

SCI LECTURE PAPERS SERIES  
**THE ROLE OF THE SCI IN THE DEVELOPMENT  
OF OILS AND FATS TECHNOLOGY**

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I was asked to review the history of the Oils and Fats Group, but on reflection I thought it would be better to set this in the context of the Society's interest in oils and fats from its inception in 1881.

In his presidential address at the Society's first general meeting in 1881 Dr Roscoe reviewed recent advances in the chemical industry and referred to the soap trade as an important branch, producing ¼ million tons/year. The newly developed recovery of glycerine (valued at £120/ton) was saving imports from Germany and France.

In 1882 the first volume of the Journal appeared in monthly parts. Each part contained abstracts of patents and papers and Oils and Fats formed a substantial section. The original papers were mainly in German journals. This service continued for many years.

1882 also saw the formation of the London section. Original work and reviews were discussed at section meetings and the discussions were reported verbatim. Some examples will give a flavour of the times.

Several papers on fats were reported in the next two years, mainly on analysis, which was in a very unsatisfactory and rudimentary state. The only reliable chemical tests were saponification values and iodine or bromine numbers, but everyone had their own method for the latter. Desperate attempts were made to wring useful information out of the Maumené tests. This is the temperature rise given when an oil is mixed with strong sulphuric acid.

There was a serious shortage of solid fat for candles and soap and Mr WL Carpenter discussed a process patented by M. St Cyr Radisson in Marseilles. Oleic acid is converted into palmitic by heating to 608°F with 43° Beaumé caustic potash. Oleic acid fetched £20 per ton, while hard fatty acids were worth 3 times as much.

Another attempt to harden oleic acid was to isomerise it to elaidic acid. The pre-occupation with a shortage of hard fats continued until hydrogenation became practicable in 1900–1910, and a

large number of patents on the subject were being abstracted. Initially hydrogenation was used to turn liquid oils into soap fats, and only gradually was it introduced for margarine fats and “compound” lard substitutes.

Returning to 1883, the Liverpool section discussed a paper by AN Tate on sampling. Not surprisingly he had difficulty with palm oil arriving in barrels. We would agree today that sampling “needs integrity, experience and brains”. The Glasgow and West of Scotland section was inaugurated in 1884 with 158 members of whom 9 had interests in oils and soap. An incidental comment on the Railways at the time in the Chairman’s speech is worth quoting:

*“heavy, uneven charges and monstrous mismanagement” it was “cheaper to send goods to India and America than to London”.*

In 1886 AH Allen gave a paper on the “Examination of Fixed Oils”. He had had a letter from Chevreuil, the eminent French pioneer in Oils and Fats who, at that time, was 100 years old:

*“He intends to revise and complete his researches on fats and then devote his spare time to the neglected correspondence of the past 50 or 60 years.”*

Volume VI of 1887 carries a report of the Manchester Royal Jubilee Exhibition. There were 8 stands of soap, Joseph Crosfield’s exhibit was in the form of a Turkish Temple built entirely of soap bars. In this year Dr Julius Lewkowitsch emigrated from Germany to become chemist at Jos. Watson’s Whitehall soap works in Leeds. His name first appears in the membership list in 1890 and two years later he was a committee member of the Yorkshire section. He had already contributed a series of papers on analysis. They are striking in comparison with those of his contemporaries in employing a wider range of quantitative methods and in drawing firm conclusions. He was bluntly critical of the various colour reactions in use. He described them as useless, not reliable etc. Lewkowitsch took an active part in the discussion on a broad range of papers. He clearly enjoyed an argument and often was able to give detailed data to support his case. His criticisms were often strong. He described the Baumé hydrometer scale as “irrational” and the Twaddle scale as “meaningless”. I think they have not disappeared yet!

A recurrent research topic was the oxidation and polymerisation of oils, in relation to paints, and also to the use of olive oil for lubrication. Adulteration with more unsaturated oils led to gumming. L Archbutt of the Nottingham section was involved in these analyses for some 20 years.

In 1903 Lewkowitsch described 10 problem areas in oils and fats. The shortage of high melting point fats, hydrogenation technology, the chemistry of blown and boiled oils (a technique invented by the painter van Eyck) and of vulcanised oils and last but not least how glycerides were synthesised in nature.

In 1913 a curious article appeared on “Adipocene”, a hard fat found in human corpses after 30 years burial. It was high in palmitic acid, with an Iodine Value of 10 instead of the usual 41. No explanation was offered.

In 1914 European capacity for hydrogenation was 250,000 tons, mainly used for soap fats, while margarine production was close to ½ million tons. In 1911 TP Hilditch joined Joseph Crosfield, soap manufacturers of Warrington as research chemist. He studied fat hydrogenation. In 1914 EF Armstrong was appointed technical director at Crosfields and, together with Hilditch published an important series of papers on hydrogenation. In the 1920s Allan, Clarke and Moore at Crosfields were working on the fractional distillation of fatty acid esters of lauric and whale oils for analytical purposes, and published in the Society's journal. In 1925 Hilditch was appointed to the Chair of Industrial Chemistry at Liverpool University and asked to research on the chemistry of fats and fatty acids. Until his retirement in 1951 Hilditch and his students provided a steady stream of papers in the *JSCI*. The fatty acid and glyceride composition of many important and unusual fats were determined using simple techniques with great care. They were fractional crystallisation of fats, distillation of methyl esters, saponification values and iodine values. After graduation Hilditch's students worked in industry, university and research institutes and many continued to publish on oils and fats topics.

The initiative to form an Oils and Fats Group arose in the Food Group at over 1000 members, the Society's largest group. The Council asked Dr EB Hughes of Lyons Laboratories, the Group's Honorary Secretary at the time, to explore the idea with Professor Hilditch. Later in 1951 an inaugural meeting took place at which Hilditch presented a paper on the "Rational Grading of Seed Oils". He argued this should be on the basis of their linoleic acid content. This could "now be determined in 24 hours".

The Committee secretary was Harold Jasperson chief chemist of Bibby's and the Treasurer was Norman Sylvester from Lyons Laboratories. Both continued in office for a number of years.

At this point mention should be made of Leslie Lampitt, an officer of the Society for many years. He was not specifically interested in Oils and Fats but, as chief chemist of Lyons, he strongly encouraged his staff to join a scientific society. Their subscription was not paid for them, but they were enabled to attend meetings and take part in organising. As a result Sylvester, Barry Bullimore and I were at various times officers of the Group and regular participants in meetings. Not surprisingly, over the years a number of officers and committee members were old Hilditch students.

The Group developed a pattern of 7–10 evening meetings per year, usually devoted to a single speaker, occasionally to two. Meetings were held in London and the main provincial cities. The subjects covered both food and industrial applications, processing, basic chemistry, biological, analytical and legislative aspects. This pattern changed gradually with a greater emphasis on food related topics. Evening meetings proved less and less popular and there was a move towards less frequent ½ day, 1 day and 2 day meetings. Outstanding memories of domestic meetings include an early meeting in Cambridge on antioxidants, chaired by Hilditch, a meeting on frying at the Food Research Institute in Norwich. A 2-day meeting in December 1974 on Palm Oil at the Cumberland Hotel attracted a sell out audience of 200. The secretary (Barry Bullimore) took over £2,000 in cash on the day. Palm oil was just becoming an important component of world supplies at this time. Subsequent review meetings on palm oil chemistry, nutrition and its applications have proved popular. In 1976 the 25<sup>th</sup> anniversary of the group was celebrated with a tea party after the lecture, to which all available earlier office holders were invited.

In 1990 Professor Frank Gunstone, one of Hilditch's most eminent pupils, retired from St Andrews University and the occasion was marked by a one-day meeting at which a number of his students from as far away as Hong Kong and Ottawa gave papers. A sell-out meeting in 1993 at the Society's lecture room was on Antioxidants, Nutrition and Health. Highly successful meetings on Confectionery fats and on the technologies of fractionation, hydrogenation and interesterification have been held since then. They were noteworthy for the strong participation of foreign visitors. Two other well supported features of recent years have been a 2-day teach-in, intended to review the up to date technology for the benefit of relatively new entrants to the industry, (held in Liverpool) and a day in London given over to papers by young scientists, mainly PhD students.

Group membership has remained around 300–350 over the years. The Group has organised 3 major international conferences under the aegis of the International Society of Fat Research (ISF), in 1962 (London), 1978 and 1999 (both Brighton).

All three meetings were successful. The surplus from the 1978 meeting was used to fund an International Lectureship, which takes place every 2–3 years.

A fund raised in memory of Professor Hilditch provides for the Hilditch lecture, while Dr Elsa Lewkowitsch provided funds for lectures in her Will, for lectures in memory of her father. This gift specified that the lecture should be followed by refreshments for the audience. These lectureships enable internationally known scientists to be invited and significantly strengthen the regular programme.

In recent years a significant proportion of audiences has consisted of non-members of the group or of the Society and of delegates from continental Europe. Clearly the meetings provide a service to a wider audience than the oils and fats specialists. Over the last 5 years the Group Committee has been involved actively in discussions on the formation of a European Federation of Lipids. This is now becoming a reality and will result in a regular programme of meetings organised on a joint basis. This cooperation will enable us to participate in a wider programme and should result in larger audiences.

## Appendix 1

### Oils and Fats Group

	<b>Chairman</b>	<b>Secretary</b>
1951/1952	Prof TP Hilditch	Dr H Jasperson
1952/1953	Prof TP Hilditch	Dr H Jasperson
1953/1954	Prof TP Hilditch	Dr H Jasperson
1954/1955	Dr KA Williams	Dr H Jasperson
1955/1956	Dr KA Williams	Dr H Jasperson
1956/1957	Dr JA Lovern	Dr H Jasperson
1957/1958	Dr JA Lovern	Dr H Jasperson
1958/1959	Dr BJF Hudson	Dr H Jasperson
1959/1960	Dr BJF Hudson	Dr H Jasperson
1960/1961	Mr PN Williams	Dr H Jasperson
1961/1962	Mr PN Williams	Dr H Jasperson
1962/1963	Dr CH Lea	Dr H Jasperson
1963/1964	Dr CH Lea	Dr H Jasperson
1964/1965	Mr ND Sylvester	Dr H Jasperson
1965/1966	Dr WD Raymond	Mr H Lavery
1966/1967	Dr WD Raymond	Mr H Lavery
1967/1968	Dr BJF Hudson	Mr H Lavery
1968/1969	Dr BJF Hudson	Mr H Lavery
1969/1970	Prof FD Gunstone	Mr H Lavery
1970/1971	Prof FD Gunstone	Dr BK Bullimore
1971/1972	Mr KG Berger	Dr BK Bullimore
1972/1973	Mr KG Berger	Dr BK Bullimore
1973/1974	Dr AD Scott	Dr BK Bullimore
1974/1975	Dr AD Scott	Dr BK Bullimore
1975/1976	Dr PAT Swoboda	Dr BK Bullimore
1976/1977	Dr PAT Swoboda	Dr BK Bullimore
1977/1978	Dr A Crossley	Dr MJ Hayes/Dr BK Bullimore
1978/1979	Dr A Crossley	Dr MJ Hayes
1979/1980	Prof RJ Hamilton	Dr MJ Hayes/Dr PJ Barnes
1980/1981	Prof RJ Hamilton	Dr PJ Barnes
1981/1982	Mr J Podmore	Dr PJ Barnes
1982/1983	Mr J Podmore	Mr P Mountjoy
1983/1984	Dr FB Padley	Prof RJ Hamilton
1984/1985	Dr FB Padley	Prof RJ Hamilton
1985/1986	Dr BW Nichols	Prof RJ Hamilton
1986/1987	Dr BW Nichols	Prof RJ Hamilton
1987/1988	Prof ID Morton	Prof RJ Hamilton
1988/1989	Prof ID Morton	Prof RJ Hamilton
1989/1990	Dr R Burt	Prof RJ Hamilton
1990/1991	Dr R Burt	Prof RJ Hamilton
1991/1992	Dr MH Gordon	Prof RJ Hamilton
1992/1993	Dr MH Gordon	Prof RJ Hamilton
1993/1994	Mr KG Berger	Prof RJ Hamilton
1994/1995	Mr KG Berger	Prof RJ Hamilton
1995/1996	Mr W Hamm	Prof RJ Hamilton
1996/1997	Mr W Hamm	Prof RJ Hamilton
1997/1998	Dr R Timms	Prof RJ Hamilton
1998/1999	Dr R Timms	Prof RJ Hamilton
1999/2000	Mr J Podmore	Prof RJ Hamilton
2000/2001	Mr J Podmore	Prof RJ Hamilton

## Appendix 2

### THE HILDITCH MEMORIAL LECTURE commemorates

### PROFESSOR TP HILDITCH (1886–1965)

***Administered jointly by:***

Chairmen of Oils & Fats Group

SCI Liverpool Section

RSC Liverpool Section

OCCA Manchester Section

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1967	JG Collingwood
1968	RA Morton
1971	HG Dutton
1972	LD Bergel'son
1975	FD Gunstone
1977	JWE Coenan
1978	JFG Vliegenthart
1981	Lord Kearton
1984	GA Garton
1987	K Aitzetmueller
1991	G Robbelen
1994	Joyce Beare-Rogers
1997	RG Ackman
1999	Prof M Lie Ken Jie

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### Appendix 3

#### **OILS AND FATS GROUP INTERNATIONAL LECTURE Established in 1964**

Manuscript of Lecture to be submitted for publication as the committee thinks fit

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1966	H A Boekenoogen (Netherlands)
1969	H Niewiadomski (Poland)
1970	D Swern (USA)
1975	K Downey (Canada)
1981	RT Holman (USA)
1983	KKG Menon (India)
1986	HK Mangold (USA/Germany)
1987	RG Ackman (Canada)
1990	EN Frankel (USA)
1995	K Larsson (Sweden)
1999	J Harwood (UK)

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### Appendix 4

#### **JULIUS LEWKOWITSCH MEMORIAL LECTURE**

Endowed in 1980 by Dr Elsa Lewkowitsch in memory of her father (1857–1913), an authority on oils and fats, who joined the Society in 1889.

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1981	H J Dutton
1984	R H Ohlson
1986	K G Berger
1989	A Uzzan
1991	R E Timms
1993	K Van't Riet
1996	W W Christie
1999	S Renaud

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## Appendix 5

### SUMMARY OF KEY EVENTS

#### 1881–1900

Valuable Service of Extended Abstracts

Topics: Hard fats for soap

Glycerine recovery

Analysis – methods limited and unsatisfactory

#### 1887–1913

Higher level of activity often associated with Dr J Lewkowitsch

Hydrogenation a major topic

#### 1911–1925

T P Hilditch appointed Research Chemist at Joseph Crossfields

Papers on hydrogenation with E F Armstrong

Fractional distillation of methyl esters

#### 1925–1951

Hilditch First Professor of Industrial Chemistry at  
Liverpool University

Research School on Composition of Fats

#### 1951

SCI Oils & Fats Group formed

Hilditch first chairman

Supported over the years by many of his students

Regular evening meetings 7–10 per year

London and provincial centers

#### 1970 onwards

Meeting pattern gradually changed towards ½ to 2-day meetings. Often with significant international participation

#### International Meetings

ISF 1962 – London

ISF 1978 – Brighton

ISF 1999 – Brighton

European Federation of Lipids – after 2000 regular meetings are planned