ents the plane of polarization of the vertical beam and the observer is supposed to move around the circle turning his analysing 'Polaroid' as indicated by the arrows.

An explanation of the effect is suggested by the following experiment. A graphite surface is mounted in a beaker of water so as to be inclined at 45° to the vertical, and a beam of plane polarized light is directed on it vertically downwards. As the beaker is rotated, the horizontal reflected beam is found to vary as regards the orientation of the plane of polarization in much the same manner as the scattered light from the solution, although complete extinction is not obtained in this case. It is therefore suggested that the graphite particles are in the form of (hexagonal) flakes which are, of course, chaotically oriented. At any instant a number of them will be so inclined as to reflect the light in the direction of the eye. The inclination of the plane of polarization of the scattered light will then depend on the angle between the plane of polarization of the incident (vertical) ray and the plane of incidence (and observation).

I have not found any previous reference to this phenomenon, which is possibly of sufficient interest for record.

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¹ Strutt, *Phil. Mag.*, **41**, 107 and 274 (1871).

Magnetic Permeability of Nickel in the Region of Centimetre Waves

It is well known that the magnetic permeability of ferromagnetic materials decreases towards unity in the region of centimetre waves. The measurements by Hoag and Jones¹ extend only down to 20 cm. wave-length (undamped oscillations); all the older measurements used damped oscillations.

In order to check the theory of the effect², I made measurements with undamped oscillations of four wave-lengths ranging from 3.20 cm. to 20.1 cm. The shielding effect of a thin foil of the investigated material placed between coupling loops of the transmission lines was measured. Films of pure nickel evaporated *in vacuo* on glass plates have been compared with silver films. The specific resistance of both films being known, the magnetic permeability can be computed. The results for nickel films about 1000-2000 Å. thick are shown on the accompanying graph. As the energy of oscillations was relatively small (10-100 mW.), only films of low shielding power could be measured accurately and their thickness had to be small. It was also found that the static permeability decreases with the thickness from about 22 for 2300 Å., to unity for zero thickness. The investigation is being continued.

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¹ Hoag and Jones, *Phys. Rev.*, **42**, 571 (1932).

² Becker, *Z. Tech. Phys.*, **19**, 542 (1938).

Solubility and Heat of Solution of Caprylic Acid in Water

IN connexion with experiments on the foaming of aqueous solutions of capillary-active substances, we have determined the solubility of caprylic acid, m.p. 16.5°C , in water over the range $0-90^\circ\text{C}$.

At the higher temperatures we used a solution of known concentration and rapidly determined the temperatures at which milkiness appeared and disappeared. The mean was taken as the temperature of saturation. At the lower temperatures the acid was stirred with water at constant temperature in a large Dewar flask for some days, and eventually filtered through a plug of cotton-wool. The filtrate was sucked directly by a carefully regulated pump into a calibrated pipette. Concordant results were obtained by approaching the equilibrium from both sides at each temperature. Considerable time is necessary for the attainment of complete saturation from the unsaturated side, but supersaturated solutions come into equilibrium with the solid substance more quickly.

At the higher temperatures care is necessary to guard against the great volatility of the acid in water vapour.

The results obtained are as follows:

Temperature	Solubility
$0-0^\circ\text{C}$.	0.0594 gm./100 gm. solution
6.1	0.0661 " " "
11.8	0.0714 " " "
18.8	0.0818 " " "
52.2	0.1322 " " "
89.5	0.1996 " " "

The simple logarithmic formula

$$\log_{10} c = a - b/T$$

describes the results accurately with $a = 0.916$ and $b = 586$ and $T = ^\circ\text{Absolute}$.

The heat of solution of the acid so calculated is -2680 calories per gram molecule. It is remarkable that no abrupt change is visible in the solubility curve when the temperature passes through the melting point of the acid.

A full account will be published later.

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Effect of Heat on Wool, Cotton and Nylon

TEXTILE fibres, especially those included in certain mechanical cloths exposed during use to high temperatures, show obvious deterioration after the lapse of time. Thus, when aqueous extracts of such woollen and cotton cloths, so damaged, have been examined, they have always been found to be of relatively low pH value and high electrical conductivity as compared with extracts of the original material. Also, it has been observed that in cases where one side of a thick cloth is in contact with heated drying cylinders, there is a progressive increase in the pH values and a decrease in the conductivity figures of the extracts as one proceeds from the heated side. It was found, for example, that the fibres taken from the side of a woollen dry felt in contact with the heated cylinder gave a pH value of 3.82, whereas those from the middle and from the outside of the felt gave extracts of pH 4.46 and 5.36 respectively.

The adverse effect of high temperatures on the physical properties of these materials is well known, and figures showing the effect of heat on the strength, extensibility and weight of both wool and cotton have been published by Marsh¹. A study of the effect of heat on the tendering of yarns and fabrics, including cotton, worsted and nylon, has been made by the British Cotton Industry Research Association². In the case of cotton and nylon, the chemical effects of heat treatment do not appear to have been widely investigated, but in the case of wool some notes published by Woodmansey³ deal with the evolution of ammonia and hydrogen sulphide. The development of acidity, due, in part, to the oxidation of wool sulphur to sulphuric acid, was noted. In a more recent work by Skiern and Rouette⁴, the relationship between heat damage and the evolution of ammonia and sulphur-linkage breakdown under varying conditions of acidity and alkalinity is the subject of a detailed investigation, which also deals with the changes in thickness and tensile strength of fibres.

Heated at 150°F . for :	pH values			Conductivity (dionic units)		
	Wool	Cotton	Nylon	Wool	Cotton	Nylon
Control	6.74	6.64	5.47	124	12	8
1 hr.	6.29	5.93	4.76	183	25	18
2 "	5.80	5.33	4.37	208	29	21
4 "	5.10	5.77	4.39	246	31	26
6 "	4.18	5.70	4.20	281	38	29
8 "	4.29	5.60	4.05	288	38	37
12 "	3.08	5.29	4.06	345	45	38
16 "	3.65	—	4.00	360	—	40
20 "	3.66	5.05	3.98	350	48	43
24 "	3.37	4.94	4.00	390	52	40
28 "	3.41	—	—	393	—	—
36 "	3.26	4.85	3.99	447	48	42