OBITUARY

It is difficult to realize that Otto Hehner is gone from us. The blow is all the more severe because it was so unexpected. He was attacked by malaria and died on September 9th.

Otto Hehner was born November 25th, 1853, at Marienberg, in Nassau. His father was a judge of the High Court of Appeal in Wiesbaden, and it was doubtless this legal strain in his blood which gave him that intuitive grasp of the legal aspects of the case, which was freely acknowledged by the leaders of the English Bar, who so often met him in consultation. He was educated at Wiesbaden, studied chemistry under Fresenius until in 1873 he moved to Glasgow where he became assistant to Professor Bischof. At about the same time Ramsey was also starting his professional career also as assistant to Bischof and the association between the two young men was formed which closed only with Ramsey's life.

Among the outstanding investigations associated with his name it may be recalled that the method of analyzing beeswax, based upon the constant ratio of free cerotic acid to myricin, was first devised by Hebner in 1881 (*Analyst*, **1881,** 8, 16), and that Hubl, whose name is associated with the method, did not publish the same discovery until a few months later. The dichromate method of estimating glycerol in fats was another contribution to analytical chemistry and has long been accepted as a standard process (*Analyst*, **1888,** 12, 44), and the Hehner method of estimating the hardness in water without the use of soap solution is almost as widely known (*Analyst*, **1884,** 8, 77).

The characteristics which must have struck everyone first in dealing with Hehner were his straightforwardness, his love of justice and the simplicity of his nature. To those who did not know him well his manner might seem brusque at times, and he was inclined to be impatient with those whose brains moved more slowly than his. Yet these were only surface faults, and beneath was a deep vein of genuine sympathy. None of his friends ever turned to him in vain for counsel or help, and only those who were closely associated with him know of his many acts of kindness and generosity even to complete strangers. His outlook on life was shrewd, but never cynical, and was always instinct with a broad humanity. When the writer first knew him he was inclined to be dogmatic in the expression of his views, but time softened this and in his later years he showed a kindly tolerance of the opinions of those from whom he differed.

In his chemical work he showed that gift which is akin to genius, of seeing instinctively the crux of a problem, and he would eagerly devise ingenious methods of testing the truth of its hypothesis. At the same time he had the drawback, which is frequently part of such a temperament, of being too readily discouraged if his first efforts were unsuccessful.

Much of his time was spent in the Law Courts, and he was never happier than when he was working up the chemical side of a case and devising experiments which could be shown in Court to convince judge and jury of the truth of his contention. He was an excellent witness, clear and concise in his evidence, and always ready with a humorous answer for a cross-examining counsel.

Although in the later years of his life he was denied the happiness of the home life for which he was so well fitted, he remained unsoured, and was always ready to join in any piece of boyish fun on hand. In one of his letters to the writer he mentioned how happy he had been in his friendships throughout life. He was a lovable man, and his death makes a great and lasting gap in the lives of all of us who loved him.

C. A. MITCHELL.*

ABSTRACTS FROM OTHER JOURNALS

The recognition of hydrogenated oils. K. A. WILLIAMS, B.SC., AND E. R. BOLTON, F.I.C. *The Analyst*, October, **1924.**—The test most widely applied for the detection of hydrogenated oils is based on the presence of traces of nickel in the oil. The evidence given by this test is confirmed by the use of certain tests of minor importance and of doubtful reliability such as microscopic examination of the crystals deposited from solutions of fat in ether. Unless nickel is found in considerable quantities the test is of little value as nowadays hydrogenated fats are manufactured free of all sub-

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* From the *Analysis*, **49,** 502 (Nov , 1924.)

stances. The authors of this process for the detection of hydrogenation depend on the presence of iso-oleic acid and use mostly petroleum spirit and methylated ether in separating the salts. Petroleum ether tests lead to erroneous results. An iodine value over 5 for the spirit acids is taken as an indication of the relative amount of iso-oleic acid present. A drastic change in the composition of hydrogenated oils has recently resulted from a modification of the methods employed, by the introduction of a continuous process, whereby a flow of oil passes through a relatively large mass of catalyst. The process can be operated so as to produce (*a*) the normal proportion of iso-oleic acid in the product or (*b*) a reduced amount. It will be obvious that the control of the proportion of iso-oleic acid on a commercial scale militates against the accuracy of the deductions made from the process the use of which the authors have suggested, with the result that in cases where the method of hydrogenation employed is unknown the proportion of hydrogenated oil may be largely over-estimated. The value of the process for the actual detection of hydrogenated oil remains, however, unaltered.

Relation between the iodine values and refractive indices of hardened oils. II. H. E. Watson and J. J. Sudborough. *J. Indian Inst. Sci.* **7,** 81–95(1924).—Iodine values and refractive indices for oils of different degrees of hydrogenation are recorded for argemone, English mustard, rocket, Indian Rape, cashew-kernel, soya bean, poppy seed, rayan, olive, seal and cod-liver oils. Rocket, mustard and rape oils are higher refractive indices for a given iodine value than all the other oils examined except castor and argemone oils, this being attributed to the presence of glycerides of erucic acid. The high ratio of refractive index to iodine value for argemone oil is not due to glycerides of erucic acid, but to diglycerides and glycerides of hydroxy acids. The refractive index for completely hardened olive oil ($n^{60}_{D} = 1.4463$) agrees very closely with that of the purest tristearin (1.4462). Most of the curves showing the relation between iodine value and refractive index are approximately parallel, but the curve for seal oil is exceptional and crosses most of the others. Full numerical details and tables are given. (Cf. *J.,* **1923,** 103*a*.) (From *J. S. C. I.,* **43,** No. 37.) P. M.

Separation of solid saturated from liquid fatty acids. D. Holde, M. Selim and W. Bleyberg. *Z. Deut. Öl- Fett-Ind.* **44,** 277–9(1924); *Chem. Zentr.* **95,** II, 903 (1924).—One grm. of the mixed fatty acids is dissolved in 50 cc. of 96% alcohol, neutralized with *N*/2 or *N*/10 alcoholic potassium hydroxide, diluted with the same solvent to 125 cc., and 65 cc. of water and 35 cc. of 4% thallous sulfate solution are added at the ordinary temperature. The thallous salts of the solid acids are separated by filtration through a fluted filter, and after washing, the free fatty acids are liberated from the precipitate and the filtrate by means of sulfuric acid, and determined gravimetrically after removal of the solvent. 100 g. of water dissolve 0.0461 g. of thallous oleate at 15°, and 0.3034 g. at 80°; 100 g. of 50% alcohol (by vol.) dissolve 0.0247 g. at 15%, and 100 g. of 96% by volume alcohol dissolve 2.254 g. at 15°. Excess of potassium hydroxide or of potassium soaps in presence of a small quantity of alcohol greatly increase the solubility of thallous oleate in water. (Through *J. S. C. I.,* **43,** No. 37.) P. M.

So-called polymerization of drying oils. H. Wolff. *Z. angew. Chem.* **37,** 729–32(1924).—The change of properties of drying oils, such as linseed oil and tung oil, on heating is usually attributed to polymerization. The chief characteristics of this change are a greatly increased viscosity, some slight increase in density, and an appreciable diminution in the iodine value. In the case of linseed oil there is a considerable increase in the acid value, but this is not the case with tung oil. The increase in viscosity and the fall in the iodine value do not take place concurrently, the increase in viscosity taking place chiefly after the iodine value has fallen to a constant. Molecular weight determinations, using benzene or chloroform as solvent show some evidence of polymerization, but the results are of very little value on account of the tendency of these solvents to cause association. Intramolecular polymerization may take place between two or more unsaturated acid groups in the same molecule of glyceride, and to detect this it would be necessary to determine the mean molecular weight of the fatty acids obtained by saponification instead of the mean molecular weight of the glycerides. This was done, using camphor as a solvent, as it shows no associating power. No trace of polymerization could be detected in the fatty acids obtained from even the most highly thickened tung, linseed or soya bean oils. For example, linseed oil gave fatty acids with a molecular weight of 285, and the most highly thickened oil with a viscosity 250 times as great as that of the original linseed oil gave fatty acids with a mean molecular weight of 280. There can therefore be not more than a trace of polymerization in the process of thickening, and it is concluded that the phenomenon is actually a colloidal gelation in which at most only a small portion of the oil actually undergoes a chemical change. This is similar to the formation of a jelly by the addition of only 1% of gelatin to water. This view is supported by the fact that a large proportion of unchanged oil can be recovered from a highly gelatinized tung oil. (Through *J. S. C. I.*, **43,** No. 46.) P. M.

Polymerization of linseed oil. J. N. Friend and H. J. Alcock. *J. Oil and Colour Chem. Assoc.* **7,** 146–52(1924).—Linseed oil when heated in glass vessels in an atmosphere of nitrogen, does not undergo appreciable changes below 200°. Above this temperature there is a slight increase in density and viscosity which becomes more pronounced at about 250°. The fall in iodine value begins below 200°, but becomes more marked at 200–250°. In one sample polymerization began below 100° with prolonged heating and became very pronounced above 200°. The molecular weight determined by the freezing point of 10% benzene solutions increases somewhat as polymerization proceeds. It is necessary to use solutions of the same concentration in the molecular weight determination, as the apparent molecular weight of the oil diminishes with increased concentration of the solution, indicating combination between the oil and the benzene. (Through *J. C. S. I.*, **43,** No. 37.) P. M.

Theory of polymerization in fatty oils. II. R. S. Morrell. *J. Oil and Colour Chem. Assoc.* **7,** 153–60(1924); (cf. *J.*, **1915,** 105).—The degree of polymerization of drying oils is not accurately indicated by the determination of the iodine value, on account of the depolymerizing action of some of the components of Wijs' solution. The molecular weight of these oils cannot be satisfactorily determined with benzene as a solvent, as esters show a tendency to combine with the solvent, and association will occur if acids be present. The polymerization of linseed oil may be extra-molecular as well as intra-molecular, and it must be viewed from a colloidal as well as a strictly chemical aspect. The ethyl esters of linseed oil and of tung oil show a greater gain in weight in "drying" than do the glycerides, but the resulting films are liquid and not solid, as in the latter case, where polymerization followed by gelation takes place. There is absorption of oxygen in both cases. (Through *J. S. C. I.*, **43,** No. 37.) P. M.

Bleaching of oils and fats, a colloid chemical problem. H. T. Twisselmann. *Seifenseider-Ztg.* **51,** 351–3(1924); *Chem. Zentr.* **95,** II, 560–1(1923).—The individual components of bleaching earths, *viz.*, aluminium silicate, calcium silicate, magnesium silicate, magnesia, magnesium chloride, ferric oxide and silica showed no bleaching action, even when mixed in the same proportion as in the bleaching earths. The presence of ignited organic substances (sugar or albumin) also conferred no bleaching action on them. The bleaching action of the earths is due to their particles being electrically charged. By vigorous grinding the synthetic mixtures become electrically charged, and acquire bleaching power, and conversely active bleaching earths lose some of their activity when they are stirred with water to neutralize their electrical charges, dried at 120–150°, and then ground. Oils, therefore, should be perfectly dry when submitted to the bleaching treatment. Other physical properties, such as capillarity, surface tension and coagulation temperature of the colored substance, are of importance. The bleaching properties of the earths are improved by fine grinding. Bleaching earths containing oil are best revivified by treatment with petrol, benzene or trichloroethylene in rotary extractors. The colloidal dispersions of the earth in the mixtures of fat and solvent can be separated by the addition of a solution of salt (an oppositely charged electrolyte). (Through *J. S. C. I.*, **43,** No. 37.) P. M.

Preparation and reactivation of metallic catalysts used in the hydrogenation of oils and the like substances. Technical Research Works, Ltd., and E. J. Lush. E. P. 221,000, May 31, 1923. The fresh or spent catalyst, freed from oil, etc., is oxidized at the surface with hypochlorous acid or its salts, washed and reduced in hydrogen, the operation being preferably carried out in situ. (Through *J. S. C. I.*, **43,** No. 46.) D. G. H.

Dehydrogenating action of nickel-copper catalysts. G. Kita, T. Mazume and K. Kino. *Chem. Umschau* **31,** 165–7(1924).—Catalysts of kaolin containing 16.9% Ni and 3.1% Cu, 14.0% Ni and 6.0% Cu, and 10.5% Ni and 9.5% Cu, respectively, were used. Stearic acid at 300–310° does not undergo dehydrogenation, but unsaponifiable substances are formed, the iodine value of which increases with increase of copper in the catalyst. With herring oil, dehydrogenation of the fatty acids takes place at 200°, and at 170° with those catalysts containing more copper, and hydrogenation with those containing only nickel or nickel with a small quantity of copper. The catalyst containing little copper shows slight dehydrogenation at 100°. The temperature of reduction of the catalyst has an important effect; that reduced at 340–350° shows some dehydrogenating activity even at 100°, but that reduced at 220–230° shows none at any of the temperatures employed. (Through *J. S. C. I.*, **43,** No. 37.) M. P.

Constituents of American (Mississippi Delta) cotton wax. P. H. Clifford and M. E. Probert. *J. Text. Inst.* **15,** 401–13*t*(1924).—The method previously employed for extracting the wax of American cotton (Fargher and Probert, *J.*, **1923,** 263A.) was open to the objection that superheated steam was used for the heating and might cause saponification, and that the benzene used was impure. American Mississippi cotton has now been extracted with chloroform. The results obtained confirm those obtained previously, the only noteworthy error in the former results being due to the presence of impurities from the benzene in the hydrocarbon fraction. Using carbon tetrachloride as the extracting agent, the waxes obtained from the Mississippi Delta cotton (0.49%) and American Upland cotton (0.35%) had the following characteristics: m. p. 76.5°, 80.5°; d 0.976, 1.005; acid value 29, 211; saponif. value 57, 76; saponif. value after acetylation, 137, 121; acetyl value 84, 48; iodine value 27, 20; unsaponifiable matter, 68%, 66%; acetyl value of unsaponifiable matter, 123, 117. The wax of the Mississippi Delta cotton contains, therefore, a lower proportion of combined acids and a higher proportion of free alcohols than the Upland cotton. A sterol, $C_{34}H_{58}O$ (m. p. 197–199°) which does not seem to have been described previously, was isolated. None of the acid occurs in the form of soaps. (Through *J. S. C. I.*, **43,** No. 40.)
S. H. H.

Action of chlorine water on unsaturated fatty acids. A. Grun, E. Ulbrich and J. Janko. *Z. Deut. Öl- Fett-Ind.* **44,** 169(1924); *Chem. Zentr.* **95,** II, 1032–3 (1924).—In accord with the observation of Margosches and Hinner (*B.*, **1924,** 341) that fats add not iodine but IOH, from iodine solutions, the authors find that a similar change occurs when chlorine acts on the unsaturated acids of fats in the presence of water. Oleic acid reacts with chloride in the presence of water and boric acid to form chlorohydroxstearic acid, iodine value 0.48. The neutralization value of the product indicates that partial formation of the anhydride occurs. The esters of oleic acid show similar behavior. The acids from marine animal oils exhibit the same properties but the tendency to form anhydride is greater. Neutral marine animal oils react in a similar manner but more slowly. (Through *J. S. C. I.*, **43,** No. 41.) F. B.

Action of halogens on unsaturated fats. J. J. Cerdeiras. *Bull. Soc. chim.* **35,** 902–4(1924).—The comparative rates of addition of Wijs' reagent and a solution of iodine in acetic acid to substances containing ethylenic linkages has been studied. In the case of olive oil and linseed oil, Wijs' reagent is some 3–4 times more reactive than the iodine in acetic acid solution, and in the case of oleic and linolenic acids some 2–3 times as reactive. In each case the reaction with Wijs' reagent is practically complete after 40 mins. (Through *J. S. C. I.*, **43,** No. 41.) A. E. C.

Removing odoriferous substances from oils and fats. H. Bollmann. E. P. 218,910, Nov. 19, 1923. The fatty oil flows down a column provided with horizontal partitions and packed with Raschig rings or the like. Steam flows in counter current to the oil passing up from one compartment to the next through short tubes with hoods suspended over them. The oil accumulates in a thin layer on the partitions, is freed from water by a heating coil, and passes through overflow tubes to the next stage, there undergoing similar treatment, and so on to the bottom stage. The oil is then treated with low pressure superheated steam in a vacuum apparatus to remove the last traces of water. (Through *J. S. C. I.*, **43,** No. 42.) D. G. H.

Natural soaps in soya beans. S. Muramatsu. *Nippon Kwagaku Kwai Shi* (J. Chem. Soc., Japan) **44,** 1035–49(1923).—The soaps contained in soya beans were extracted with warm 80% alcohol; the amount varied slightly in different species, *viz.*, from 1.44 to 1.86% on the dried material. By decomposing the soap with hydrochloric acid a mixture of fatty acids (42.22% of the total organic acids) and hydroxy acids (57.78%) was obtained. The fatty acids were separated into liquid acids (29.31% of the total acids), m. p. 38°, and solid acids (4.63%) m. p. 55°. From the latter a new acid, hispidic acid ($C_{34}H_{68}O_{17}$, white crystals, m. p. 224°, 36.93%) was isolated. It gives a hexa-acetyl derivative, m. p. 155), and its alkaline salt gives a viscous aqueous solution, which has a high foam producing and cleaning power. (Through *J. S. C. I.*, **43,** No. 42.) K. K.

Determination of fat in butter and margarine. J. Grossfeld. *Z. Unters. Nahr. Genussm.* **47,** 420–32(1924).—Five grams of the sample are placed in a flask, 100 cc. of trichloro ethylene was added, the flask is closed with a cork and the mixture is shaken until the fat has dissolved; 5 g. of ignited calcium sulfate are then added, the mixture is again shaken, the clear solution is filtered rapidly, 25 cc. of the filtrate are evaporated in a tared flask, and the residue of fat is dried at 105–110°, and weighed. A correction is applied for the slight loss of solvent during the filtration; this correction is found by experiment with pure fat alone. (Through *J. S. C. I.*, **43,** No. 46.)
W. P. S.