.
Length of run: 24 cm.
Detection: Not given.

Amino acid	R_F
Aspartic acid	0.34
Asparagine	0.37
Glutamic acid	0.41
Arginine	0.47
Histidine	0.54
Glycine	0.55
Lysine	0.55
Tyrosine	0.60
Alanine	0.60
Methionine	0.76
Tryptophan	0.85
Phenylalanine	0.88
Leucine	0.90

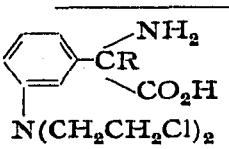
TABLE 8

R_F VALUES OF SOME CHLOROETHYLAMINOARYL-SUBSTITUTED AMINO ACIDS

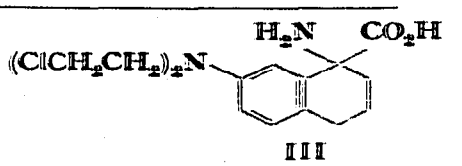
(T. A. CONNORS AND W. C. J. ROSS, *Chem. & Ind. (London)*, (1960) 492)

Solvents: S_1 = *n*-Butanol–ethanol–propionic acid–water (10:5:2:5).
S_2 = *n*-Butanol saturated with water.
Paper: Whatman No. 1.
Detection: Not given.

Compound	R_F	
	S_1	S_2
I	0.74	
II	0.80	
p-Di-(2-chloroethyl)-amino-DL-phenylalanine	0.73	0.51
III	0.82	
o-Di-(2-chloroethyl)-amino-DL-phenylalanine	0.79	0.64



I: R = H
II: R = Me



III

TABLE 9

R_F VALUES OF SOME SUGARS AND RELATED COMPOUNDS

(R. Y. SHKOL'NIK AND N. G. DOMAN, *Biokhimiya*, 25 (1960) 276)

Solvent: Propanol–0.88 ammonia–0.5% Trilon B soln. (60:30:10, by vol.) (LOUGHMAN AND MARTIN, 1957).
Paper: Leningrad Chromatography Paper No. 2 (ascending).
Length of run: 24 cm.
Detection: Not given.

Compound	R_F	*Compound*	R_F
Raffinose	0.35	Fructose	0.55
Maltose	0.43	Galactose	0.56
Sucrose	0.50	Ribose	0.58
Lactose	0.50	Phosphopyruvic acid	0.11
Glucose	0.52	Glucose-1-phosphate	0.13
Sedoheptulose	0.54	Sodium glycerophosphate	0.16

TABLE 10

R_F VALUES (RELATIVE) OF SOME NUCLEOTIDES, CONSTITUENT SUGARS AND RELATED SUGAR PHOSPHATES

(H. G. PONTIS, A. L. JAMES AND J. BADDILEY, *Biochem. J.*, 75 (1960) 428)

Solvents: S_1 = Ethanol–ammonium acetate (pH 7.5) (PALADINI AND LELOIR, 1952).
S_2 = Ethanol–ammonium acetate (pH 3.8) (PALADINI AND LELOIR, 1952).
S_3 = Ammonium sulphate–propan-2-ol–sodium acetate (MARKHAM AND SMITH, 1951).
S_4 = Butanol–pyridine–water (3:2:1.5).
S_5 = Phenol–water (PARTRIDGE, 1948).
Paper: Whatman No. 1.
Detection: U.V. light (Hanovia lamp); alkaline silver reagent; benzidine–trichloroacetic acid; molybdate reagent.

Compound	*R Adenosine**				
	S_1	S_2	S_3	S_4	S_5
Guanosine diphosphate mannose	0.13	0.11	3.47	—	—
Uridine diphosphate glucose	0.27	0.27	4.46	—	—
Uridine diphosphate N-acetyl-glucosamine	0.39	0.36	3.94	—	—
Guanosine diphosphate	0.03	0.05	3.42	—	—
Guanosine-5′-phosphate	0.10	0.32	3.20	—	—
Guanosine-3′-phosphate	0.12	0.41	2.54	—	—
Galactose	—	—	—	0.62	0.54
Glucose	—	—	—	0.70	0.48
Fructose	—	—	—	0.79	0.82
Mannose	—	—	—	0.83	0.61
Acetylglucosamine	—	—	—	0.96	1.34
Glucose-1-phosphate	—	0.60	—	—	—
Glucose-6-phosphate	—	0.62	—	—	—
Fructose-1-phosphate	—	0.68	—	—	—
Fructose-6-phosphate	—	0.73	—	—	—
Fructose-1,6-diphosphate	—	0.29	—	—	—
Sucrose phosphate**	—	0.54	—	—	—

* *R* Adenosine = R_F of substance/R_F adenosine.
** From data of LELOIR AND CARDINI (1955).

TABLE 11

R_F VALUES (RELATIVE) OF SOME MONOSACCHARIDE SULPHATE ESTERS

(A. G. LLOYD, *Biochem. J.*, 75 (1960) 478)

Solvent: S_1 = Butan-1-ol–acetic acid–water (50:12:25, by vol.).
Paper: Whatman No. 3 MM (descending).
Time of run: 48 h.
Temperature of run: 20°.
Detection: Silver nitrate (sugars); aniline hydrogen phthalate (sugars); Elson-Morgan reagent (hexosamines); 10% perchloric acid in ethanol, 5 min at 80–85° (moist atmosphere), $BaCl_2$ solution–sodium rhodizonate (sulphuric acid esters).

Compound	R_G*		
	Parent compound	*Ester sulphates*	
		Di-	*Mono-*
Glucose sulphate	1.0	0.66	0.42
Galactose sulphate	0.95	0.59	0.42
N-Acetylglucosamine sulphate	1.25	0.76	0.54
N-Acetylgalactosamine sulphate	1.15	0.71	0.51

* R_G = R_F of compound/R_F glucose.

TABLE 12

R_F VALUES OF SOME FLAVANONE GLYCOSIDES AND RELATED COMPOUNDS

(W. J. DUNLAP AND S. H. WENDER, *Arch. Biochem. Biophys.*, 87 (1960) 228)

Solvents: S_1 = *n*-Butanol–acetic acid–water (6:1:2).
S_2 = 15% acetic acid.
S_3 = Distilled water.
S_4 = 60% acetic acid.
S_5 = Nitromethane–benzene–water (2:3:5).
Paper: Whatman No. 1 (descending).
Detection: U.V. light.

Compound	R_F				
	S_1	S_2	S_3	S_4	S_5
Isosakuranetin-7-rhamnoglucoside	0.59	0.79	0.51		
Isosakuranetin	0.94			0.83	0.97
Naringin	0.52	0.80	0.63		
Naringenin	0.93			0.76	0.82
Hesperidin	0.45	0.75	0.50		
Hesperetin	0.92		0.78		0.92

TABLE 13

R_F VALUES OF SALICYLIC ACID AND SOME OF ITS METABOLITES

(D. HOSTYNOVÁ, P. PROVAĆ, R. DZURÍC AND T. R. NIEDERLAND, *Farmácia*, 28 (1959) 145)

Solvent: *n*-Butanol–acetic acid–water (40:4:56):0.2 % NH_3 atmosphere.
Paper: P_1 = Schleicher & Schüll 2043b; P_2 = Whatman No. 1.
Time of run: P_1:12–15 h; P_2:6–7 h.
Direction: Ascending.
Temperature of run: 14–18°.
Detection: U.V. light, diazotized sulphanilic acid, 0.2 % $FeCl_3$ solution, diazotized *p*-nitraniline.

Compound	R_F	
	P_1	P_2
Salicylic acid	0.78	0.75
Salicyluric acid	0.66	0.63
Gentisic acid	0.55	0.52
Salicylamide	0.86	0.85

TABLE 14

R_F VALUES OF SOME POSSIBLE METABOLITES OF CHLOROBENZENE

(T. GESSNER AND J. N. SMITH, *Biochem. J.*, 75 (1960) 172)

Solvents: S_1 = Hexane–isopropyl ether (10:1, v/v).
S_2 = Hexane.
S_3 = Butan-1-ol–acetic acid–water (4:1:5, by vol.).
S_4 = Butan-1-ol saturated with water.
S_5 = Benzene–acetic acid–water (1:1:2, by vol.).
S_6 = Pyridine–benzene–acetic acid–water (3:1:5:3, by vol.).
S_7 = Butan-1-ol–benzene–acetic acid–water (1:1:1:5, by vol.).
S_8 = Hexane–isopropyl ether (5:1, v/v).
Paper: Whatman No. 4 (descending).
Impregnation: For S_1, with 0.2 *N* Na_2CO_3; for S_2, 20 % (v/v) formamide in methanol; for S_8, 20 % glycerol in methanol.
Times of run: 1.5 h (S_1, S_2, S_8); 3 h (S_5); 7 h (S_3, S_4, S_6, S_7).
Detection: 0.01 % ethanolic dichloroquinonechloroimide, then satd. aq. $NaHCO_3$ spray; 0.1 *N* $AgNO_3$ with 1 % (v/v) aq. NH_3 (sp. gr. 0.88) (these first two for phenols); 1:5 (v/v) *Helix pomatia* gastric juice, followed by first reagent after 5 min (for phenolic glucosides); 0.1 *N* HCl spray, then heating (50–60° for 10 min) followed by first reagent (for ethereal sulphates); 0.1 % ninhydrin in butan-1-ol (10 min at 100°); U.V. fluorescence quenching; $Ag_2Cr_2O_7$ reagent. (Last three for the chlorophenyl derivatives.)

Compound	R_F							
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8
o-Chlorophenol	0.3	0.5	1.0	0.9	0.8	1.0	1.0	0.9
m-Chlorophenol	0.5	0.7	1.0	0.9	0.8	1.0	1.0	0.9
p-Chlorophenol	0.6	0.6	1.0	0.9	0.8	1.0	1.0	0.9
o,*m* or *p*-Chlorophenyl glucoside	0	—	0.8	0.8	0	0.8	0.6	—
o,*m* or *p*-Chlorophenyl sulphate	0	—	0.6	0.4	0	0.6	0.2	—
o,*m* or *p*-Chlorophenylcysteine	0	—	0.7	0.6	0	0.6	0.5	—
o,*m* or *p*-Chlorophenylmercapturic acid	—	—	0.9	0.5	0.7	0.6	1.0	—
4-Chlorocatechol	0	0.1	1.0	—	0.3	0.9	1.0	0.2
4-Chlororesorcinol	0	—	0.9	—	0.2	0.9	0.9	—
2-Chlororesorcinol	0	—	0.9	—	0.25	0.9	—	0.03
2-Chloroquinol	0	—	0.9	—	0.2	0.9	0.9	0.03
Phenol	0.4	0.3	—	—	0.9	—	—	0.06

TABLE 15

R_F VALUES OF BUTYLATED HYDROXYANISOLE ISOMERS AND THEIR METABOLITES

(B. D. ASTILL, D. W. FASSETT AND R. L. ROUDABUSH, *Biochem. J.*, 75 (1960) 543)

Solvents: S_1 = Butanol–acetic acid–water (4:1:5, by vol.), organic layer of fresh mixture.
S_2 = Benzene–acetic acid–water (2:2:1, by vol.), organic phase.
S_3 = Butanol–formic acid–light petroleum b.p. 66–75° (1:10:10, by vol.). (1) After 10–15 cm development. (2) After 35–40 cm development.
Paper: Whatman No. 1 (descending).
Detection: D_1 = aq. 1 % (w/v) $AgNO_3$–aq. 3 *N* NH_3 soln. (1:1).
D_2 = 1 % (w/v) sulphanilic acid in 3 *N* HCl–aq. 5% (w/v) $NaNO_2$ (1:1), freshly mixed; dried paper sprayed with aq. 2 % (w/v) Na_2CO_3.
D_3 = 0.05 % (w/v) ethanolic 2,6-dichloroquinone-chloroimide (solution A); dried paper sprayed with aq. 2 % (w/v) sodium borate.
D_4 = Solution A; dried paper sprayed with aq. *N* NH_3 soln.
D_5 = *N* HCl; dried paper heated at 70° for 3 min, then treated as in D_4.

Compound	R_F			*Colour**				
	S_1	S_2	S_3	D_1	D_2	D_3	D_4	D_5
2-*tert.*-Butyl-4-hydroxyanisole (isomer A)	0.96	0.92	(1) 0.90 (2) 0.82	bbn	o	bg	db	—
3-*tert.*-Butyl-4-hydroxyanisole (isomer B)	0.96	0.94	(1) 0.90 (2) 0.90	bbk	or	bp	p	—
2,5-Di-*tert.*-butyl-4-hydroxyanisole	0.95	0.94	(1) 0.94	wbn	wo	pk	—	—
p-Methoxyphenol	0.95	0.80	(1) 0.32	bn	r	b		
Isomer A ethereal sulphate	0.82	0.10	(1) 0.00	—	—	—	—	bg–g
Isomer B ethereal sulphate	0.79	0.07	(1) 0.00	—	—	—	—	btb–pk
Isomer A glucuronide	0.90	0.00	(1) 0.00	—	—	—	—	vwb
Isomer B glucuronide	0.89	0.00	(1) 0.00	—	—	—	—	vwp
Compound H**	0.83	0.00	(1) 0.00	—	o	wp	m	y
tert.-Butylquinol	0.97		(1) 0.50	bk	p	b	bp	

* b = blue; o = orange; g = grey; d = dark; bk = black; r = red; p = purple; w = weak; bt = bright; bn = brown; v = very; m = mauve; y = yellow; pk = pink — = no colour reaction given.

** Tentatively identified as the O-demethylation product of isomer A ethereal sulphate (*i.e.* 2(or 3)-*tert.*-butyl-4-hydroxyphenyl sulphate).

TABLE 16

R_F VALUES OF OESTRIOL AND 2-HYDROXYOESTRIOL

(R. J. B. KING, *Biochem. J.*, 74 (1960) 22P)

Solvent: Acetic acid–water–ethylene dichloride (proportions not given).
Paper: Not given.
Detection: Folin-Ciocalteu (blue without alkali).

Compound	R_F
Oestriol	0.65
2-Hydroxyoestriol	0.05

TABLE 17

R_F VALUES OF SOME STEROLS

(J. W. COPIUS PEEREBOOM AND J. B. ROOS, *Fette, Seifen, Anstrichmittel*, 62 (1960) 91)

Paper: Schleicher & Schüll 2043b mgl, impregnated with liquid paraffin (0.15 g/g of paper).
Solvent: Acetic acid–water (84:16).
Method: Ascending (for 40–45 h).
Temperature: 22–24°.

Sterol	R_S *value* (*S* = *cholesterol*)
Cholesterol	1.00
γ-Sitosterol	0.75
β-Sitosterol	0.75
Campesterol	0.87
Stigmasterol	0.84
Rapeseed oil phytosterols (brassicasterol?)	1.03
Cholestanol	0.82
7-Dehydrocholesterol	1.17
Ergosterol	1.20

TABLE 18

R_F VALUES OF SOME STEROIDS OF THE CONESSINE SERIES

(A. KASAL, V. ČERNÝ AND F. ŠORM, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 927)

Solvents: S_1 = Methanol–ammonia–water (50:2:48).
S_2 = Methanol–butanol–ammonia–water (80:5:2:13).
Paper: Whatman No. 4 (impregnated with liquid paraffin in light petroleum; 1:10).
Detection: Dragendorff reagent.

Substance	R_F	
	S_1	S_2
Dihydroconessine	0.05	0.50
N-Cyano-dihydroisoconessimine	0.01	0.70
Dihydroisoconessimine	0.23	0.80
N-Chloro-dihydroisoconessimine	0.00	0.15
5α-Conanin-3-one	0.07	0.78
5α-Conanin-3β-ol	0.32	0.86
3β-Acetoxy-5α-conanine	0.00	0.24
18-Dimethylamino-5α-pregn-20-en-3-one	0.00	0.27
18-Dimethylamino-5α-pregn-20-en-3β-ol	0.00	0.63
3β-Acetoxy-18-dimethylamino-5α-pregn-20-ene	0.00	0.06
18-Dimethylamino-5α-pregnan-3β-ol	0.00	0.61
18-Dimethylamino-5α-pregnan-3-one	0.00	0.26
Hexahydroapoconessine	0.00	0.00
18-Dimethylamino-5α-pregnane-20,21-diol-3-one	0.82	0.94
18-Dimethylamino-5α-pregnane-3β,20,21-triol	0.88	0.98
18-Dimethylamino-3-oxo-5α-androstane-17β-carboxylic acid methyl ester	0.01	0.54

TABLE 19

R_F VALUES (RELATIVE) OF DICYANOCOBYRINIC ACID a,b,c,d,e,g-HEXAMIDE f-(DL-2-HYDROXYPROPYL)-AMIDE DIHYDROGEN PHOSPHORIC ACID ESTER (A)

(K. BERNHAUER, F. WAGNER, H. DELLWEG AND P. ZELLER, *Helv. Chim. Acta*, 43 (1960) 700)

Solvents: S_1 = Water-saturated *sec.*-butanol, 0.01 % HCN.
S_2 = S_1 saturated with $KClO_4$.
S_3 = *sec.*-Butanol–water–acetic acid–10 % HCN soln. (100:50:1:0.05).
S_4 = *sec.*-Butanol–water–25 % NH_3 soln.–10 % HCN soln. (100:36:14:0.05).
S_5 = Water-saturated *sec.*-butanol, 0.01 % HCN, 0.5 % sodium tetraphenyl borate.
S_6 = *n*-Butanol–10 % sodium carbonate soln.–10 % HCN soln. (100:100:0.1).
S_7 = Isoamyl alcohol–5 % disodium hydrogen phosphate soln. (100:100), 0.005 % KCN. (Both phases used in the two last-mentioned solvents.)

Paper: Whatman No. 1.
Temperature of run: 22–23°.
Time of run: 18 h.
Detection: Not given.

Compound	R_F (relative)*						
	S_1	S_2	S_3	S_4	S_5	S_6	S_7
A	0.345	0.185–0.22	0.43–0.53	0.29–0.31	0.135–0.15	1.22	1.10

* Factor B = 1 (Factor B = dicyanocobyrinic acid a,b,c,d,e,g-hexamide f-(D-2-hydroxypropyl)-amide).

TABLE 20

R_F VALUES (RELATIVE) OF COBYRINIC ACID a,b,c,d,e,g-HEXAMIDE (VIa) AND ITS AMIDE

(K. BERNHAUER, H. DELLWEG, W. FRIEDRICH, G. GROSS, F. WAGNER AND P. ZELLER, *Helv. Chim. Acta*, 43 (1960) 693)

Solvents: S_1 = Water-saturated *sec.*-butanol, 0.01 % HCN.
S_2 = S_1, saturated with $KClO_4$.
S_3 = *sec.*-Butanol–water–glacial acetic acid–10 % HCN soln. (100:50:1:0.05).
S_4 = *sec.*-Butanol–water–25 % NH_3 soln.–10 % HCN soln. (100:36:14:0.05).
S_5 = Water-saturated *sec.*-butanol, 0.05 % HCN, 0.5 % sodium tetraphenyl borate.

Paper: Whatman No. 1.
Temperature of run: 22–23°.
Time of run: 18 h.
Detection: Not given.

Compound	R_F (relative)*				
	S_1	S_2	S_3	S_4	S_5
VIa	0.53	0.45	0.97	0.65	0.34
VIa amide	0.90	0.87	0.90	0.91	0.88

* Factor B = 1 (see previous table).

TABLE 21

R_F VALUES OF SUDAN DYES

(J. GASPARIČ AND M. MATRKA, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1959)

Solvents: S_1 = Cyclohexane.
S_2 = Ethanol–water (8:2).
S_3 = Ethanol–ammonia (8:2).
S_4 = Ethanol–water (1:1).
S_5 = Ethanol–ammonia (1:1).

Paper: P_1 = Whatman No. 3 (13 × 40 cm).
P_2 = WF_1.

Impregnation: I_1 = 50% dimethylformamide in ethanol.
I_2 = 10% liquid paraffin in hexane.
I_3 = 50% lauryl alcohol in ethanol.

Detection: Visible light.

Dye	*Name*	*Colour Index No.*	R_F S_1 P_2I_1	S_2 P_1I_2	S_3 P_1I_2	S_4 P_1I_3	S_5 P_1I_3	*Colour**
Aniline→2-Naphthol	Sudan I	24	0.80	0.50	0.555	0.133	0.220	o
2-Toluidine→2-Naphthol			0.86	0.36	0.442	0.069	0.122	ro
3-Toluidine→2-Naphthol			0.86	0.37	0.442	0.069	0.122	ro
4-Toluidine→2-Naphthol			0.86	0.35	0.442	0.069	0.111	ro
4-Amino-1,3-dimethylbenzene→2-Naphthol	Sudan II	92	0.89	0.30	0.338	0.068	0.110	ro
2-Amino-1,4-dimethylbenzene→2-Naphthol			0.90	0.31	0.338	0.066	0.110	ro
o-Anisidine→2-Naphthol	Sudan R	113	0.58	0.68	0.772	0.115	0.255	r
p-Anisidine→2-Naphthol			0.72	0.51	0.559	0.112	0.116	ro
4-Aminoazobenzene→2-Naphthol	Sudan G	248	0.88	0.10	0.114	0.022	0.033	cc
4-Amino-3,2′-dimethylazobenzene→2-Naphthol	Sudan IV	258	0.89	0.10	0.114	0.022	0.033	cc
4-Amino-3,3′-dimethylazobenzene→2-Naphthol	Sudan Red B		0.88	0.10	0.114	0.022	0.033	cc
1-Naphthylamine→1-Naphthol	Sudan Brown	81	0.86**	0.20**	0.440**	0.104**	0.114**	cc
2-Naphthylamine→2-Naphthol	Sudan CB	93	0.78	0.30	0.336	0.044	0.089	ro
Aniline→Resorcinol	Sudan G	23	0.45	0.60	0.82	0.113	0.775	y
			0.01	0.82	0.84	0.332	0.442	b
1-Naphthylamine→1,3-Phenylenediamine	Sudan Brown RRN					0.339	0.550	
1-Naphthylamine→1-Naphthylamine	Sudan Brown R		0.31	0.84	0.85	0.112	0.333	b
4-Amino-1,3-dimethylbenzene→1-Phenyl-3-methyl-5-pyrazolone	Sudan Yellow G		0.90	0.26	0.162	0.104	0.483	y
	Sudan Red 3R		two streaks	0.23	0.440	0.116 0.559	0.022 0.255	cc
	Sudan Yellow GRN		0.96	0	0	0	0	y
	Sudan Black B		0.08 0.51	0.50 0.84	0.162 0.87	0.022	0.055 0.109	bbbl
Dimethylaminoazobenzene	Butter Yellow	19	0.80	0.64	0.773	0.222	0.249	y
4-Aminoazobenzene	Aniline Yellow	15	0.03	0.90	0.90	0.552	0.556	y
Aniline→1-Naphthol *o*-isomer			—	0.90	0.85	—	—	
p-isomer			—	0.10	0.80	—	—	

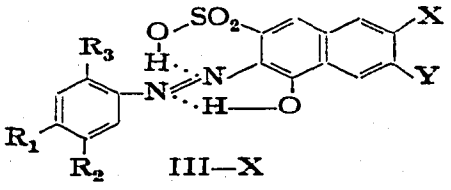
* o = orange; r = red; c = carmine red; y = yellow; b = brown; bbl = blue black.
** Main spot, carmine red.

TABLE 22

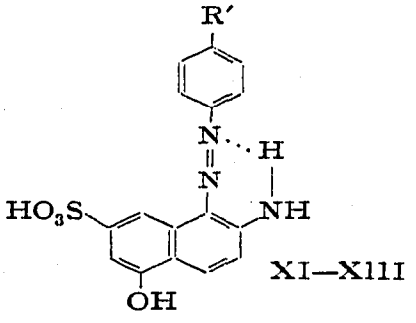
R_F VALUES OF AZO DYES

(J. FRANC AND M. WURST, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 663)

Solvents: S_1 = 80% aqueous ethanol.
S_2 = Ethanol–3 *N* ammonia (8:2).
Paper: Whatman No. 1 (30% liquid paraffin, b.p. 195–275°, in cyclohexane, impregnation; descending).
Temperature of run: 20° ± 1°.
Detection: Visible light.



III–X



XI–XIII

	Azo dye					R_F		*Colour**
						S_1	S_2	
I.	2-Amino-5-naphthol-7-sulphonic acid (J-acid)					0.32	0.41	vF
II.	2-Amino-8-naphthol-6-sulphonic acid (γ-acid)					0.32	0.41	vF
III.	$R_1 = H$	$R_2 = H$	$R_3 = H$	$X = NH_2$	$Y = H$	0.19	0.34	o
IV.	$R_1 = H$	$R_2 = H$	$R_3 = H$	$X = H$	$Y = NH_2$	0.23	0.36	v
V.	$R_1 = H$	$R_2 = SO_3H$	$R_3 = OH$	$X = NH_2$	$Y = H$	0.05	0.11	r
VI.	$R_1 = H$	$R_2 = SO_3H$	$R_3 = OH$	$X = H$	$Y = NH_2$	0.07	0.17	v
VII.	$R_1 = SO_3H$	$R_2 = H$	$R_3 = H$	$X = NH_2$	$Y = H$	0.07	0.35	o
VIII.	$R_1 = SO_3H$	$R_2 = H$	$R_3 = H$	$X = H$	$Y = NH_2$	0.09	0.45	v
IX.	$R_1 = NO_2$	$R_2 = H$	$R_3 = H$	$X = NH_2$	$Y = H$	0.17	0.30**	r
X.	$R_1 = NO_2$	$R_2 = H$	$R_3 = H$	$X = H$	$Y = NH_2$	0.24	—**	v
XI.	$R' = NO_2$					0.48	0.49	pv
XII.	$R' = SO_3H$					0.125	0.38	o
XIII.	$R' = H$					0.53	0.58	y

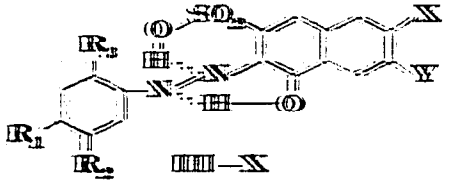
*F = fluorescence; r = red; v = violet; pv = pale violet; o = orange; y = yellow.
**Elongated spot.

TABLE 23

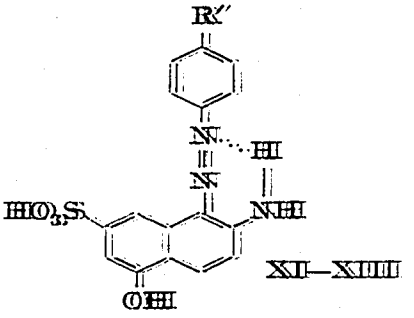
ELECTROPHORETIC MOBILITIES OF AZO DYES

(J. FRANC AND M. WURST, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 663)

Electrolytes: E_1 = 3 *N* ammonia.
E_2 = 1 *N* acetic acid.
Paper: Whatman No. 1.
Mobility units: $u \times 10^5$ cm^2 V^{-1} sec^{-1}.
Potential: 6–7 V/cm.
Standard: 3-Nitrophthalic acid (u = 20.5).
Detection: Visible light.
Time of run: 3–4 h.



I–III



XII–XIII

Azodye	Mobility E_1	Mobility E_2	Colour*
I. 2-Amino-5-naphthol-7-sulphonic acid (J-acid)	20.5	0.5	vF
II. 2-Amino-8-naphthol-6-sulphonic acid (γ-acid)	20.5	0.5	vF
III. R_1 = H; R_2 = H; R_3 = H; X = NH_2; Y = H	11.5	2.3	o
IV. R_1 = H; R_2 = H; R_3 = H; X = H; Y = NH_2	2.0	0.8	v
V. R_1 = H; R_2 = SO_3H; R_3 = OH; X = NH_2; Y = H	13.4	4.6	r
VI. R_1 = H; R_2 = SO_3H; R_3 = OH; X = H; Y = NH_2	15.6	5.1	v
VII. R_1 = SO_3H; R_2 = H; R_3 = H; X = NH_2; Y = H	10.4	9.0	o
VIII. R_1 = SO_3H; R_2 = H; R_3 = H; X = H; Y = NH_2	13.7	9.0	v
IX. R_1 = NO_2; R_2 = H; R_3 = H; X = NH_2; Y = H	0.3	1.2	r
X. R_1 = NO_2; R_2 = H; R_3 = H; X = H; Y = NH_2	0.3	0.0	v
XI. R′ = NO_2	3.9	1.85	pv
XII. R′ = SO_3H	16.8	11.4	o
XIII. R′ = H	5.6	2.5	y

* F = fluorescence; r = red; v = violet; pv = pale violet; o = orange; y = yellow.

TABLE 24

R_F VALUES OF SOME THIAZINE DYES

(K. B. TAYLOR, *J. Histochem. and Cytochem.*, 8 (1960) 248)

Solvents: S_1 = 2 *N* HCl.
S_2 = Dioxane–2 *N* HCl (92.5 : 7.5).
Paper: Whatman No. 1 (circular).
Detection: Visible light.
R_{tet} = Radial distance moved by unknown to that moved by tetraethylthionine for a standard run of 5 cm.

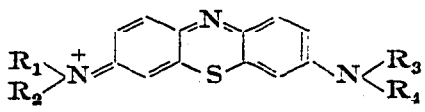
Thiazine dye		R_{tet}	
			
R_1,R_2	R_3,R_4	S_1	S_2
Pr_2	Pr_2	0.65	2.00
Et_2	Et_2	1.00	1.00
Et_2	MeEt	0.94	0.78
Et_2	Me_2	0.81	0.62
EtMe	MeEt	0.82	0.58
EtMe	Me_2	0.70	0.41
Me_2	Me_2	0.54	0.25
Et_2	HEt	0.80	0.90
EtMe	HEt	0.65	0.69
Me_2	HEt	0.51	0.53
Et_2	HMe	0.75	0.78
EtMe	HMe	0.59	0.54
Me_2	HMe	0.46	0.37
Et_2	H_2	0.70	0.78
EtMe	H_2	0.56	0.58
Me_2	H_2	0.39	0.41
EtH	HEt	0.47	0.78
EtH	HMe	0.43	0.65
MeH	HMe	0.38	0.49
EtH	H_2	0.37	0.66
MeH	H_2	0.33	0.53
H_2	H_2	0.27	0.57

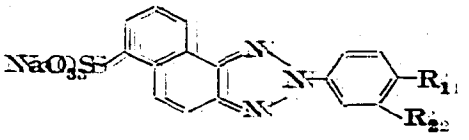
TABLE 25

R_F VALUES OF SOME 2-PHENYLNAPHTHO-[1,2]-TRIAZOLE DERIVATIVES

(J. DOBÁŠ AND J. ŠTĚRBA, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 912)

Solvent: 55% aqueous pyridine, after 11% aqueous sodium chloride elution.
Paper: Whatman No. 44.
Temperature of room: 24–25°.
Detection: U.V. light.

2-Phenylnaphtho-[1,2]-triazole derivative



		R_F
II. $R_{11}=R_{22}=H$	$C_{16}H_{10}N_3NaO_3S\cdot H_2O$	0.354
III. $R_{11}=OH$, $R_{22}=H$	$C_{16}H_{10}N_3NaO_4S\cdot H_2O$	0.228
IIII. $R_{11}=H$, $R_{22}=OH$	$C_{16}H_{10}N_3NaO_4S\cdot H_2O$	0.215
IIV. $R_{11}=OCOCH_3$, $R_{22}=H$	$C_{17}H_{12}N_3NaO_4S\cdot 2H_2O$	0.211
V. $R_{11}=H$, $R_{22}=OCOCH_3$	$C_{17}H_{12}N_3NaO_4S$	0.223
VII. $R_{11}=NH_2$, $R_{22}=H$		0.197
VIII. $R_{11}=H$, $R_{22}=NH_2$		0.215
VIIII. $R_{11}=Cl$, $R_{22}=H$	$C_{16}H_9ClN_3NaO_3S\cdot H_2O$	0.168
IIX. $R_{11}=H$, $R_{22}=Cl$	$C_{16}H_9ClN_3NaO_3S\cdot H_2O$	0.242
IX. $R_{11}=SO_3Na$, $R_{22}=H$	$C_{16}H_9N_3Na_2O_6S_2\cdot 2H_2O$	0.575
XI. $R_{11}=H$, $R_{22}=SO_3Na$	$C_{16}H_9N_3Na_2O_6S_2\cdot 2H_2O$	0.618
XII. $R_{11}=COOH$, $R_{22}=H$	$C_{17}H_{10}N_3NaO_5S\cdot 2H_2O$	0.400
XIII. $R_{11}=H$, $R_{22}=COOH$	$C_{17}H_{10}N_3NaO_5S\cdot 2H_2O$	0.420
XIV. $R_{11}=CONH_2$, $R_{22}=H$	$C_{17}H_{11}N_3NaO_4S\cdot 1\frac{1}{2}H_2O$	0.181
XV. $R_{11}=CN$, $R_{22}=H$	$C_{17}H_9N_3NaO_3S\cdot 1\frac{1}{2}H_2O$	0.282
XVII. $R_{11}=H$, $R_{22}=CN$	$C_{17}H_9N_3NaO_3S\cdot H_2O$	0.228

TABLE 26

R_F VALUES OF SOME AMINOPTERIN DERIVATIVES

(K. ŠLAVÍK, W. ŠLAVÍKOVÁ AND Z. KOLMAN, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1929)

Solvents: S_1 = 0.55% aqueous sodium carbonate.
S_2 = 0.035 *M* acetate (pH 6).
Paper: Whatman No. 33 or No. 44 (ascending).
Detection: U.V. light (280 mμ–330 mμ) and recorded on Foma-Reflex photographic paper (15–330 min exposure).

Compound	R_F	
	S_1	S_2
Tetrahydroaminopterin	0.22	0.17
N^{10}-Formylaminopterin	0.77	0.73
N^{10}-Formyltetrahydroaminopterin	0.33	0.30
N^5-Formyltetrahydroaminopterin	0.90	0.86
$N^{5,10}$-Methylene-tetrahydroaminopterin	0.60	0.47
N^{10}-Hydroxymethylaminopterin	0.70	0.65
N^{10}-Hydroxymethyltetrahydroaminopterin	0.75	0.75

TABLE 27

R_F VALUES OF SOME COUMARIN DERIVATIVES

(E. STEINEGGER AND A. BRANTSCHEN, *Pharm. Acta Helv.*, 34 (1959) 334)

Solvent: *n*-Butanol–acetic acid–water (4:1:2).
Paper: Schleicher & Schüll 2045 bm.
Detection: U.V. light ("Chromalite" 2537 Å)—before and after 1% KOH spray—heating at 100°.

Compound	R_F
Fraxin	0.44
Fraxetin	0.68
Fraxidin	0.81
Isofraxidin	0.81
Fraxinol	0.82
Aesculin	0.51
Aesculetin	0.74
Aesculin-7-monomethyl ether	0.52
Aesculetin-7-monomethyl ether	0.80
Aesculetin-6,7-dimethyl ether	0.82
Cichoriin	0.49
Cichoriin-6-monomethyl ether	0.51
Aesculetin-6-monomethyl ether	0.80

TABLE 28

R_F VALUES OF SOME *Senecio* ALKALOIDS

(C. B. COULSON, P. J. DAVIES AND W. C. EVANS, *J. Comp. Pathol. Therap.*, 70 (1960) 199)

Solvents: S_1 = *n*-Butanol–acetic acid–water (100:30; just saturated).
S_2 = *n*-Butanol–acetic acid–water (100:10; just saturated).
S_3 = *n*-Butanol–acetic acid–water (100:4; just saturated).
S_4 = *n*-Butanol–formic acid–water (100:10; just saturated).
Paper: Whatman No. 4 (ascending; 5 cm × 45 cm).
Detection: Dragendorff.

Compound	R_F			
	S_1	S_2	S_3	S_4
Senecionine*	0.88	0.57	0.34	0.51
Jacodine (jacobine)	0.80	0.73	0.66	0.65

* Tentative identification.

TABLE 29

R_F VALUES OF SOME *Lobelia* ALKALOIDS

(F. KACZMAREK AND E. STEINEGGER, *Pharm. Acta Helv.*, 34 (1959) 330)

Solvent: Benzene (thiophene-free)–chloroform (alcohol-free) (1:1) saturated with formamide.
Paper: P_1 = Schleicher & Schüll 2043 bm.
P_2 = Schleicher & Schüll 2045 bm.
Impregnation: I_1 = Formamide pro analysi (Xenon Co., Lodz, Poland)–acetone (9:20).
I_2 = Formamide purum (Xenon Co., Lodz, Poland)–acetone (9:20).
I_3 = Formamide pro analysi–ammonium formate (9 ml shaken with 0.9 g then added to 20 ml acetone and filtered).
Length of run: 30 cm (descending).
Detection: Dragendorff.

Paper	*Impregnation*	R_F		
		Lobinaline	*Lobelanidine*	*Lobeline*
P_1	I_1	0.00	0.03	0.05
P_1	I_2	0.03	0.11	0.15
P_1	I_3	0.09	0.16	0.22
P_2	I_1	0.00	0.04	0.06
P_2	I_2	0.02	0.09	0.12
P_2	I_3	0.11	0.18	0.25

TABLE 30

R_F VALUES OF SOME *Lobelia* ALKALOIDS

(F. KACZMAREK AND E. STEINEGGER, *Pharm. Acta Helv.*, 34 (1959) 413)

Solvent: Ether–chloroform (1:9).
Paper: Schleicher & Schüll 2045 bm (descending).
Impregnation: Formamide–formic acid–ammonium formate–acetone (9 ml:0.9 g:1 ml:20 ml).
Time of run: 5–6 h.
Detection: U.V. light; Dragendorff.

Compound	R_F
Lobeline	0.41
Lobelanidine	0.50
Lobelanine	0.73

TABLE 31

R_F VALUES OF SOME PAPAVERACEAE ALKALOIDS

(J. SLAVÍK, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1663)

Solvent: S_1 = *n*-Butanol–acetic acid–water (10:1:3).
Paper: Whatman No. 1.
Length of run: 25 cm (approx.).
Detection: U.V. light; Dragendorff reagent.

Alkaloid	R_F
Sanguinamine	0.47
Chelerythrine	0.58
Protopine	0.65
Coptisine	0.44
Berberine	0.61

TABLE 32

R_F VALUES OF SOME PAPAVERACEAE ALKALOIDS

(J. SLAVÍK AND L. SLAVÍKOVÁ, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1667)

Solvents: S_1 = *n*-Butanol–acetic acid–water (10:1:3).
S_2 = Water-saturated butanol with varying acetic acid content (see table).
S_3 = Water-saturated ethyl acetate with 2% acetic acid.
Paper: Whatman No. 1 (descending).
Detection: U.V. light fluorescence.

Alkaloid	R_F									*Fluorescence**
	S_1	S_2, % CH_3COOH							S_3	
		0.5	1	2	3	4	5	10		
Chelirubine	0.53	0.54	0.54	0.50	0.49	0.49	0.48	0.48	0.50	pr
Sanguinarine	0.43	0.37	0.37	0.35	0.37	0.34	0.35	0.40	0.19	o
Sanguirubine	0.39	0.23	0.24	0.28	0.29	0.29	0.31	0.34	0.19	pr
Macarpine	0.48	0.28	0.34	0.37	0.39	0.40	0.42	0.46		cr
Chelilutine	0.67	0.44	0.52	0.54	0.55	0.55	0.55	0.62	0.14	o
Chelerythrine	0.54	0.35	0.38	0.40	0.43	0.43	0.45	0.51	0.08	y
Sanguilutine	0.60	0.30	0.38	0.40	0.43	0.44	0.45	0.53	0.03	o

* p = purple, r = red, o = orange, c = carmine, y = yellow.

TABLE 33

R_F VALUES OF SOME AMINO ACIDS AFTER SINGLE AND MULTI-DEVELOPMENT

(M. S. DUNN AND E. A. MURPHY, *Anal. Chem.*, 32 (1960) 461)

Solvents: S_1 = *tert.*-Butanol–formic acid–water (70:1:29, v/v).
S_2 = *tert.*-Butanol–formic acid–water (70:15:15, v/v).
S_3 = Phenol–water (78:22, v/v)–conc. ammonium hydroxide (94:1, v/v); stabilised by addition of 8-quinolinol (20 mg/lb. phenol).

Paper: Schleicher & Schüll No. 589.

Time of run: S_1, 8 h; S_2, 4 h (single development).

Detection: See table; abbreviations: N = ninhydrin; *p*-D = *p*-dimethylaminobenzaldehyde; D = diazotised sulphanilamide; I = isatin, 0.3% in absolute ethyl alcohol; P-I = platinic iodide; V = vanillin.

Compound	$R_F \times 100$							*Detection*[a]
	S_1		S_2			S_3		
	× 1	× 2	× 1	× 2	× 3	× 1	× 2	
Alanine	48	72	38	68	83	60	77	N*
L-Arginine·HCl (in H_2O)	22	43	(15;26)	(25;40)	(38;54)	79	92	—
L-Arginine·HCl (in 6 *N* HCl)	—	—	—	20	34	72	83	—
Asparagine·H_2O	—	—	13	23	50	44	—	N+[b]
Aspartic acid	34	52	23	37	65	18	25	N*[b]
Citrulline	—	—	21	39	—	67	—	*p*-D*
Cysteine·HCl	—	—	48	(31;48)	(63;71)	(38;72)	—	P-I+
Cystine (in 1 *N* HCl)	7.8	12	5.8	6.9	18	36	49	N*[b]
Glutamic acid	43	63	32	56	70	30	45	N*
Glycine	32	50	23	42	63	39	49	N*[b]
Histidine·HCl·H_2O	16	28	12	16	36	72	84	D*
Hydroxy-L-proline	35	56	30	58	67	70	84	I*
Isoleucine	81	—	77	86	91	86	—	N*
Leucine	81	—	77	86	91	86	—	N*
Lysine·HCl	17	28	12	27	36	78	92	N*[c]
Methionine	65	—	56	76	88	80	—	N*
Methionine sulphone	—	—	—	38	64	—	—	N+
Methionine sulphoxide	33	50	26	61	80	82	92	N+
Norleucine	—	—	82	86	93	86	96	N+
Norvaline	—	—	72	87	92	84	92	N+
Ornithine	—	—	10	20	34	67	—	V+
Phenylalanine	72	—	60	84	89	88	—	N*
Proline	48	—	45	67	80	90	—	I*
Sarcosine·HCl	—	—	47	54	72	77	—	N+
Serine	32	50	23	41	60	39	49	N*[b]
Taurine	—	—	14	34	47	42	88	N+[b]
Threonine	38	60	29	57	70	50	68	N*
Tryptophan	—	—	40	71	81	80	—	N+
Tyrosine (in 1 *N* HCl)	48	72	38	61	76	60	77	N*
Valine	64	—	56	79	85	80	—	N*

Limiting amounts for detecting 0.5 μg^* or 1.0 μg^+ in the presence of 500 μg of L-arginine·HCl.

[a] S_2(× 2), one-dimensional chromatogram.

[b] Two-dimensional chromatogram (S_2 then S_3).

[c] S_3 used but water replaced by pH 6.2 buffer; paper pre-treated with buffer.

TABLE 34

R_F AND RELATIVE R_F VALUES OF SOME AMINO ACID DERIVATIVES

(J. RUDINGER, K. PODUŠKA AND M. ZAORAL, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2022)

Solvent: *n*-Butanol–pyridine–acetic acid–water (15:10:3:12).
Paper: Whatman No. 1.
Detection: VOGES-PROSKAUER reagent (alkaline α-naphthol–diacetyl); ninhydrin.

Compound	R_F
N^{α}-Tosyl-L-α, γ-diaminobutyric acid	0.44
γ-Guanidino-L-α-tosylaminobutyric acid	0.52
β-Guanidino-L-α-tosylaminopropionic acid	0.53
N^{α}-Benzoyl-L-α, γ-diaminobutyric acid	0.41
γ-Guanidino-L-α-benzamidobutyric acid	0.49
β-Ureido-L-α-aminopropionic acid (albizziine)	1.03*
β-Guanidino-L-α-aminopropionic acid	1.38*
γ-Ureido-L-α-aminobutyric acid	1.54*
γ-Guanidino-L-α-aminobutyric acid	1.47*

* R_{Dab} (= R_F of compound/R_F of α, γ-diaminobutyric acid?).

TABLE 35

R_F VALUES OF SOME α-KETO ANALOGUES OF SOME NATURAL DIAMINO ACIDS

(L. MACHOLÁN AND E. SVÁTEK, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2564)

Solvents: S_1 = *n*-Butanol saturated with 1 *N* HCl (1:1).
S_2 = *n*-Butanol–acetic acid–water (4:1:5).
S_3 = *n*-Butanol saturated with water.
S_4 = *n*-Butanol–pyridine–water (5:2:2).
Paper: Whatman No. 4 (descending).
Temperature of run: 20–21°.
Tank size: 85 × 50 × 25 cm.
Detection: 0.1 % ninhydrin in acetone; 0.2 % 2,4-dinitrophenyl-hydrazine in 1 *N* HCl.

Hydrochloride of	R_F				*Colour with ninhydrin**
	S_1	S_2	S_3	S_4	
α-Keto-γ-aminobutyric acid	0.14	0.19	0.06	0.07	ob
α-Keto-δ-aminovaleric acid	0.19	0.30	0.12	0.22	yo
DL-Pipecolic acid	0.36	0.43	0.23	0.20	v
L-Proline	0.25	0.35	0.14	0.13	y
Δ^1-Piperideine-2-carboxylic acid	0.37	0.42	0.22	0.24	bry

* o = orange; b = brown; y = yellow; br = bright; v = violet.

TABLE 36

ELECTROPHORETIC MOBILITIES (RELATIVE) AT HIGH POTENTIALS OF SOME AMINO ACIDS, PEPTIDES, AND CERTAIN DERIVATIVES

(Z. PRUSÍK AND B. KEIL, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2049)

Electrolyte: Acetic acid–formic acid–water (150:50 ml in 1000 ml), pH 1.9.
Paper: Whatman No. 3 (?).
Potential of run: 85 V/cm (?).
Temperature of run: —5° (?).
Apparatus: According to the authors; horizontal.
Units: $cm^2 . V^{-1} . sec^{-1}$ (U); U/U_{Ala} = mobility relative to that of alanine.
Detection: Ninhydrin.

Compound	U/U_{Ala}	*Compound*	U/U_{Ala}
$CySO_3H$	—0.25	$CySO_3H$. Ala	0.00
ε-DNP-Lys	0.48	$CySO_3H$. Gly	0.00
Try	0.48	$CySO_3H$. Leu	0.00
S-Carboxymethylcysteine	0.46	Leu. $CySO_3H$	0.00
Hypro	0.60	Phe. $CySO_3H$	0.00
$MetSO_2$	0.60	$GluNH_2$. $GluNH_2$	0.62
Phe	0.62	Gly. Tyr	0.64
Cit	0.62	Val. Phe. Lys	0.67
CyS-S	0.67	Ileu. Glu. Lys	0.67
Hexahydrophenylalanine	0.67	Thr. Val	0.68
Met	0.71	Tyr. Gly	0.69
$AspNH_2$	0.73	Leu. Gly. Gly	0.69
Pro	0.75	Leu. Gly	0.81
Thr	0.78	Ser. Ala	0.82
Ala	1.00	Gly. $GluNH_2$	0.82
Gly	1.15	Ileu. Ala. Lys	1.07
Octahydrotryptophan	1.17	Asp. Ser. Lys	1.07
Lys	1.41	Leu. Lys	1.20
Orn	1.41	Ala. Arg.	1.24
$CySO_3H.MetSO_2$	—0.04	Ser. Arg.	1.29
Thr. $CySO_3H$	—0.02	Ala. Hist	1.34

TABLE 37

R_F VALUES OF VARIOUS PEPTIDES

(H. ZAHN AND N. H. LAFRANCE, *Ann.*, 630 (1960) 37)

Solvents: S_1 = *sec.*-Butanol–formic acid–water (75:15:10).
S_2 = *sec.*-Butanol–10% aqueous ammonia (85:15).
S_3 = 80% Phenol.
Paper: Not given (H. ZAHN AND R. KOCKLÄUNER, *Biochem. Z.*, 329 (1953/4) 339).
Detection: Not given (H. ZAHN AND R. KOCKLÄUNER, *Biochem. Z.*, 329 (1953/4) 339).

Compound	R_F		
	S_1	S_2	S_3
L-Ala-L-leu	0.53	0.22	0.84
L-Leu-L-val	0.80	0.30	0.88
L-Tyr-L-leu	0.72	0.30	0.87
L-Tyr-L-leu-L-val	0.90	0.38	—
L-Ala-L-leu-L-tyr-L-leu-L-val	0.94	0.60	0.90

TABLE 38

R_F VALUES OF SOME ISOVALERIC ACID DERIVATIVES

(M. STRASSMAN, J. B. SHATTON AND S. WEINHOUSE, *J. Biol. Chem.*, 235 (1960) 700)

Solvents: S_1 = *n*-Butanol saturated with water.
S_2 = *n*-Butanol saturated with 3 % NH_4OH.
S_3 = *n*-Butanol–ethanol–water (5:1:4).
S_4 = *n*-Butanol–formic acid–water (5:1:4).
S_5 = Phenol saturated with water.
S_6 = *sec.*-Butanol–propionic acid–water (19:1:9).
S_7 = *n*-Butanol–pyridine–water (6:4:3).
S_8 = Ethyl acetate–pyridine–water (5:2:5).
S_9 = Ethyl acetate–glacial acetic acid–water (2:1:1).
S_{10} = *n*-Propanol–conc. NH_4OH (6:4).
S_{11} = Phenol (80 %).
Paper: Whatman No. 1 (ascending).
Detection: Not given.

Compound	R_F										
	S_1	S_2	S_3	S_4	S_5	S_6	S_7	S_8	S_9	S_{10}	S_{11}
2,4-Dinitrophenylhydrazone of α-ketoisovaleric acid	0.66	0.78	0.78	0.95							
Valine					0.71	0.27	0.25				
α,β-Dihydroxyisovaleric acid		0.17	0.68				0.35	0.41	0.79	0.58	0.58

TABLE 39

R_F VALUES OF SOME Δ^3-ISOPENTENYL COMPOUNDS

(H. EGGERER AND F. LYNEN, *Ann.*, 630 (1960) 58)

Solvents: S_1 = Ethanol–conc. ammonia–water (80:4:16).
S_2 = Butanol saturated with 1.5 *N* NH_3.
S_3 = Isoamyl alcohol–collidine–water (10:2:1).
S_4 = Methanol saturated with heptane.
S_5 = Amylene hydrate–glacial acetic acid–water (4:1:2).
Paper: Whatman No. 1 (ascending); for S_4: equilibrated overnight; descending.
Detection: 0.1 % $KMnO_4$; U.V. light (3.5-dinitrobenzoates); 0.5 % ethanolic α-naphthylamine (3.5-dinitrobenzoates).

Compound	R_F				
	S_1	S_2	S_3	S_4	S_5
Δ^3-Isopentenoic acid*	0.76	0.27	0.03		
Δ^3-Isopentenol 3,5-dinitrobenzoate				0.7	
Dicyclohexylammonium-Δ^3-isopentenyl phosphate					0.82

* Inseparable from the isomeric dimethylacrylic acid.

TABLE 40

ELECTROPHORETIC MOBILITIES OF Δ^3-ISOPENTENOIC ACID AND DIMETHYLACRYLIC ACID

(H. EGGERER AND F. LYNEN, *Ann.*, 630 (1960) 58)

Electrolyte: Pyridine–acetate (pH 6.2) buffer.
Paper: Whatman No. 1.
Potential of run: 45 V/cm.
Time of run: T_1 = 60 min; T_2 = 65 min (40 mA).
Detection: 0.1 % $KMnO_4$ solution spray of moist paper.
Migration units: cm.

Compound	*Migration*	
	T_1	T_2
Δ^3-Isopentenoic acid	13.1	11.5
Dimethylacrylic acid	10.3	9.7

TABLE 41

ELECTROPHORETIC MOBILITIES OF SOME L-ARABINOSIDO-D-GLUCOSES

(K. WALLENFELS AND D. BECK, *Ann.*, 630 (1960) 46)

Electrolyte: Borate buffer (pH 10).
Paper: Whatman No. 3 (27.5 × 45.5 cm).
Time of run: 60 min.
Potential: 1000 V.
Detection: Silver nitrate reagent.

Compound	M_G
6-(α-L-Arabinosido)-D-glucose (Vicianose)	0.82
4-(α-L-Arabinosido)-D-glucose	0.40
3-(α-L-Arabinosido)-D-glucose	0.76
2-(β-L-Arabinosido)-D-glucose	0.42

TABLE 42

R_G VALUES OF SOME L-ARABINOSIDO-D-GLUCOSES

(K. WALLENFELS AND D. BECK, *Ann.*, 630 (1960) 46)

Solvent: Butanol–pyridine–water (6:4:3).
Paper: Schleicher & Schüll No. 2043b.
Time of run: 75 h.
Detection: Silver nitrate reagent.

Compound	R_G
6-(α-L-Arabinosido)-D-glucose (Vicianose)	0.50
4-(α-L-Arabinosido)-D-glucose	0.55
3-(α-L-Arabinosido)-D-glucose	0.80
2-(β-L-Arabinosido)-D-glucose	0.62

TABLE 43

R_F VALUES OF SOME PHOSPHATIDES AND FATTY ACIDS

(J. E. MULDREY, O. N. MILLER AND J. G. HAMILTON, *J. Lipid Research*, 1 (1959) 48)

Solvent: Benzene–pyridine (100:100, v/v) with water added.
Paper: Glass paper (X-934-AH; H. Reeve Angel & Co., Clifton, N.J., U.S.A.) 10 × 12.5 cm, with prior heating to 600° (30 min).
Impregnation: Dipped in fresh 0.4% sodium silicate solution; dried over hot-plate.
Treatment: Developed with benzene first; phospholipids remain at start, neutral lipids carried to front.
Detection: Conc. H_2SO_4 spray, then heating to 230° (4 min); (also: ninhydrin; phosphomolybdate; fuchsin–sulphurous acid–mercuric chloride; Dragendorff).

Lipid	R_F								
	Volume of water added								
	0	*2*	*4*	*6*	*8*	*9*	*10*	*11*	*14*
Free fatty acids	0.65	0.60	0.60	0.60	0.70	0.82	0.85	0.85	—
Phosphatidyl choline	0	0	0	0.25	0.50	0.60	0.75	0.80	0.85
Sphingomyelin	0	0	0	0.04	0.25	0.40	0.50	0.65	0.85
Phosphatidyl ethanolamine	0	0	0	0.02	0.10	0.20	0.25	0.50	0.85
Phosphatidyl serine	0	0	0	0	0	0	0	0	0.60

TABLE 44

R_F VALUES OF SOME PHOSPHOLIPIDS

(E. GJONE, J. F. BERRY AND D. A. TURNER, *J. Lipid Research*, 1 (1959) 66)

Solvents: S_1 = Diisobutyl ketone–acetic acid (30:7).
S_2 = *n*-Butyl ether–acetic acid–chloroform–water (40:35:6:5).
S_3 = Ether–acetone–phenol–water (J. W. DIECKERT *et al.*, 1958).
Paper: P_1 = Unimpregnated paper (R. F. WITTER *et al.*, 1957).
P_2 = Silicic acid-impregnated paper (G. V. MARINETTI AND E. STOTZ, 1956).
P_3 = Glass filter paper impregnated with silicic acid (J. W. DIECKERT *et al.*, 1958).
Detection: Rhodamine B; ninhydrin; and iodine vapour.

Lipid	R_F*		
	S_1P_1	S_2P_2	S_3P_3
L-α-Dimyristoyl phosphatidyl ethanolamine	0.55 ± 0.11	0.56 ± 0.12	0.80 ± 0.17
L-α-Dimyristoyl lecithin	0.70 ± 0.07	0.53 ± 0.11	0.75 ± 0.16
Sphingomyelin	0.39 ± 0.10	0.36 ± 0.11	0.67 ± 0.18

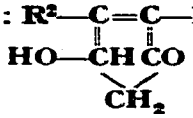
* R_F computed to centre of spot ± half length of spot divided by distance to solvent front.

TABLE 45

R_F VALUES OF SOME HYDROXYDIKETONES AND RETHROLONES

(J. FARKAŠ, H. KOMRSOVÁ, J. KRUPIČKA AND J. J. K. NOVÁK, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1824)

Solvent: Petroleum ether (65–90°)–methanol–water (100:20:1).
Paper: Whatman No. 1.
Detection: 0.1% $KMnO_4$ spray followed by water wash then by a 0.5% benzidine in acetic acid spray.
Hydroxydiketone: $R^1CH_2COCH_2CH(OH)COR^2$
Rethrolone:



Compound		R_F	
R^1	R^2	Hydroxydiketone	Rethrolone
Allyl	Methyl	0.26	0.06
2-Cyclopenten-1-yl	Methyl	0.45	0.11
2-Cyclohexen-1-yl	Methyl	0.79	0.53

TABLE 46

ELECTROPHORETIC MOBILITIES OF SOME PYRIMIDINE DERIVATIVES, AND THE EFFECT OF 5-FLUORO-SUBSTITUTION

(R. W. BROCKMAN, J. M. DAVIES AND P. STUTTS, *Biochim. Biophys. Acta*, 40 (1960) 22)

Electrolyte: Sodium tetraborate (0.05 *M*; pH 9).
Paper: Whatman No. 3MM.
Apparatus: R. MARKHAM (1955).
Time of run: 90 min.
Potential: 750 V.
Standard: Uridine-5′-phosphate (14–16 cm from origin; 750 V, 90 min).

$$\text{Units: Relative migration distance} = \frac{\text{migration distance (cm) of pyrimidine} \times 100}{\text{migration distance (cm) of uridine-5′-phosphate}}$$

Detection: U.V. absorption.

Compound	Relative migration distance	
	Unsubstituted compound	5-Fluoro-substituted compound
Uracil	30	82
Uridine	66	85
2′-Deoxyuridine	18	60
Cytosine	−5	−4
Cytidine	46	42
2′-Deoxycytidine	−12	−12
Orotic acid	97	113

TABLE 47

ELECTROPHORETIC MOBILITIES OF SOME AZAURIDINE DERIVATIVES

(J. BERÁNEK AND J. SMRT, *Collection Czechoslov. Chem. Commun.*, 25 (1960) 2029)

Electrolyte: Citrate buffer (0.05 *M*, pH 3.7).
Paper: Whatman No. 3.
Units: cm/h.
Potential: 100 V/cm.
Apparatus: Not given (presumably Z. PRUSÍK AND B. KEIL, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2049).
Detection: Not given.

Compound	*Mobility*
6-Azauridine-2′(3′)-phosphate	9
6-Azauridine-2′(3′),5′-diphosphate	13.5
6-Azauridine-5′-phosphate	9

TABLE 48

R_F VALUES OF SOME AZAURIDINE DERIVATIVES

(J. BERÁNEK AND J. SMRT, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2029)

Solvents: S_1 = Isopropanol–ammonia–water (7:1:2).
S_2 = Isopropanol–1% aqueous $(NH_4)_2SO_4$ (2:1).
S_3 = Saturated $(NH_4)_2SO_4$ solution–0.1 *M* ammonium acetate–isopropanol (79:19:2).
Paper: Whatman No. 1 (S_1, S_2, descending; S_3, ascending).
Detection: Not given.

Compound	R_F		
	S_1	S_2	S_3
6-Azauridine-2′(3′)-phosphate	0.20	0.3	0.77
6-Azauridine-2′,(3′)-cyclic phosphate	0.47	0.4	0.58
6-Azauridine-2′(3′),5′-diphosphate	—	0.12	0.85
6-Azauridine-5′-phosphate	0.20	0.3	0.80

TABLE 49

R_F VALUES OF AZAURACIL, AZAURIDINE AND AZAURIDINE-5′-PHOSPHATE

(R. E. HANDSCHUMACHER, *J. Biol. Chem.*, 235 (1960) 764)

Solvents: S_1 = Butanol–acetic acid–water (10:2:5).
S_2 = Isobutyric acid–0.5 *N* ammonium hydroxide (5:3).
S_3 = Ethyl acetate saturated with 0.05 *M* phosphate buffer, pH 5.0.
S_4 = Isopropanol–6 *N* HCl (17:8).
Paper: Whatman No. 1 (descending).
Detection: U.V. light.

Compound	R_F			
	S_1	S_2	S_3	S_4
Azauracil	0.56	0.60	0.50	0.67
Azauridine	0.38	0.51	0.06	0.67
Azauridine-5′-phosphate	0.11	0.29	0.0	0.72

TABLE 50

R_F VALUES OF SOME AROMATIC ANIONS

(I. JAKUBEC, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1736)

Solvents: S_1 = 1 *N* KCl.
S_2 = 1 *N* K_2SO_4.
Paper: P_1 = Whatman No. 4 (ascending; 17 cm, 24 cm).
P_2 = Schleicher & Schüll 602 hart (ascending; 4 cm, 24 cm).
Impregnation: I_1 = 20% liquid paraffin (d = 0.809) in 50–60° petroleum ether (rolled and exposed to air for 6 h).
I_2 = None.
Detection: Not given.

Compound	R_F			
	$P_1 I_1$		$P_2 I_2$	
	S_1	S_2	S_1	S_2
p-Hydroxybenzoic acid	0.78	0.66	0.82	0.69
Salicylic acid	0.73	0.63	0.78	0.65
p-Aminosalicylic acid	0.61	0.53	0.64	0.54
Phenylcinchoninic acid	0.36	0.23	0.34	0.23
Sulphadimidine	0.81	0.74	0.85	0.77
Sulphanilimide	0.72	0.66	0.71	0.61
Salicylamide	0.60	0.54	0.56	0.49
p-Aminobenzoic acid	0.77	0.69	0.84	0.69
Sulphaguanidine	0.77	0.75	0.71	0.64
Procaine	0.72	0.70	0.83	0.75
Benzocaine	0.49	0.44	0.51	0.40

TABLE 51

R_F VALUES OF SOME AROMATIC ACIDS

(K. REHNELT, *Ber. naturwiss. Ges. Bayreuth*, 10 (1958/60) 232)

Solvents: X-alcohol–ethanol–water–conc. ammonia (5:5:2:1).
Substances chromatographed: (1) Perylene-3,9-dicarboxylic acid.
(2) Pyrenoyl-(3)-β-propionic acid.
(3) Fluoren-9-one-1-carboxylic acid.

X-alcohol	R_F		
	1	*2*	*3*
Methanol	0.51	0.72	0.75
Ethanol	0.49	0.81	0.79
Propanol	0.30	0.74	0.71
Butanol	0.25	0.66	0.64
Pentanol	0.17	0.55	0.52
Hexanol	0.19	0.56	0.50
Heptanol	0.18	0.52	0.47
Octanol	0.13	0.45	0.39

TABLE 52

R_F VALUES OF CAROTENES

(A. JENSEN, *Acta Chem. Scand.*, 14 (1960) 2051)

Solvents: S_1 = Petroleum ether (b.p. 60–80°).
S_2 = Petroleum ether–benzene (80:20, v/v).
Paper: Schleicher & Schüll No. 667 (circular).
Impregnation: 20% Al_2O_3 (activated after impregnation at 150° for 15 min).
Detection: Visible light.

Compound	$R_F \times 100$	
	S_1	S_2
α-Carotene	43	66
β-Carotene	38	62
γ-Carotene	5	15
Phytofluene	77	88
ζ-Carotene	36	60
Neurosporene*	15	25
Lycopene	2	8
Azobenzene**		80

* Second isomer.
** Standard marker.

TABLE 53

R_F VALUES OF SOME *Vinca minor* L. ALKALOIDS

(J. TROJÁNEK, O. ŠTROUF, K. KAVKOVÁ AND Z. ČEKAN, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2045)

Solvents: S_1 = Petroleum ether (50–70°) shaken with 10% I_1.
S_2 = Methanol–1% acetic acid (1:4).
S_3 = Methanol–5% acetic acid (1:1) saturated with octan-2-ol.
Paper: P_1 = Whatman No. 4 (descending).
P_2 = Whatman No. 3 (descending).
Time of run: S_1, 1 h; S_2, 6 h; S_3, 7 h.
Temperature of run: 18–20°.
Impregnation: I_1 = Ammonium formate, anhydrous (50 g/l) dissolved in formamide–ethanol (1:6). Formamide solution initially adjusted to pH 9.9 with 25% ammonia. Resultant pH 7.5.
I_2 = 10% liquid paraffin in petroleum ether.
I_3 = 10% octan-2-ol in acetone.
Detection: Initial heating to 100–110°, then U.V. light or Dragendorff reagent spray.

Compound	F_F			U.V. fluorescence*
	$S_1P_1I_1$	$S_2P_2I_2$	$S_3P_2I_3$	
Vincaminorine	0.93	0.14	0.48	y(S_2S_3)
Vincaminoreine	0.93	0.66	0.72	wy
Vincamidine	0.39	0.71	0.69	wy

* y = yellow; w = weak.

TABLE 54

R_F VALUES OF SOME LYSERGIC ACID DERIVATIVES

(M. SEMONSKÝ AND V. ZIKÁN, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 2038)

Solvent: Chloroform.
Paper: Not given.
Impregnation: Formamide–5 % ammonium formate.
Detection: U.V. light.

Compound	R_F
d-Isolysergic acid (+)-3-cyclopentyl-1-hydroxy-2-propylamide	0.94
d-Lysergic acid (+)-3-cyclopentyl-1-hydroxy-2-propylamide	0.56
d-Isolysergic acid (—)-3-cyclopentyl-1-hydroxy-2-propylamide	0.89
d-Lysergic acid (—)-3-cyclopentyl-1-hydroxy-2-propylamide	0.66

TABLE 55

R_F VALUES OF SOME STEROIDS

(J. R. SWARTWOUT, J. W. DIECKERT, O. N. MILLER AND J. G. HAMILTON, *J. Lipid Research*, 1 (1960) 281)

Solvents: S_1 = Isooctane.
S_2 = Benzene–isooctane (1:1.5).
S_3 = Benzene.
S_4 = Benzene–isooctane (1:1).
S_5 = Benzene–isooctane (2:1.25).
S_6 = Benzene–ethanol (100:1).
S_7 = Isooctane–acetic acid (200:3).
S_8 = Isooctane–acetic acid (200:7).
Paper: Glass paper No. X-934-AH (Reeve Angel & Co., Clifton, N. J.; 15 × 19 cm, ascending).
Impregnation: I_1 = The paper is heated (600° for 30 min), cooled, dipped in aqueous 0.4 % sodium silicate, freed of excess with glass rod and dried over hot plate.
I_2 = Silicic acid (J. W. DIECKERT, W. B. CARNEY, R. L. ORY AND N. J. MORRIS, *Anal. Chem.*, 30 (1958) 1442).
Time of run: 7 min.
Detection: Sulphuric acid (conc.) spray, then charred by heating (230°, 4 min).

Compound	R_F							
	S_1I_1	S_2I_1	S_3I_1	S_4I_1	S_5I_1	S_6I_1	S_7I_1	S_8I_2
Coprostanone	0.88							
Cholesterol	0.54							
β-Cholestanol	0.54							
β-Sitosterol	0.54							
Coprostanol	0.70							
Progesterone		0.71						
Pregnane-3α, 20α-diol			0.29					
Allopregnane-3β,20α-diol				0.57				
Androsterone					0.47			
Dehydroepiandrosterone				0.59				
Epiandrosterone				0.66				
Testosterone				0.38				
Oestrone				0.54				
Hydrocortisone						0.50		
Lithocholic acid							0.50	
3,12-Diketocholanic acid								0.64

TABLE 56

R_F VALUES OF SOME STEROIDS

(P. KABASAKALIAN AND A. BASCH, *Anal. Chem.*, 32 (1960) 458)

Solvents: S_1 = Chloroform–formamide.
S_2 = Benzene–formamide.
S_3 = Toluene–propylene glycol.
S_4 = Ligroin–propylene glycol.
S_5 = Heptane–methyl cellosolve.
S_6 = Heptane–phenyl cellosolve.
(*cf.* R. NEHER, *J. Chromatog.*, 1 (1958) 205).

Paper: Whatman No. 1 (descending).

Impregnation: 35 % propylene glycol in methanol; methyl cellosolve, undiluted; phenyl cellosolve, 18 % in acetone (v/v); formamide, stabilised reagent grade (Fisher Scientific Co.).

Temperature of run: 22°.

Detection: Not given.

Compound	R_F					
	S_1	S_2	S_3	S_4	S_5	S_6
11α,17α,21-Trihydroxy-16α-methyl-1,4-pregnadiene-3,20-dione	0.23					
11α,17α,21-Trihydroxy-16α-methyl-1,4-pregnadiene-3,20-dione 21-acetate		0.14				
9α-Fluoro-11β,17α,21-trihydroxy-16α-methyl-1,4-pregnadiene-3,20-dione						
9α-Bromo-11β,17α,21-trihydroxy-16α-methyl-1,4-pregnadiene-3,20-dione 21-acetate	0.17	0.27				
9α-Fluoro-11β,17α,21-trihydroxy-16α-methyl-1,4-pregnadiene-3,20-dione 21-acetate		0.22				
3β,17α,21-Trihydroxy-16α-methylallopregnan-20-one 21-acetate			0.41			
16α-Methyl-17α,21-dihydroxy-1,4-pregnadiene-3,20-dione 21-acetate			0.71			
16α-Methyl-17α,21-dihydroxy-1,4,9(11)-pregnatriene-3,20-dione 21-acetate			0.65			
9β,11β-Epoxy-16α-methyl-17α,21-dihydroxy-1,4-pregnadiene-3,20-dione 21-acetate			0.62			
3β-Hydroxy-5,16-pregnadien-20-one				0.18	0.18	
3β,17α-Dihydroxy-16α-methyl-21-bromoallopregnan-20-one				0.07		
16α-Methyl-17α,21-dihydroxyallopregnane-3,20-dione 21-acetate				0.15		
2ε,4ε-Dibromo-16β-methyl-17α,21-dihydroxyallopregnane-3,20-dione 21-acetate				0.09		
22α-5-Spirosten-3β-ol(Diosgenin)					0.52	0.24
3β-Hydroxy-5,16-pregnadien-20-one 3-acetate					0.55	
3β-Hydroxy-16α-methyl-5-pregnen-20-one					0.24	0.17
3β-Hydroxy-16α-methylallopregnan-20-one					0.24	0.18
16β-Methyl-17(20)-allopregnene-3β,20β-diol 3,20-diacetate						0.80
16α-Methyl-17α,20α-epoxyallopregnane-3β,20β-diol 3,20-diacetate						0.21

TABLE 57

R_F VALUES OF SOME TRITERPENE ALCOHOLS

(B. PASICH, *Dissertationes Pharm.*, 12 (1960) 201)

Solvents: S_1 = Benzene (purified: B. PASICH, *Dissertationes Pharm.*, 11 (1959) 23).
S_2 = Toluene (agitated with 7% H_2SO_4 (4 h), then washed with NaOH, water and distilled).
S_3 = Cyclohexane (analytical reagent grade).
S_4 = Xylene (refluxed with 90% H_2SO_4 (4:1) for 2 h, then distilled).
Paper: Whatman No. 1 (12 × 40 cm).
Impregnation: Al_2O_3 (B. PASICH, *Dissertationes Pharm.*, 11 (1959) 23); reactivation by heating (110° for 1 h).
Length of run: 30 cm.
Time of run: 3–3.5 h.
Temperature of run: 18°.
Detection: D_1 = $SbCl_5$ in $CHCl_3$.
D_2 = $SbCl_3$ in $CHCl_3$.
D_3 = Phosphotungstic acid in ethanol.
D_4 = Silicotungstic acid in ethanol (25%; spray and heat to 115–118° for 2 min).
D_5 = $ZnCl_2$ in benzoyl chloride.
D_6 = Acetic anhydride and H_2SO_4.
D_7 = Chlorosulphonic acid and Sesolvan NK (Badische Anilin u. Sodafabrik, Ludwigshafen a.Rh.). Dried chromatogram is dipped into Sesolvan NK, transferred to glass plate covered with thin layer of the acid, more of the acid is then rolled on with a glass rod.
D_8 = Red blood cell suspension.
(For D_1 and D_2 see B. PASICH, *Dissertationes Pharm.*, 11 (1959) 23; for D_3–D_6 see B. PASICH, *Dissertationes Pharm.*, 11 (1959) 31.)
Sensitivity: Mean sensitivity in $\mu g/cm^2$.
Light source: V = visible; U.V. = ultraviolet.

Compound	*R_F*				*Colour**										
					D_1	*D_2*		*D_3*	*D_4*	*D_5*		*D_6*		*D_7*	*D_8*
	S_1	S_2	S_3	S_4	*V*	*V*	*U.V.*	*V*	*V*	*V*	*U.V.*	*V*	*U.V.*	*V*	*V*
Aescigenin	0.03	0.08	0.03	0.04	gn	v	r–v	g–gn	gn–bn	gn	bn	gn–b	gn–bn	pi	h
Primulagenin A	0.04	0.09	0.05	0.06	pi	v	pi	ch	pi–ch	ch–bn	y	ch	v	pi	h
Arnidiol	0.28	0.11	0.23	0.13	bn	ch	r–o	g–pi	y	o	p–y	o	y–bn	pi	h
Betulin	0.31	0.30	0.33	0.16	bn	y	y	pi–bn	p–pi	o	p–b	o	y	pi	h
Lupeol	0.53	0.49	0.45	0.24	bn	o–pi	pi–y	pi–y	bn–pi	o	b	o	y–bn	pi	h
α-Lactucerol	0.76	0.67	0.64	0.42	v	pi	pi–y	pi	p–pi	pi	ch	o	o	pi	h
Sensitivity	—	—	—	—	2–5	20–30		5–8	10–20	5–8		8–10		8–10	5–20

* b = blue; bn = brown; ch = cherry; g = grey; gn = green; h = haemolysis; o = orange; p = pale; pi = pink; r = red; v = violet; y = yellow.

TABLE 58

R_F VALUES OF SOME AZULENES

(V. SÝKORA AND K. VOKÁČ, *Collection Czechoslov. Chem. Communs.*, 25 (1960) 1702)

Solvents: S_1 = 10.10 % HCl.
S_2 = 13.38 % HCl.
S_3 = 15.37 % HCl.
S_4 = 20.07 % HCl.
S_5 = 25.05 % HCl.
Paper: Whatman No. 1 (ascending).
Impregnation: I_1 = 10 % paraffin oil.
I_2 = 20 % paraffin oil.
I_3 = 30 % paraffin oil.
Impregnation carried out with the paraffin oil in petroleum ether b.p. 40–60°, v/v).
Time of run: 3 ½ h (I_1); 4 h (I_2); 5 h (I_3).
Detection: Visible light; EM-reagent spray on chromatogram washed to neutrality.

Compound	*I*	R_F				
		S_1	S_2	S_3	S_4	S_5
Vetivazulene	I_1	0.01	0.04	0.08	0.43	0.76
	I_2	0.01	—	0.05	0.35	0.71
	I_3	0.00	—	0.03	0.23	0.57
S-Guiazulene	I_1	0.03	0.11	0.24	0.59	0.83
	I_2	0.02	—	0.17	0.58	0.80
	I_3	0.00	—	0.10	0.48	0.74
Se-Guiazulene	I_1	0.04	0.23	0.42	0.75	0.87
	I_2	0.04	—	0.26	0.69	0.88
	I_3	—	—	0.22	0.57	0.77
Chamazulene	I_1	0.08	0.28	0.42	0.78	0.82
	I_2	0.04	—	0.30	0.68	0.80
	I_3	0.03	—	0.25	0.55	0.83
Se-Chamazulene	I_1	0.13	0.39	0.53	0.84	0.87
	I_2	—	—	—	0.79	0.89
	I_3	—	—	—	—	—
2-Methylchamazulene	I_1	0.08	0.30	0.40	0.76	0.82
	I_2	0.04	—	0.35	0.68	0.82
	I_3	0.03	—	0.28	0.62	0.81
2-Ethylchamazulene	I_1	0.22	0.59	0.67	0.83	0.86
	I_2	0.13	—	0.58	0.81	0.85
	I_3	0.09	—	0.55	0.78	0.85
Artemazulene	I_1	0.54	0.67	0.77	0.82	0.83
	I_2	0.35		0.69	0.83	0.84
	I_3	0.31		0.66	0.82	0.87