Variety	Mildew score	Significance	
Juliana	-2.9	$P < 0.01$	resistant
Iron III	-2.7	$P < 0.01$	resistant
Wilhelmina	-2.6	$P < 0.01$	resistant
Desprez 80	-2.5	$P < 0.02$	resistant
Weibull's Standard	-2.0	$P < 0.05$	resistant
Als	-1.3		
Garton's 60	-0.3		
Victor	0	Average	
Steadfast	0		
Red Standard	$+0.1$		
Wilma	$+0.2$		
Yeoman I	$+1.5$		
Holdfast	$+2.3$	$P < 0.05$	susceptible
Little Joss	$+3.3$	$P < 0.01$	susceptible
Warden	$+9.3$	$P < 0.001$	susceptible

While mildew is not a factor of major importance in determining yield of wheat under British conditions, these data are of interest since, so far as I am aware, no numerical data of similar scope have previously been published.

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White Plumage of Sea-Birds

IN recent correspondence, Craik[1] has suggested that the white plumage of gulls and some other sea-birds might be an advantage to them by rendering them less visible to the fish on which they prey. This interpretation was questioned by Pirenne and Crombie[2], partly on the grounds that it is by no means certain that fish can see birds in the air, whatever their colour. This uncertainty, however, does not arise in the case of birds of prey which hunt over land, for these are undoubtedly seen by their prey. The reactions of other birds to a passing hawk have often been described. It would seem, therefore, that if a white under-surface were of adaptive value to birds which hunt against a background of sky, this form of cryptic coloration would be found among predaceous land-birds. Yet none of the eagles, hawks or owls have the pure white plumage of gulls. Some are certainly very pale on the under-surface, but there does not seem to be a greater tendency among these birds to have light-coloured under-parts than there is among other land-birds.

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[1] Craik, K. J. W., NATURE, **153**, 288 (1944).
[2] Pirenne, M. H., and Crombie, A. C., NATURE, **153**, 526 (1944).

The Hole Theory of Liquids

RECENTLY, Fürth[1], in a series of papers, has developed the hole theory of the liquid state. A liquid is regarded as a continuum permeated by a large number of holes, the number of holes being comparable to the number of particles in the liquid. The motion of the holes in the material continuum is similar to that of particles in a gas, and the hole theory on this account has a formal similarity with the kinetic theory of gases. A hole has four degrees of freedom, three of translation and one corresponding to a change in its radius. The average period for radial oscillation of holes is found to be

$$\Gamma_0 = 0\cdot17 \frac{\rho^{1/2} (kT)^{3/4}}{\sigma^{5/4}},$$

which is of a far smaller order of magnitude than the meanlife Γ of the hole. σ represents the surface tension of the liquid, ρ its density, T the temperature and k is Boltzmann's constant. The meanlife as discussed by Fürth is the time for which a hole lasts before it is destroyed by evaporation of molecules into it. In determining the meanlife, Fürth has neglected the effect of curvature on the rate of evaporation. When this is taken into account, the hole theory affords a simple though, because of its inherent defects, not quantitatively accurate description of the variation of viscosity of liquids with pressure. For example, for pressures smaller than p_2, the internal pressure of the liquid, we have

$$\log_e q = \frac{0\cdot54M}{\rho RT}\, p,$$

where q is the ratio of the viscosity under pressure p(kgm./cm.^{2}) to that under atmospheric pressure, M the gram molecular weight, and R the gas constant. For most liquids p_i is of the order of 10^3 kgm./cm.^{2}.

It is interesting to observe that (on certain assumptions) the thermal conductivity of a liquid can be connected with the period of the radial oscillations of a hole. We find that the theory requires

$$C \equiv 2\chi/\rho^{1/2} S\, (\sigma kT)^{1/4}$$

to be a constant and equal to *unity* for all unassociated liquids. In the above expression, χ is the thermal conductivity and s the specific heat per unit mass. The accompanying table gives the observed values for C—the average value for non-metallic liquids is about twice the theoretical value. In the case of metallic liquids, the observed value for C is of the order of 10^2; this is as it should be, for in metallic liquids the conductivity is due to electrons and the hole theory is inapplicable.

Substance	Temperature (T°K.)	Thermal conductivity, χ (watts/cm. deg.)	Specific heat, S (joule/gm.)	Surface tension, σ (dyne/gm.)	C
Mercury	273	8360	0·14	466	158
H_2O	293	587	4·18	74·2	2·1
C_6H_6	293	170	1·7	28·9	2·1
CCl_4	273	110	0·84	28·0	2·0
C_6H_8O	273	180	2·0	44·0	1·6
CH_3OH	293	209	2·5	22·6	1·9
CS_2	293	161	0·96	33·8	2·7
$CHCl_3$	285	138	0·95	28·5	2·3
$C_4H_{10}O$	293	138	2·29	17·0	1·5
C_3H_6O	293	179	2·21	23·7	1·8

The full account of this work will appear in the *Proceedings of the National Institute of Sciences, India.*

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[1] Fürth, R., *Proc. Camb. Phil. Soc.*, **37**, 252 (1941).

Deformation of Rubber-like Materials

IN a recent paper on the highly elastic deformation of polymers, Aleksandrov and Lazurkin[1] give the following expressions, first for the total deformation $D(t)$ of rubber at time t after application of a constant stress:

$$D(t) = D_0 + D\infty\ (1 - e^{-t/\tau}), \quad . \quad . \quad . \quad . \quad (1)$$

and second, for the amplitude D of deformation under a harmonic stress.