

Jørg Hviding

**THE AMAZING STORY OF THE STAVANGER SARDINE
INDUSTRY**

Stavanger November 2002
ISBN 82-900-5461-0

Published by Stavanger Museum / Norsk Hermetikkmuseum
Printed by Allservice

Thank you to

The Sales branch of the canning industry, NODEC A/S, for their exceptionally generous support for the printing of the book.
Also to Curator of the Museum, Piers Crocker, and the Chairman of the Advisory Council of the Canning Museum, Per Forgaard, for their help with proof reading and source material.

Foreword

The Amazing Story of the Stavanger Sardine Industry – from beginning to end
Norwegian Canning Museum – Stavanger.

In his books **”The Race for the Seaming Machine”** and **”The Story of Smoked Norwegian Sardines”**, published by the Norwegian Canning Museum in 1994 and 1995 respectively, Jørg Hviding wrote about the technical development and the technical pioneers in the sardine industry before the First World War.

But hitherto there has been no-one who has written about the revolutionary technical development that took place in the industry after the Second World War. The Norwegian Canning Museum therefore owes Jørg Hviding a great debt of gratitude for taking upon himself in **”The Amazing Story of the Stavanger Sardine Industry”** the task of telling about this development in which he and his colleagues at the “The Research Laboratory of the Norwegian Canning Industry” played so prominent a part. This publication has additional value in that it also includes dating of the structural development of the industry, its common organisations, its central agencies (*sentraler*), associations and institutes which were all established for the common good in both the commercial and technical fields. Those who wish to go deeper into the subject will find more in the different Annual Reports and other publications from these organisations – see the Bibliography.

That which is also of particular value is that most of the illustrations come from the collections of private individuals and the many institutions of the canning industry, and have never before been published. Thus we are particularly grateful to Egil Forgaard, Johan T. Østbø and the institutions of the canning industry represented by the Norconserv foundation, which made its photographic archive available.

Jørg Hviding was formerly employed at the Machinery Department of the Research Laboratory of the Norwegian Canning Industry, from its inception in 1948 until his retirement in 1990. For the last 25 years he was Head of Research and Head of Department. When he writes in this booklet about the times after the Second World War, they are times which he experienced. The Norwegian Canning Museum is thus most grateful for his work which has meant so much for the presentation of the museum’s public programs.

Stavanger, February 2003-01-21
Piers Crocker
Curator, Norwegian Canning Museum

Contents

What happened when during the Amazing Sardine Story?.....	5
1810 – 1872.....	5
1873 – 1900.....	6
1901 – 1905.....	11
1906 – 1913	15
1914 – 1927.....	18
1928 – 1945.....	21
1946 – 1955.....	25
1956 – 1963.....	33
1964 – 1969.....	36
1970 – 1980.....	38
1981 – 1984.....	44
1985 – 1995.....	46
1996 – 2002.....	49
Sardine Factories in operation in Stavanger in 1949.....	51
Postscript.....	53
Original and Secondary Sources.....	57
List of Illustrations.....	58

What happened when during the ”Sardine Story”?

1810 - 1872

”Predecessors” of the Canning Industry • Nicolas Appert
• French Sardines • Christian August Thorne produces the first
”Brisling packed in Oil”•

c. 1810

Nicolas Appert is awarded a prize of 12,000 francs, which Napoleon had promised to anyone who invented a method of preserving food. Appert must therefore be considered to be the inventor of canning.

1830

Production of canned sardines begins in France. Sardines (*Clupea Pilchardus*) are boiled in olive oil (known in Norway as “fransking” i.e. “Frenchifying”), before being packed in cans or glass containers, and then boiled in open pans.

1841

Christian August Thorne of Moss (eastern Norway) begins production of anchovies, and then other canned foods (meats, vegetables etc.), in round cans.

1852

Raymond Chevalier Appert, son of Nicolas Appert, is granted the patent for an autoclave (pressure cooker/retort) for sterilising canned products.

1865

Christian August Thorne exhibits “Brisling packed reserved in Oil” at the International Fisheries Exhibition in Bergen. There is no documentary evidence to suggest that anyone else produced so-called Norwegian sardines before he did. **Thorne should therefore have the honour of being the first to produce “Norwegian Sardines”.**

1866

Hagbart Thorsen of Sunde (a small village on the coast between Stavanger and Bergen) produces “Smoked brisling in fish stock” and “Smoked Brisling in Oil”. However he does not succeed with the marketing of these products.

1873 – 1900

Founding of Stavanger Preserving Co. • “The Amazing Sardine Story” begins • Production by hand • The “Wildhagen” smoking oven • The First Autoclave • Hand Soldering of cans • The First Tuition • The First Cannery’s Association • The First Seaming Machine

1873

Stavanger Preserving Co. established the first canning factory in Stavanger for production of canned meals for the merchant fleet, *fig. 1*.

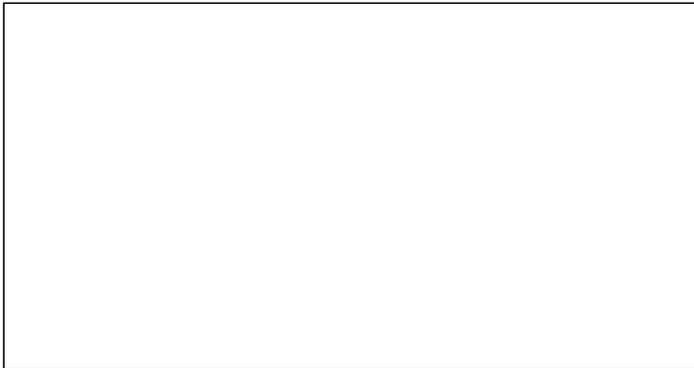


Fig. 1 STAVANGER HERMETISKE FABRIKK, locally known as “HERMETEN”, was in Øvre Strandgate, approximately where the “Straen Senter” is today.

1875

Torkild Aarestad of Stavanger, and a German, began smoking of brisling at a small smokehouse in (the street) Strandgate. They named the product “Kielersprut” and it was sold both locally and in Germany.

1878

Martin Gabrielsen of Stavanger equipped a smokehouse in Sandvigå (by Bjergsted, in Stavanger), where together with Torkild Aarestad as his smoker he continued his production of “Kielersprut”.

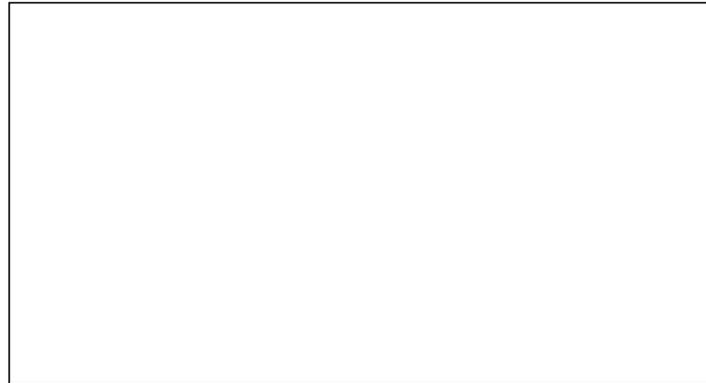


Fig. 2. Sandvigå, site of today’s container port. In the warehouse marked with a cross was where Martin Gabrielsen had his smokery and smoked brisling which Johan B. Mejlænder of Stavanger Preserving Co. launched as “Smoked Norwegian Sardines” on the world market.



1879

Martin Gabrielsen and the manager of the Stavanger preserving Co., Johan G. Mejlænder began co-operation in the production of smoked brisling packed in soldered cans. After the lids had been soldered on, the cans were boiled in open pans at 100° C. Gabrielsen was responsible for the smoking while Mejlænder managed the packing, boiling and marketing. The product was called “**Røgede Norske Sardinier**” (Smoked Norwegian Sardines). Gabrielsen however became ill and the partnership came to an end, *fig. 3*

Stavanger Preserving Co. won their first medal for “Røgede Norske Sardinier” at a Fisheries Exhibition in Trondheim.

1880

Mejlænder had been on a study tour to Germany to study food smoking. He installed the first German-

made “Wildhagen” chamber smoking oven in the Stavanger Preserving Co.’s factory (known as “Hermeten”) in Øvre Strandgate (Stavanger), *figs. 4 &5.*

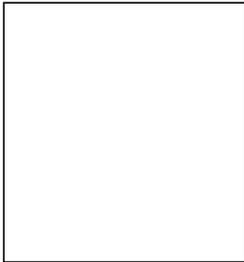


Fig. 4. *The founder of canned sardines, Johan B. Mejlænder (1836–1920), Manager of the Stavanger Preserving Co. He had the glory for the “Sardine Story” in Stavanger and Norway and received “The Royal Norwegian Order of St. Olav” for this achievement.*

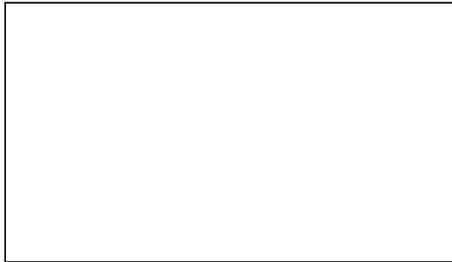


Fig. 5. *Wildhagen chamber smoking-oven at Rønneberg Preserving Co. The frames of fish were first put in to the top of the ovens and then moved down in course of the 1-hour smoking process.*

Stavanger Preserving Co. won gold medals for their smoked sardines at Fisheries Exhibitions in Berlin and Melbourne.

1881

Mejlænder recounted (in a later interview) that sales of sardines rocketed. Stavanger Preserving Co. sold 13,000 cans to a company in Hamburg.

1883

Fisheries Exhibition in London with many Norwegian participants. Up until this point, cans had been boiled in open pans at a temperature of 100° C. Stavanger Preserving Co. now installed an autoclave (pressure cooker) from France. Now the sardines could be sterilised at a temperature of 106° C. (the usual temperature for canned sardines), and thus prolong its keeping properties. It should be stated that Chr. August Thorne of Moss (Eastern Norway) had obtained a similar autoclave in 1878.

Stavanger Preserving Co. acquired a mechanical press from the U.S.A. for stamping out lids and cans directly from sheet metal. It was driven by a gas engine

1885

Stavanger Preserving Co. obtained a steam boiler and steam engines to drive mechanical presses and similar machinery.

18 factories in Norway. Most of them were in old warehouses. Techniques of production were largely by hand with very little mechanical equipment.

1890

The “three-piece” soldered “French can” is in general use. There is an extension in one corner of the lid for opening the can with a key.

1892 - 1905

There was teaching about canning at a fisheries school at Bodø.

1893 - 1901

Selskapet for de Norskes Fiskeriers Fremme (“Company for the Promotion of Norwegian Fisheries”) in Bergen begins a course for training in canning production.

1894

Christian Bjelland and Co. A/S began production of sardines at their no.1 factory at Skagenkaaien (in Stavanger). The company grew rapidly and set up factories all over the country. *Fig. 6.*



Fig. 6. *Christian Bjelland's first sardine factory. It was known as “Factory no. 1” and was situated on Skagenkaaien where today's Skagen Brygge Hotel now lies.*

1898

Founding of the Canning Factories Association in Stavanger.

1900

There were 38 canning factories in Norway, 14 of them in Stavanger.

On May 17th, Søren Opsal of Stavanger launched the first practical seaming machine for rectangular cans. This was used for attaching the base to an assembled “french-type” of can, which had the lid soldered on. Christian Bjelland and Co. bought two of Opsal’s seaming machines, *fig. 7*.

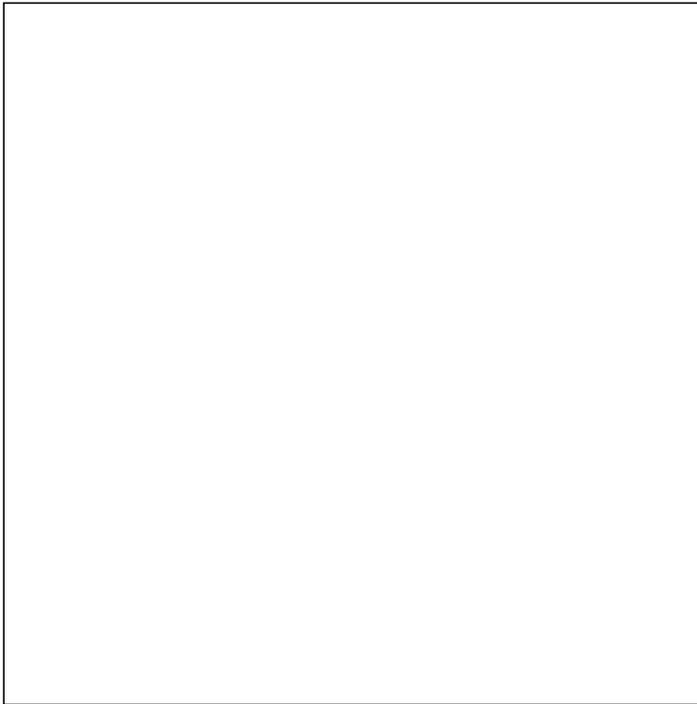


Fig. 7. Probably Europe’s first seaming machine for sardine cans, invented by the foreman Søren Opsal, at Nessler’s machine Workshop.

1901 – 1905

Factory workers get organised • The “Reinertsmachine”

• Mechanisation • Deep-drawn Cans • Opening Techniques

• Packaging Factories • The Name “Sardine”, Lawsuits

1901

Stavanger Canning Workers’ Association (Union) was established in Stavanger. The Stavanger Metalworkers’ Association (founded 1894) joined with them.

The Association of Female Canning Workers was also founded in Stavanger.

There was a long running dispute in the canning industry in Stavanger.

Søren Opsal and Wilhelm Nessler launched an improved version of Opsal’s first machine. Søren Opsal was foreman at Nessler’s Machine Works. This was originally a plumber’s business which was established in 1865, but developed into one of the town’s most important machine workshops which contributes a great deal to the canning industry’s technical development., *fig. 8*.



Fig. 8. Interior of W. NESSLER’S MACHINE WORKSHOP in Salvågergaten and Steinkargaten. Nessler’s activity covered the whole block between the two streets. Today there are respectively a restaurant and a health food business in the buildings.

Pressed (deep drawn) cans begin to be used. The cans were stamped out from one sheet of tinplate in three operations, and the lid seamed in place. However, there was no method of opening the can. Nessler's Machine Workshop had a very significant position in this development. The first presses were imported from Germany.

1902

Henrik Jørgen Reinert from the Rosenberg Machine Workshop at Sandvigå (Stavanger) was granted a patent for a seaming machine for rectangular cans. It had a daily capacity of about 8,000 cans. Competition between Opsal/Nessler and Reinert begins.

1903-

Henrik Finne, Paul Scholtz and H. Abel Lunde, employees of Stavanger Blikemballagefabrik A/S (Tinplate packaging factory limited) take out a patent for a method of opening cans using a tongue soldered to the lid, and a score line on the lid. The factory began production of cans with this method of opening, *fig. 9*.

Søren Opsal and Wilhelm Nessler launched their first semi-automatic seaming machine for sardine cans. It had an output of c. 9,000 cans per day.

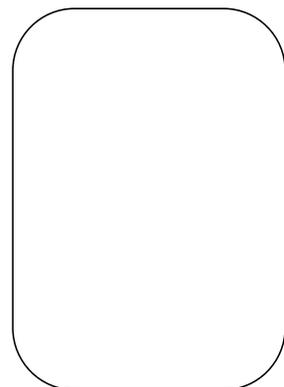
1905

Up until this point sardine production had been largely carried out by hand without much in the way of machinery. The quantity produced was thus relatively small. But the inventiveness of those employed in the industry was extensive and a string of inventions (mostly from Stavanger) resulted in an increasing number of machines and technical devices being adopted by the industry, and replacing manual work.

The quantities both of goods produced, and of goods sold, increased significantly.

The invention of the deep drawn can, Reinert's seaming machine, and Opsal's press tool revolutionised the production of cans, and forced the "French type" of cans out of the market. At the same time, the blacksmiths' workshops which had produced the older type of can, also began to fade out of the picture.

Fig. 9. Seamed can with soldered "tongue", patented in 1904 by P. Scholtz, Abel Lunde and Henrik Finne. The patent provided the basis for establishing the Stavanger Bliktrykeri & Maskinværksted in 1903



Paul Scholtz and Abel Lunde founded Stavanger Bliktrykeri & Maskinværksted (Metal printing works and machine workshop) based on the technique of opening with a soldered tongue and score line, which they had patented together with Henrik Finne in 1903. Finne pursued his own direction with the patent, *fig. 9*.



Fig. 10. Sardine can with "seamed" tongue-opening. This technique for opening was in its day known as the "Bjelland tongue". It was invented in 1905 by the foreman Ole Andreas Rasmussen (1875-1939) at Bjelland's factory "Møllers" in Strømsteinen. This technique was used for about 80 years for the whole of the "Sardine Story", and was superseded by the Ring-pull opening when Norway Foods began using it on their sardine cans in the 1990s.

A foreman, Ole Andreas Rasmussen, who was employed by Christian Bjelland & Co. A/S, invented a way of making the opening "tongue" in one piece with the can lid, thereby eliminating the extra soldering process. The patent is however in the name of Bjelland. After a time it was adopted by the whole industry, *fig. 10*.

Søren Opsal launched the combined cutting, pressing and trimming tool which considerably simplified can production. Daily production could increase to 20,000 cans per press, *fig. 11*.

C. Middelthon bought the patent to Reinert's seaming machine and made rapid strides in marketing "Reinert's machine". It was produced by De Forenede Norske Laase- og Beslagfabriker A/S in Stavanger, which later became Trio Fabriker A/S, *fig. 12 & 13*.

Stavanger Preserving Company bought Reinert's machines nos. 1, 2 and 5, and got rid of some of their Opsal/Nessler machines. Christian Bjelland & Co. A/S bought machines nos. 3 and 4, while Rønneberg Preserving bought nos. 6 and 7.

Fig. 11 Picture from the W. NESSLER MACHINE WORKSHOP catalogue. The man on the left is almost certainly the foreman Søren Opsal, who together with his son, Ingvald, proudly display their cutting, pressing and trimming tools. The principle of these tools is still used. Catalogue must be from c. 1910.



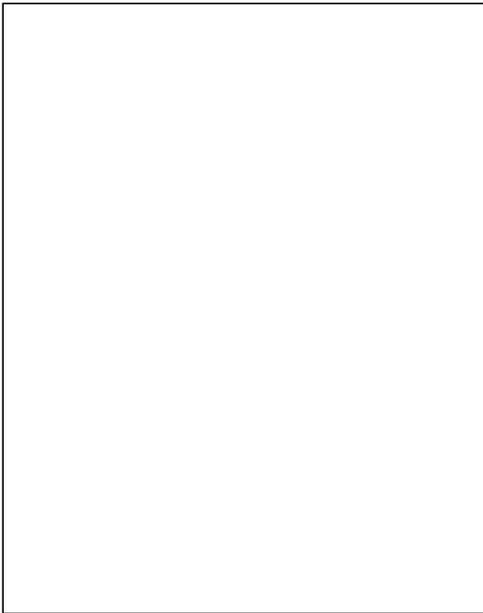


Fig. 12. Advertisement for the "REINERTS-MACHINE", which gradually became the market leader for seaming of sardine cans, not only in Norway, but also overseas. It was invented by the technician Henrik Jørgen Reinert (1870-1936). The machine was produced by Trio Machine Industries and marketed by C. Middelthon right up until the beginning of the 1950s

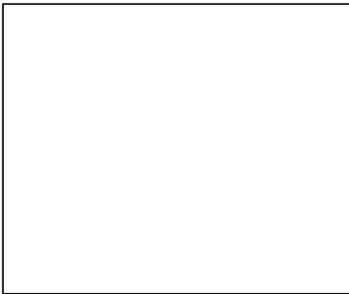


Fig. 13. Seaming with a REINERTS_MACHINE. Picture from Buøen Packing Co. A.s. during the 50s.

Henrik Jørgen Reinert won a silver medal from Selskapet for De Norske Fiskeriers Fremme for his seaming machine.

The French sardine industry brought a lawsuit against the Norwegian sardine factory owners in a number of European courts with the claim that smoked Norwegian brisling should not be called - still less sold as - smoked sardines. The French claimed sole rights to the use of the word "sardine" for their sardines. The case lasted for 10 years, ending with a victory for the French - see under 1914.

1906 – 1913

Decapitating Machine and Threading Machine • Purse Net • The Western Canning Factories Association • "Norcanners Ltd." • Tuition in Stavanger • "Raw Fish Companies"

1906

In an article in the local newspaper *Stavanger Aftenblad* it was suggested that a Museum of the Canning Industry should be set up.

1907

Nessler's workshop had by this time delivered 70 Opsal/Nessler semi-automatic seaming machines.

Johan Tjaaland launched the first practical decapitating machine. It worked with horizontal rotating knives. However, one year later Hans J. Larsen introduced a machine which was far superior to Tjaaland's machine. The particular feature of Larsen's machine was that it had a rotating blade which ran on two large wheels, and removed the heads of the fish. The machine was thus known as the "båndklippemaskin" (band-cutting machine) and came to be the market leader for several decades, *fig. 14*.



Fig. 14. The smoked brisling has its head removed in so-called "band cutting machines". "99.9%" of the sardine factories used this type of machine. It was invented by Hans J. Larsen in 1907 and was later produced and marketed by Rydberg & Petterson A.s. The picture is from the Avance Canning Factory at the beginning of the 1950s. The machine shown was in use throughout the 50s and was then replaced by a machine with horizontally rotating knives, developed and produced by Rydberg & Petterson A.s.

1908

The purse net began to be used, resulting in more efficient fishing.

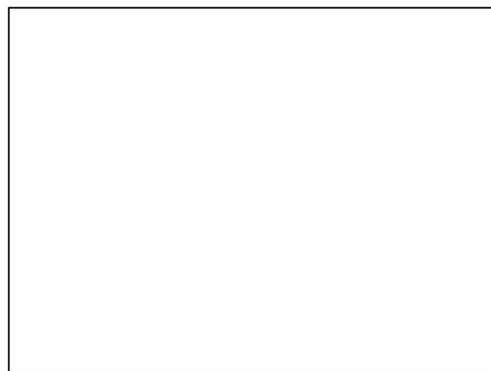


Fig. 15. Brisling fishermen in one of the fjords of Ryfylke, during a warm summer evening in the 1950s.

The phenomenal growth in the sardine industry, together with very variable catches of brisling (average 500,000 crates (of 20 litres), corresponding to roughly 50 million cans per year) resulted in there not being enough fish to go round. Thus the industry began to use young herring (so-called *mussa*) instead of brisling. Annual production increased thereby to up to 100 million cans.

A jig for threading fish through the eyes began to be used. Previously this task had been done entirely by hand. These jigs were first made out of wood, later they were cast in lead and glass before reaching their final form as cast, enamelled ware, *fig. 16*.

The name of the Hermetikfabrikanernes Forening (Canning Factories' Association) was changed to the De Vestlandske Hermetikfabrikanernes Forening (Western Canning Factories' Association).

C. Middelthon began exporting Reinert's seaming machines, especially to Spain. Her there was a native of Stavanger, Johannes Kielland Sømme, who had taken up residence in Bilbao in 1891, and was, among other things, a representative for C. Middelthon. After a time he realised that it was far too expensive to import machines all the way from Norway, and came to an agreement with Middelthon to produce Reinert's machines in Spain under licence. This became very successful and in time the business developed to become one of Europe's leading factories for seaming machines, with the name SOMME. The company was owned by the Sømme family until a few years ago when it went bankrupt. New owners took over and the company is still in operation under the name of SOMMERTRADE. See below under **2001**.

1910

John Braadland Ltd. bought the property Øvre Strandgate 88, which is now the Norwegian Canning Museum, for use as a store and for production of anchovies.

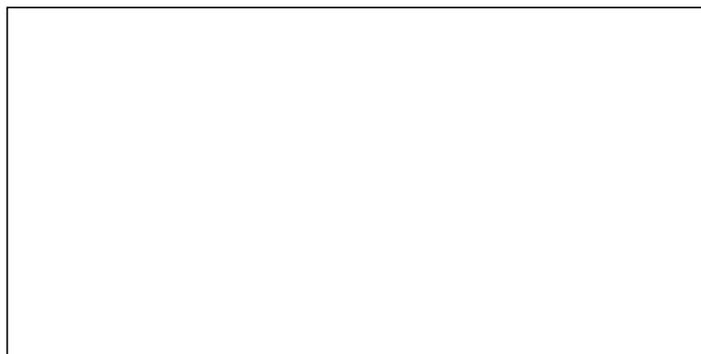


Fig. 16. Threading of brisling with a threading jig. An averagely competent "threader" could thread 5-7 frames per hour. With 22 fish per rod and 29 rods per frame she would have to thread just over one fish per second, including putting the rods onto the frames. Picture: Avance Canning Factory, 1950s.

The building dates from 1875 and originally housed one of the town's largest tanneries. The smokehouse for production of smoked sardines was a later addition.

1912

Founding of the A/S Norwegian Cannery Export Office, later "Norcanners Ltd.". As the name indicates, this was the joint sales organisation for most of the Norwegian Canning companies. The first manager was Jacob B. Natvig.

600 "Reinert's machines" were sold on the home and overseas markets.

Nessler launched a fully automatic seaming machine called the "Record". It received a Diploma of Honour at the Fisheries Festival in Copenhagen.

1913-1922

An Elementary Technical Day School with 6-month courses was established in Stavanger. The school had a department for canning technology, and altogether 29 students graduated from it. The Department was then closed because of lack of demand.

A number of different canning factories came together in so-called companies in order to purchase and transport the fish. The Brislingbørs, Brislingforening, Brislingkompanie, Brislingkontor (1914), Brislinglag and Indkjøpskontoret Nøitral) were all founded.

1914 – 1927

Lawsuits over the name “sardine” finish • The Norwegian Cannery Association • The Journal of the Norwegian Canning Industry • Economic Downturn • The Advertising Fund of the Norwegian Canning Industry

1914

The lawsuits over the right to use the name “sardine” came to an end, with the Norwegian canning factories losing the battle. They had to stop using the word “Sardine” in Europe, and change to “Smoked Brisling” or “Smoked Herring”. In the U.S.A. and the rest of the world there was no barrier to using the word “sardine”. The product was thus sold there as “Brisling sardines” or “Herring sardines”. Young herring were used for the latter.

Reinert’s seaming machine came out in a semi-automatic version. It was however not a success.

1914 - 1918

First World War. Massive export and increase in the number of sardine factories. **In 1915 there were 128 sardine factories in Norway, 48 of them in Stavanger.**

RYDBERG & PETERSON A/S was established. The firm developed to be one of the most significant machine workshops for the canning industry, and produced a range of machines for rationalising sardine production, for example machines for filling cans with olive oil or tomato sauce, a decapitating machine, a machine for washing cans, lifts and conveyor belts, *fig. 17*

1917

Founding of the Norwegian National Association of Cannery. The first Chairman was Jacob B. Natvig, Manager of the Norrig Sardine Factory. The Western Canning Factories Association (see above, 1908) which until this point had functioned as a kind of national association, was incorporated into the new Association.

A short time after Natvig became Chairman of the National Association, he began to implement an idea which he called “scientific help for the canning industry”. He had expressed this idea on several previous occasions. A Committee was set up, with Natvig as its Chairman, and their work resulted in the **Research Laboratory of the Canning Industry, see below, 1939.**

The publication of the journal of The Norwegian Cannery Association, the *Tidsskrift for Hermetikkindustri* began its activity, with Johs. Dahl as Editor

RYDBERG & PETERSON

A/S
MACHINE WORKSHOP

Automatic
DECAPITATING AND TRANSPORT INSTALLATIONS
FOR
Canning Factories

*HAVE YOU WORKED OUT
HOW MUCH OF YOUR TRANSPORT EXPENSES CAN BE SAVED?*

*IF NOT, DO IT AND THEN COME TO US AND LET US SUGGEST TRANSPORT
MACHINERY APPROPRIATE TO YOUR NEEDS*

A SAVING OF ONE MAN IN A FACTORY WITH PERMANENT TRANSPORT CORRESPONDS TO THE INTEREST PAYABLE ON A CAPITAL OUTLAY OF 50,000 KRONER.
TO DATE WE HAVE DELIVERED APPROX. 50 SUCH INSTALLATIONS BOTH AT HOME AND ABROAD

WE SET UP AND MODERNISE CANNING FACTORIES AND PROVIDE ALL MACHINES FOR THE INDUSTRY, OF THE BEST AND MOST MODERN MANUFACTURE, AT HIGHLY COMPETITIVE PRICES

WE BUILD SPECIAL MACHINES TO YOUR OWN SPECIFICATIONS
WE MANUFACTURE THE "RATIONEL" FISH AND MEATCAKE MACHINE WITH A PRODUCTION CAPACITY OF 6,000 CAKES PER HOUR

*WASHING MACHINES FOR CANS
ALL TYPES OF MACHINES SPEEDILY REPAIRED*

Fig. 17. Advertisement for RYDBERG & PETERSON A/S. It shows a typical arrangement for a sardine factory, which was normally on two floors with threading and smoking on the ground floor, and the packing room on the upper. The illustration shows the decapitating machine with the lift which took the trays of decapitated fish up to the upper floor. Such procedures were in use right up to until the large central factories on one floor were built at the end of the 1950s.

1918-

The Norwegian National Association of Cannery launched a prize competition for “*The improvement of current smoking techniques in canning factories, for herring and brisling*”. None of the entries won the prize. But the engineer Hans Bjørge’s suggestion of a horizontal smoking kiln appeared 15 years later as the model for Kværner’s horizontal smoking kiln which was adopted and used by the entire sardine industry.

The 1920s

Reduced demand resulted in many bankruptcies. Of the 180 producers which had been in existence in 1919, only 50 managed to avoid either change of ownership or bankruptcy.

1924

Reklamefondet for Den Norske Hermetikkindustri (The Advertising Fund of the Norwegian Canning Industry) was established with the aim of bringing the overseas marketing of Norwegian sardines under one umbrella organisation.

1925

198 canning factories in Norway, 59 of them in Stavanger.

1928 – 1945

A French Seaming Machine • A German Labelling Machine • The Research Laboratory of the Norwegian Canning Industry • Aluminium Cans • A Super Pressure Autoclave • The Canning Factories’ Co-operative • The Kværner Oven • Minimal Prices • The Canning Factories’ Herring Co-operative • Production Quotas

1928

The French automatic seaming machine from the Lubin Weiffenbach factory, with a capacity of 2,000 cans per hour, was introduced into Norway. At that time the industry in Norway was still dominated by the manually operated Reinert’s seaming machine. This was however outdated and factory-owners were “waiting in the queue” to purchase the new modern French seaming machine.

1930

C. Middelthun took up the challenge of the French seaming machine and launched a new automatic seaming machine, the Trio A. This had a capacity of 2,000-2,500 cans per hour, and was cheaper than the French machine. It did not however meet with much success on the market.

Chr. Bjelland & Co. A/S purchased 5 Benz and Hilgers labelling machines with a capacity of 40 cans per minute. The machine was unique of its kind, and packed cans in greaseproof paper, with a guarantee slip, a key, and side and top labels. These were the only examples of these machines which were used in Norway. They may have been too expensive or too complicated. The Norwegian Canning Museum has one of these displayed on the upper floor. *fig. 18.*

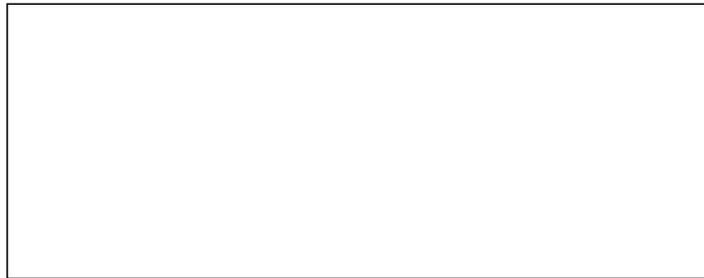


Fig. 18. Benz & Hilgers (German) labelling machine for packing and labelling of sardine cans. Altogether 7 such machines were imported in the 1930s Christian Bjelland & Co. had five of them.

1931

The first “Sternerovnen” (vertical smoking oven) was installed at United Sardine Factories in Bergen.

The Research Laboratory of the Norwegian Canning Industry (first suggested by Jacob Natvig) was opened in Stavanger, and was the first of its kind in Europe. The first Director was Gulbrand Lunde. One of its first assignments was to show that canned food was not “dead food” as some claimed, but that the sterilisation process only reduced the vitamin content to an insignificant extent. Later it was important to establish optimum sterilisation conditions for different products and to provide the canning industry with advice on all technical matters. *Figs. 19 and 20*

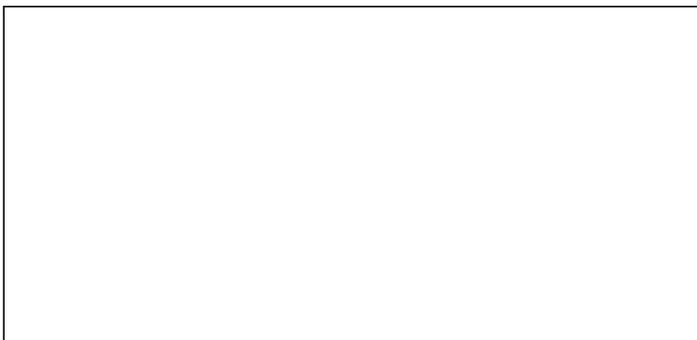


Fig. 19. The Research Laboratory of the Norwegian Canning Industry in Niels Juels Street in Stavanger was formally opened in 1931. It was at that time probably unique in the world. It began with bacteriological and chemical departments, with the Machinery Department added in 1948



Fig. 20. Interior of the Chemistry Department at the Research Laboratory of the Norwegian Canning Industry, c. 1955.

1932

A/S Nordisk Aluminiumindustri launched aluminium as a material for cans, after some ten years of research. The final tests were carried out in close co-operation with the Laboratory of the Norwegian Canning Industry. Although aluminium cans were used for several canned meals during the Second World War - fishballs for example - it was many years before aluminium was used as the preferred material for sardine cans. This was a post-war development.

Kværner brug, Ham-Jern A/S and Rydberg & Petterson Co. A/S took out patents for the so-called “super-pressure autoclaves” for the sterilisation of products packed in aluminium cans, *fig. 21 and 22*



Fig. 21. At the beginning of the 1930s cans began to be made of aluminium. However these were weaker less strong than cans made of tinplate and could not be sterilised in ordinary autoclaves. Therefore a special type of autoclave had to be developed with so called “super-pressure”. The picture shows such an autoclave from Hamar Iron Foundry, the “Ham-Jern” autoclave. Kværner Brug A/S and Rydberg & Petterson A.s. also developed similar autoclaves.

1933

A new law regarding canning was passed by the Storting (Norwegian Parliament) and the A/S Hermetikkfabrikenes Brislingsentral (Canning Factories’ Brisling Distribution Centre) was thereby established. This brought about a complete regulation of the industry with decisions about the amounts of raw fish which each factory was allowed (dependent on smoking capacity), and that the factories could sell their products to the “Brislingsentral” to be protected against loss. Regulations were also introduced to prevent the establishing of new factories.

1934

184 factories in Norway, 58 of them in Stavanger.

The first horizontal continuous smoking oven, the “Kværnerovnen” was installed at E. M. Nielsen Moe’s factory at Kråkerøy outside Fredrikstad.

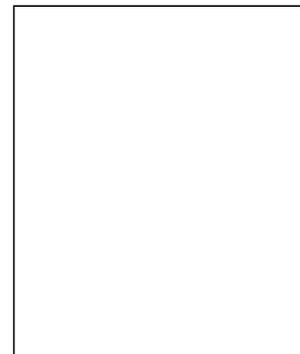


Fig. 22. Rydberg & Petterson’s “super pressure” autoclave. This was used particularly in Stavanger’s canning factories.

Because of problems with heat distribution, these were later replaced with water-filled autoclaves. Picture Buøen Packing Co. A.s.

1935

The Brislingsentral (Brisling Central) introduced minimum prices for sale of sardines overseas on the grounds that a number of factories were selling their sardines too cheaply.

1937

The Hermetikkfabrikkenes Sildsentral (Canning Factories' Herring Central) was founded with the introduction of production quotas, *fig. 23*.



Fig. 23. Horizontal continual smoking oven from Kværner Brug A/S at the Avance Canning Factory A/S. The picture shows the end of the oven where the smoking trolleys are put in. Time for smoking is about 1 hour depending on the fat content and size of the brisling. The capacity of the oven is 250-300 20 litre crates of brisling (which yields about 30,000 cans of sardines) per hour.

1939 - 1945

During the Second World War there was almost no technical advancement in the canning industry. The machines and other technical ways of assisting production were still limited to the steam boiler, the autoclave, devices for threading, a tumble washer for the rods, a pump for dispensing olive oil, the seaming machine, the washing machine for the cans, and a simple chain-driven conveyor belt for transporting the trays of fish to and from the packing room.

1946 – 1955

Joint initiatives • Threading Machine • Machinery Department at the Research Laboratory • Seaming Machines • The Norwegian Canning School • The Norwegian Quality Control Institute • The Technological Association of the Canning Industry • Freezing Experiments with Brisling

1946

De Norske Hermetikfabrikers Landsforening (The Norwegian Cannery Association) took the initiative in developing an automatic threading machine and appointed a "Threading Machine Committee" for that purpose. The Engineer Carl Sundt Hansen, from Stavanger, who had been employed at the Canning Industry's Laboratory, was employed by Studieselskapet for Norsk Industri (Research Company for Norwegian Industry) to lead the development.

C. Middelthun updated and improved the Trio A machine, changing the name to Trio B, *fig. 24*.



Fig. 24. Seaming with a TRIO –B machine at Buøen Packing Co. A.s. in the 1950s. The machine on the left of the picture is a TRIO-A machine, the first automatic seaming machine from that company.

1948

It was a slightly out of date and tired industry which started on the great post-war task of winning back the overseas markets which had been lost during the War. The Canning Industry's Laboratory thus set up a machinery department with a construction office and a modern machine workshop. In the years which lay ahead this department was to come up with a string of inventions which rationalised sardine production. At the same time the department developed a Competence Centre where factory managers could get answers to all their questions relating to (for example) the technicalities of machinery and freezing, seaming, packaging and factory planning, *fig. 33*.

Lubeca-Werke GmbH, in Germany, now broke into the Norwegian market with their fully automatic seaming machine, the LW 303, with a capacity of c.3,600 cans per hour. This had many similarities with the old French Lubin-Weiffenbach machine, but had been further developed. It was thus a good modern seaming machine and was well received by the Norwegian sardine industry - to the disadvantage of the Trio-B machine.

1949

The first automatic threading machine was tested, by, amongst others, Stavanger Canning Co A/S. The Laboratory's Machinery Department took part in the development work and built the part of the machine which places the rods on the frames for smoking, in co-operation with Carl Sundt Hansen.

The Technological Association of the Canning Industry was founded in Stavanger with 50 members. The main aim of the Association was to set up a specialist forum for technological staff employed in the Norwegian canning industry, or connected to it.

1950

The American seaming machine I.M.C. came on to the market and was bought by several of the larger factories. However, its success in penetrating the market was limited probably because it was relatively expensive and complicated.

Figs. 25, 26, 27 and 28 show the machinery in the packing hall in an ordinary Norwegian sardine factory between the beginning of the 1930s and the end of the 1950s.

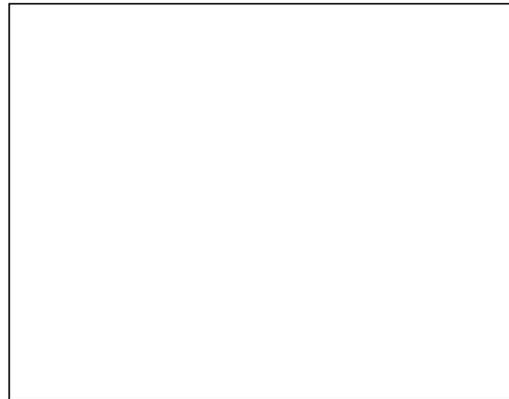


Fig. 25. typical "packing hall" from the 1950s with conveyor belts which fed the packers with full trays of fish and returned the empty trays to the decapitating machine on the ground floor where they were refilled. The transport of full and empty cans, respectively from and to the packers, was carried out manually on so-called "can-trays", by their own helpers. Trays with

empty and full cans respectively stand on the left and the right of the picture. The helpers carry the trays with finished cans to the so-called "adjusters" who checked that the packing was neatly done and that the cans were properly full. Then the cans received 15 mg. of olive oil from the oil machine, and the lids were put in place and seamed on. Every packer received their "payment" for their work in the form of so-called "tokens" which were handed in to the floor manager at the end of each working day and used as the basis for working out the piecework payments.

A normal packing production line had about 25 packers and a capacity of 25,000 cans per day. This corresponded to the capacity of a 12-chamber smoking oven or 1 Kværner smoking oven. The picture is from the 1950s and was taken at the Avance Canning Factory owned by the Hans P. Forgaard Co. A.s.

Kommentert [PC1]: Assoc of technicians....

Fig. 26. Packers at work at the Avance Canning Factory in the 1950s.

Packers were paid piece rates, i.e. they were paid according to productivity. During training they were paid an hourly rate. The rate of packing was on average about 250 cans per hour, with 10 fish per can. A competent packer was well paid by the standards of the time.



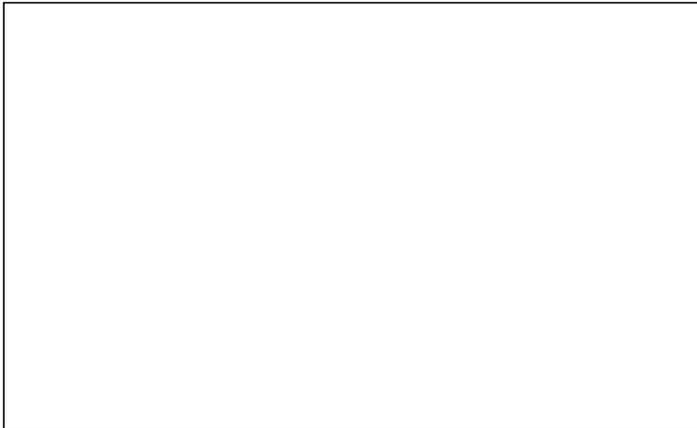
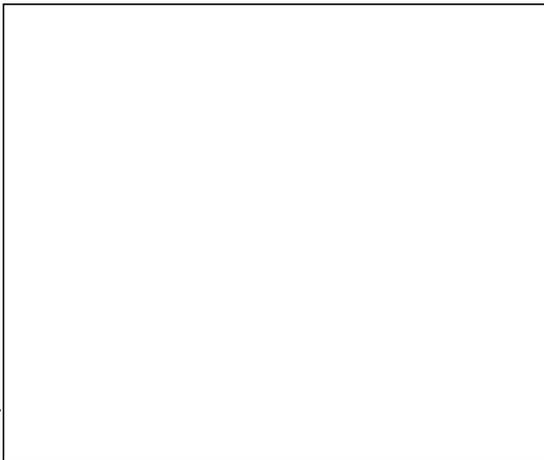


Fig. 27. "Checkers" at the Avance Canning Factory in the 1950s. Notice how neatly the sardines are packed in the cans. The task of the checker was to make sure that the packers had done a good job.

It was very important to produce as many as possible so-called "A-grade" cans, which earned most for the factory. Inspectors from the Quality Control Institute determined the quality.

Fig. 28. The picture shows an oil-filling machine from Rydberg & Petterson which the checked cans passed through and were filled with c. 15 mg. of (olive) oil before the lids were put in place and seamed on. Most of the canning factories in Stavanger used this type of oil-filling machine. It was also used to fill the empty cans with 15 mg. of oil before the sardines were put in



1951

Test-running of the trial threading machine in Stavanger and Bergen was successful, and further development of the machine continued in Bergen with a partnership between Bergens Blikktrykkeri and Trio Maskinindustri. Outside constructors were contracted to begin the construction of the prototype machine in Bergen, fig. 29.



Fig. 29. The Threading Machine which was developed by the engineer Carl Sundt Hansen in about 1950. The prototype machine was constructed in a co-operative project between Trio Maskinindustri and Bergens Blikktrykkeri. With a "staff" of 4 people the threading machine had the capacity to process c. 200 crates of fish per 8-hour working day. As a rule of thumb this would correspond to 200 crates of 100 cans each. The picture shows the part of the machine where the fish have been sorted head first and then come down into channels which direct them to the threading apparatus. After this the rods with their fish are automatically placed on frames which proceed to the ovens.

1952

Norsk Hermetikkfagskole (The Norwegian Canning School) was opened in Stavanger by King Haakon VII. The first Director was Ove Hapnes. The school later became The Food Technology School (Næringsmiddelteknisk skole), figs. 30, 31, 32, 33.

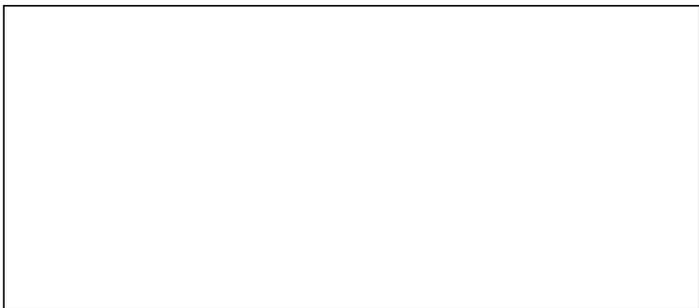


Fig. 30. The Research laboratory of the Norwegian canning Industry (left) and The Norwegian Canning School (right), on the corner of Niels Juels gate (street) and Alexander Kiellands gate. Picture taken in 1954.



Fig. 31. Demonstration of the threading machine for King Haakon VII during the tour of the Norwegian Canning School after its official opening. From left: Director Olav Johnsen, Bergenhus Canning, (unknown), mayor of Stavanger Magnus Karlson, Regional Commissioner John Norem, King Haakon VII, Engineer Carl Sundt Hansen and Director Christian Bjelland, Chr. Bjelland & Co. A.s.



Fig. 32. Students at the Norwegian Canning School receiving instruction in use of the microscope.



Fig. 33. The construction office at the Research Laboratory's Machinery Department. From left: Einar Kvie, Åsvåld Vågane and Jørg Hviding. Picture taken c. 1981.

1953

The Official Norwegian Quality Control Institute for Canned Fish Products was started. The first Director was Olav Christian Sundsvold.

Trio Maskinindustri in Stavanger launched its new automatic seaming machine, the TAF 3. This was more or less a copy of the German Lubeca machine, but it was cheaper. A few years later Trio launched an improved version which was given the name of TAF 4.

1955

134 factories in Norway, 50 of them in Stavanger.

The Canning Laboratory concluded its research, which had begun in 1943, as to whether brisling can be frozen for smoking at a later date. This would enable the packing season to be prolonged. The research showed that brisling would keep for several months if frozen, with water, and kept at a temperature of -25°C . or less.

1956 – 1963

Changing Structures • A/L Canning Central • Fewer but larger factories • Frozen Brisling • Year round Operation • Christian Bjelland & Co. A/S builds a Central Factory • Use of Plastic Wrapping for Sardine cans.

1956

This year saw the beginning of structural changes in the industry. A/L Hermetikksentralen (The Canning Central) was set up and the previous Centres (Hermetikkfabrikkenes Brislingcentral, Hermetikkfabrikkenes Sildcentral and Kipperscentralen - respectively for brisling, herring and kippers) were closed down and incorporated into the new A/L Hermetikksentralen. The first Director was Carl Frederik Kolderup. Many of the regulations from the 1930s were abandoned, for example the quota system was softened. Similarly, other special or complicated arrangements and agreements were more or less done away with.

1957

Christian Bjelland & Co. A/S began to use frozen brisling. The fish was frozen in aluminium trays in an air freezer. Freezing into blocks and storage took place at freezer plants along the coast.

Bjelland had good results with frozen brisling, and the rest of the industry followed his lead.

1958

The Canning Laboratory's Machinery Department launched the first automatic machine for removing fish heads from the rods, *fig. 34*. This was a task which had previously been carried out by hand. The machine was produced and marketed by Rydberg & Pettersen A/S and was gradually adopted by the whole sardine industry.



Fig. 34. The machine for removing the fish-heads from the rods at Central Canning's main factory in Stavanger (1965). Developed by the Research Laboratory in 1958. Production and marketing of the machine were taken over by Rydberg & Pettersen A/S.

Christian Bjelland & Co. A/S built their main factory in Stavanger with a capacity of between 60,000 and 80,000 cans per day, *fig. 35*. This corresponds to the capacity of three factories of the usual size. The factory was equipped with a completely new type of production line where the cans were automatically turned the right way up, filled with the required amount of olive oil and transported one by one to the packers. The remains of fish were removed from the trays of fish, and then the trays were washed and automatically placed in the decapitating machine to receive a new load of smoked fish. The mechanised production line for packing was developed by the Canning Laboratory's Machinery Department, and included machinery such as the oil-filling machine, the rod cleaner, the machine for turning the cans the right way up, and the machine for washing the trays for the sardines, which were developed by the Machinery Department of the Canning Laboratory. These eliminated all additional work connected with the transport of cans and thereby provided a significant saving of manpower. The production line was also the breakthrough for the use of pneumatic components for automation.

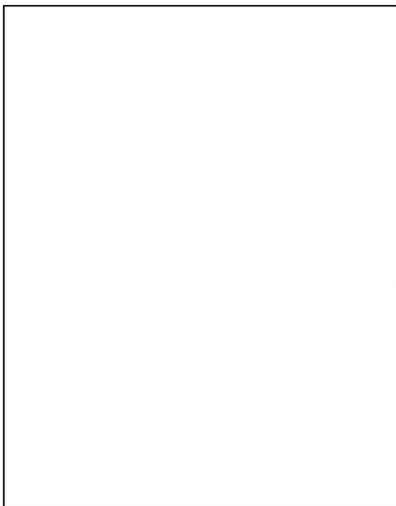


Fig. 35. Interior of the main factory of Christian Bjelland Co. A/S at Ømsteinen (1958). The factory had two production lines of 24 packers each (visible in the picture), and two Kværner horizontal smoking ovens. The factory's capacity can therefore roughly be estimated at 6-800 crates of 100 cans each, i.e. 60,000 – 80,000 cans per day. The factory's packing capacity increases with the size of the brisling.

1960

83 canning factories in Norway, 38 of which were in Stavanger. Several of these factories used frozen fish outside the fishing season.

1961-

The A/L Hermetikksentralen was dissolved, and with it, the restrictions regulating, amongst other things, minimum prices. These changes began a process whereby smaller companies began to fall away, while a few larger companies came strongly to the fore.

It was clear that frozen brisling gave satisfactory results as far as the quality of the sardines was concerned. Thus an increasing proportion of the catch was frozen and stored for later processing, so as to extend the season. The result was that several of the smaller factories were closed down, without affecting the total annual production. The remaining factories were modernised and rationalised, especially as regards provision of new packing production lines. Freezing was carried out at ordinary freezing plants along the coast, where the fish was also stored.

1963

Up to this point sardine cans had been packed in greaseproof paper with a label on the top side. This way of packing was well established in the market and it was difficult to think of any other kind of packaging. But when the labelling machines which had been introduced in 1930 were no longer obtainable, because the factory had been destroyed during the War, then most of the labelling process had to be carried out by hand again. After a time, this became too expensive. Several alternatives were discussed. One alternative was to package sardine cans in decorated plastic wrapping like that used for bars of soap. Another was to put the cans in cardboard boxes - the so-called "sjaktel". Both alternatives were adopted, and in a transitional period it seemed as though the "sjaktel" would win on grounds of cheaper cost. The Canning Laboratory even developed a simple machine to put the cans in the boxes. However, gradually the plastic wrapper took over. The first packaging machine for plastic wrappers was imported, it was an Italian machine, the "Corazza", the first of many which would come later.

The Canning Laboratory's Machinery Department took out a patent on, and launched a semi-automatic packing machine for so-called "blank" (i.e. unlabelled) cans. Trio Maskinindustri took over the production and marketing of this, *fig. 36*.



Fig. 36. Machine for turning cans right side up and stacking them, invented by the Machinery Department of the Research Laboratory. Production and marketing of the machine was taken over by Trio Maskinindustri A/S

1964 – 1969

Freezer boats, freezing at sea • Central Canning Co. A/S builds a central factory

1964

Christian Bjelland & Co. A/S had the idea that the best way to obtain good quality brisling was to freeze the fish immediately after it was caught. So they needed to acquire a freezer boat, “*F/S Sardinien*”. The boat was equipped with vertical plate freezers, which had just been tested by the British Canning Laboratory, based in Grimsby. It was clear that this system was well suited to the purpose, and all later freezer boats were equipped with the same type of freezers. (Jackstone), *fig. 37*



Fig. 37. Frozen blocks of fish being taken out of the vertical plate freezer on board the S/S Sardinien. The frozen blocks are then stored in a freezer storeroom below.

It took some time before the best technique for thawing the frozen blocks of fish was found. The solution was to spray the blocks with either tepid sea water or tap water. The Machinery Department developed special racks for this purpose.

1965

Central Canning Co. A/S also built a modern factory in Stavanger and centralised



Fig. 38. Thawing rack for frozen brisling. The blocks of fish are sprinkled with sea water. In winter this needs slight warming. Thawing time, 4 – 5 hours.

their production there. The Machine Department of the Canning Laboratory assisted with the planning.

1966-

Bjelland’s results with the first freezer boat showed that the idea of freezing fish out at the catching grounds was very good. Several other factory managers in Stavanger decided to pursue the idea and establish a freezer boat company, A/S Samfrost, which purchased the freezer boat *F/S Samfrost*.

Christian Bjelland & Co. A/S obtained another freezer boat, *F/S Stavangeren*.

There were problems with obtaining enough Norwegian brisling and young herring (“*mussa*”). The solution was Scottish brisling. Many freezer boats went across the North Sea to Scotland to get brisling there. When the quality of the Scottish brisling was not as high as Norwegian summer brisling, the “sardines” which were derived from Scottish fish were marketed as “sildsardines” (=“herring-sardines”).

1968

48 factories in Norway, of which 13 were in Stavanger.

8 of the Stavanger factories were affiliated with the freezer boat company and based a significant proportion of their production on frozen fish. They were in operation all through the year. Gradually, the remaining factories closed down.

1970 – 1980

Ban on fishing, the end of herring sardines • “Scots brisling” • Production lines, computers • Christian Bjelland & Co. A/S / Stavanger Preserving Co. A/S • Decline in profits • Sorting for size on the freezer boats • Collapse of the Sardine Industry • “The Heen Committee”.

1970

Both Bjelland and Samfrost had good results with their freezer boats, and the remaining sardine factory owners soon found out that they also had to participate in a co-operative freezer boat agreement if they were to survive. So the freezer boat company A/S Fellesfrost was established. One of the larger Bergen companies also joined this company. Fellesfrost obtained a “shelterdekker” boat which was reconstructed as a freezer boat named *King Frost*. The Machinery Department of the Canning Laboratory was the freezing and technical consultant body for both this and other later boats which were adapted for use as freezer boats.

Christian Bjelland & Co. A/S obtained a third freezer boat, *F/S Svithun*, fig. 39.

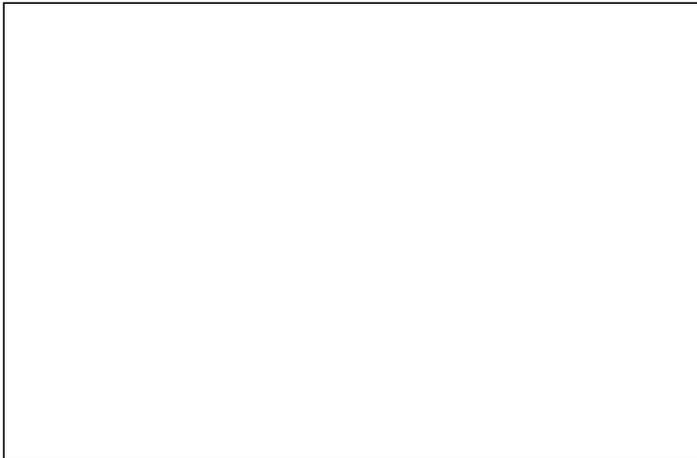


Fig. 39. Bjellands freezer boats, moored outside the central factory in Strømsteinen. From left: “F/S Sardinene”, “F/S Stavangeren”, and “F/S Svithun”.

It was not long before all brisling were frozen at sea. The fish were then stored in cold stores which the factories gradually built on to their factories, thereby making themselves independent of the freezer plants along the coast.

A shortage of fish was averted by the use of frozen brisling from the Baltic, produced by East German freezer boats.

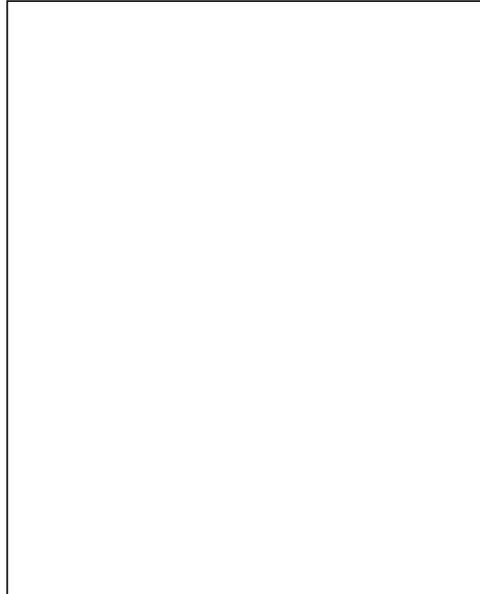


Fig. 40. Freezer store room with blocks of frozen brisling. In order to avoid damage from handling, each block of brisling is packed in plastic sheeting. The storerooms have a temperature of minus 25-30° Celsius. The brisling can be stored for up to 10 months before being processed.

Norges Sildesalgslag bought up Bergenhus Canning in Bergen and established Norbest Canning Co. A/S. Fishermen thereby became “factory owners”.

It was forbidden to catch young herring, and the sardine industry found itself with a considerable problem in securing adequate fish. As luck would have it there were huge quantities of brisling along the coast of Scotland. This saved the Norwegian sardine industry, which despatched altogether 6 freezer boats which were able both to freeze the fish and transport it to Norway for processing. There were also several Scottish land-based freezer plants which took part in the freezing.

In a good year, combined production could lie between 100 and 170 million cans.

1972

Christian Bjelland & Co. A/S bought up Stavanger Preserving Co. A/S Fellesfrost obtained the freezer boat *F/S Queen Frost*.

1973

Stavanger Preserving Co. A/S celebrated its 100-year jubilee with celebrations for the employees at the company's sardine factories along the coasts. AJAX (a well-known local journalist) wrote the celebratory ode:

*In 1873, a long time ago it were,
There was well-known folk in t' city what had an idea.
Some magistrate called Groom, 'n' Berentsen the shipper
Reckn'd food in sealed-up cans would make the sailors fitter.
They started up a factory – its name was the "Hermeten"
In 1873, with just 16,000 in Stavanger's population.
Five or six good men and true, ten women fine and free
And thus began the story of a massive industry.*

*They made good use of scissors and a whirring motor saw
They set to and they soldered - every can without a flaw
There weren't too many cans, 5-600 every day
But in each and every one there was food in wide array.
Ten thousands of our sailors sailing o'er the ocean blue
Now had much more than bully beef and bics to see them through.
While sailing ships went downwards, but steamships on the rise
Our sailor folk, as the anchor they took, sang of their new tinned prize.*

*There was folks began to reckon there was good times on the way,
But the old times of the clippers they was gone could one well say.
There was some that thought that to survive they must reverse the down-
-ward trend, and find aught different on which to build their town.
They had a bit of nous they did, for shortly came "The Fall",
But for all our wise Stavanger folk, it didn't matter at all.
An' that's because of Canning, and Canning stood alone
As the one thing that helped our town get on its feet again.*

*It's probably superfluous in such a song as this
To say that this new factory gave t'city a new dress.
A presentation volume, soon you'll have, to put you in the mood
And that from the last hundred years most items will include.
But much more of significance, and we must understand
Is foresight and the effort that has always been to hand.
The insight from the factory floor, decisions from the Board
Have brought us ever higher and ever further forward.*

*Technology progresses, the solderers are gone
And where are they who used to thread the fishes one by one?
What's happened to the oven, with its fuel of logs of oak?
And what about the packers – they've disappeared like smoke
Soon it's finished with the packing and the haste of fingers speedy,
The machinery's unpacked and standing at the ready.
Freezer boats, we've got 'em too, we catch fish every place,
And fact'ries once widespread around are now at one big space.*

*But we must always further go, the future lies ahead,
The challenges are waiting, like fish shoals in the Med.
The Two Crossed Fish, they stand aloft, a "Sign of the Times" they are,
And if we use them rightly, our sales will stand to soar.
We nail our colours to the mast, while we strive with might and main,
A toast to our future, and to the solderers we'll never see again.
The first, it lies before us, the others lie behind,
A toast to both these partners, and "Preservingen" we'll find!*

1973

International oil crisis, resulting in a significant reduction in trade.

A/S Samfrost obtained the freezer boat *F/S Samfrost* to replace the first *F/S Samfrost* which was wrecked after a fire in Boknafjord. *Fig. 41.*



Fig. 41. F/S Samfrost in Oslofjord in the summer of 1985. The boat was owned by A/S Samfrost which was a combination of Central Canning Co. A/S, A/S Ocean Packing Ltd., Rønneberg Preserving Co. A/S, Herkules Canning Co. A/S, Stavanger Packing Co. A/S and Stavanger Preserving Co. A/S-.

Research in 1971 showed that the output of the packers could be considerably increased by providing the right conditions for movement patterns, and individual transport of the cans to and from the workers. In connection with updating a canning factory in the Bergen area, the Machinery Department of the Canning Laboratory developed a new packing production line where these conditions were optimised.

Amongst other improvements, the line was equipped with electronic counting of cans.

This was the first time that computer technology was used in the canning industry.

1974-

The size of fish in a catch can vary quite considerably. Freezer boats therefore had to install sorting machinery in order to eliminate unnecessary thawing of waste (too small or too large) fish, at the same time as they sorted the fish into two groups: "One layer" and "Two layer" material. This was a great advantage in production. The system was further developed by the Machinery Department of the Canning Laboratory. *Fig. 42.*



Fig. 42. Sorting machinery on board one of the freezer boats. The fish is sorted into four size categories before freezing. Fish that is too small, one-layer fish, two-layer fish, and large fish. The first and last of these were "throw-outs", and were frozen and sold for fish fodder.

After a relatively good year in 1973, with production of 180 million cans, both production and sales sank to half that level. Many factors can be blamed: the people's "No" to the Common Market; variable supply of fish; the increased cost of fish; the explosive rise in wage levels because of the oil industry, and changes in the dollar exchange rate. The situation became very critical for most factory owners.

The so-called "Heen-Committee" was set up by Royal Decree. Its task was to clarify the situation of the sardine industry and at the same time investigate possibilities for keeping the industry going at a reasonable level, if necessary with public money. As a sub-committee, the Machinery Department of the Canning Laboratory was to investigate the technical condition of the industry, and possibilities for rationalisation.

In the same year Stavanger Kommune set up a committee to look into the possibilities for a Canning Museum in Stavanger. Its Chairman was Richard Johnsen.

1981 – 1984

Norway Foods Ltd. A/S • The Norwegian Canning Museum

• Sardine Production ceases in Stavanger.

1981

The Heen Committee began a process which ended with all the then- existing factories receiving economic support from the government to set up a new company, Norway foods Ltd. A/S. This company took over all production and sales of Norwegian sardines.

1982

The Norwegian Canning Museum was officially opened.

The Machinery Department of the Canning Laboratory launched a machine for automatic packing of unlabelled sardine cans in cardboard boxes of 100 cans per box. The machine was a further development of the packing machine from 1963, **fig. 43**.

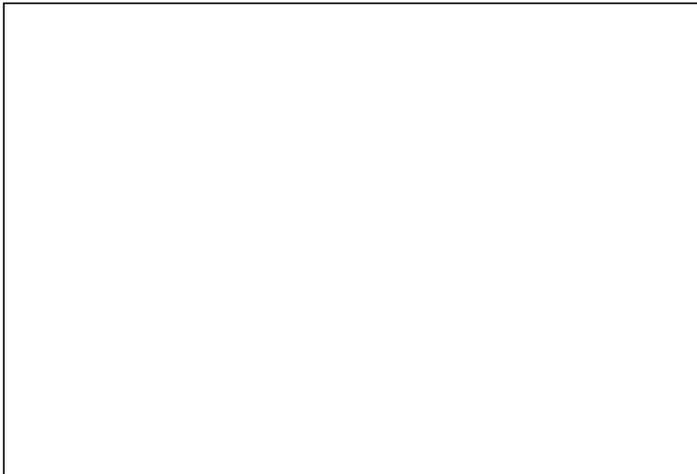


Fig. 43. Machine for turning cans the right way up, and stacking unlabelled cans in boxes of 100 cans each. capacity, c. 12,000 cans per hour. Invented and developed by the Machinery Dept. of the Research laboratory. The Department made six such machines and all were sold to the sardine industry.

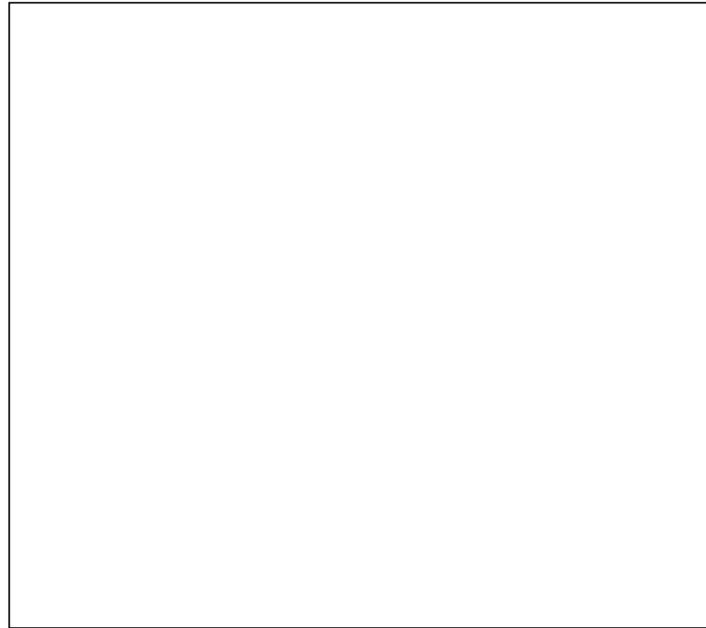


Fig. 44. section of F/S Samfrost, 1984. The drawing shows how fish are taken on board into the boat, are temporarily held in the hopper, are sorted, frozen, and stored. Today the fish are pumped on board and weighed on an electronic weighing belt.

1983

Norway Foods ceased production at Bjelland's main factory at Verven in Stavanger. With this act, the last sardine factory in Stavanger was closed.

1984

Freezer boats are equipped with machinery for making ice-flakes for cooling down the fish as they are caught. This ensures brisling with empty digestive tracts, *fig. 44*. The system was developed by the Machinery Department of the Canning Laboratory

1985 – 1995

Boycott of South Africa • Norconserv • Closure of the Quality Control Institute • The “Ring Pull” Opening • Closure of the Norwegian Cannery Association.

1985

The boycott of South Africa led to a 10% drop in exports for Norway Foods.

The company Norconserv was established, and both the Research Laboratory of the Norwegian Canning Industry (Hermetikkindustriens Laboratorium) and the Norwegian Canning School (Hermetikkfagskole) were incorporated into it. The first Director was Harald Pedersen.

After a number of years of experimentation, the Laboratory succeeded in making a machine for adding a precise quantity of olive oil to the cans, and a system for ensuring the correct net weight of the contents.

1988

The Quality Control Institute was closed down, and its personnel moved to Norconserv.

1990

There were now only four production facilities in Norway, at Davanger, Eikelandsosen, Fedje and Skånevik. Three of these had ultra-modern stainless steel production equipment, with computer-controlled machinery, all developed by the Machinery Department of the Research Laboratory, *fig. 45 & 46*. But packing the sardines in the cans was (and is) still done by hand. Every attempt to mechanise this part of the process had failed.

Norway Foods ceased production of sardine cans with the key method of opening, and changed to the “Ring-pull” technique. Keys had been in use for over 85 years. It is remarkable that the principle of the “Ring-pull” opening had been invented in Stavanger as early as 1912. The Canning Museum has can lids on display which show this. The invention was perhaps ahead of its time, *figs. 47 & 48*

The Norwegian Cannery Association (De Norske Hermetikkfabrikkers Landsforening) was dissolved and absorbed by the National Association of the Food Industry (Næringsmiddelindustriens Landsforening).

1994

Norway Foods was awarded an American prize for marketing, and the company turned over a significant profit. The three remaining factories at Skånevik, Eikelandsosen and Davanger had a combined production of 30 million cans, 90% of which went to export. The total number of employees was 280.

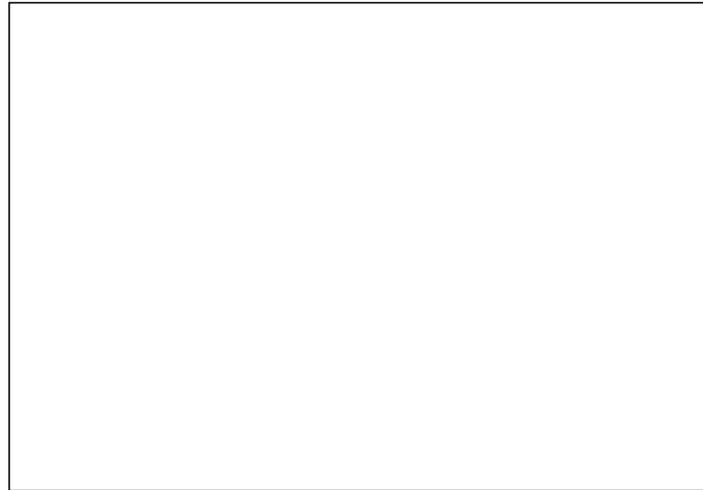


Fig. 45. Modern production line developed in 1973 by the machinery Dept. of the Research Laboratory. In contrast to earlier such lines this one has no manual handling of the fish trays. The cans are transported one by one to and from the packers, while the productivity of each packer is registered and automatically processed by computer. The packers are provided with optimal conditions for a good sitting position and an efficient way of working. The line was ready for installation in 1975 and all the sardine factories (9 in all) which were modernised after that time, were equipped with these lines. Picture from Farsund Packing Co. A/S in Farsund, taken in 1980.



Fig. 46. The “counting processor” with monitor and printer which receives all the data from the production line and works out the salary for each worker accordingly. Picture from Farsund Packing Co. A/S, taken in 1980.

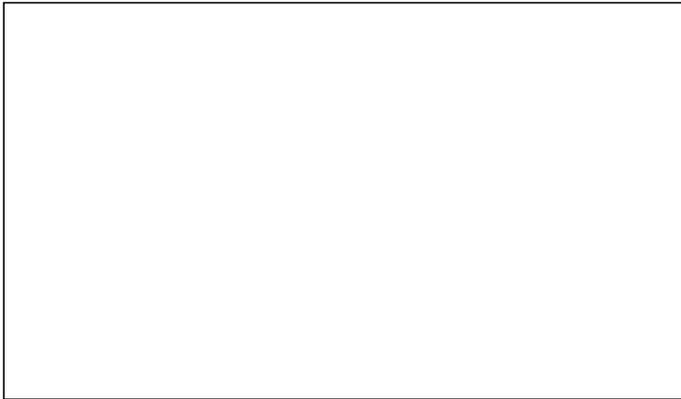


Fig. 47. Today's modern sardine can. In 1998 Norway Foods ceased production of straight-sided sardine cans, and went over to conical-sided cans with a "Ring-pull" opening. It is interesting – even sensational – that this type of opening was invented in Stavanger about 100 years ago by a machinist, Johan Thorkildsen and Thoralf Thorsen, patent no. 23753. The lid can be seen on display at the Norwegian Canning Museum!

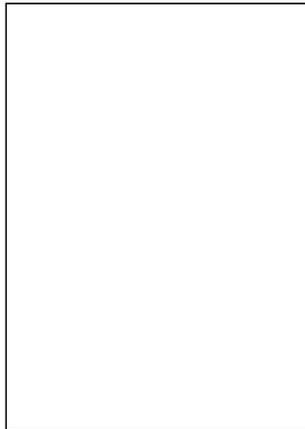


Fig. 48. "Ring-pull" opening from 1912, on display at the Norwegian Canning Museum

1996 – 2002

Rieber & Sønn ASA • Spanish Seaming Machines • The Final End in Stavanger.

1996

Norway Foods was taken over by Rieber & Sønn ASA. The Administration and Sales departments were moved to Bergen, although the warehouse remained in Stavanger.

1999

Norway Foods Ltd. began using conical sardine cans.

2001

The factory at Skånevik was closed on March 30th. The factories at Eikelandsosen and Davanger (near Bergen) are still in operation, *fig. 49*. The annual production is around 23 million cans. This can be compared with an annual production of around 170 million cans during the good years of the 1970s.



Fig. 49. Norway Foods main factory at Davanger, Askøy, outside Bergen. The factory is one of the two remaining sardine factories in Norway. Its daily production is about 60,000 cans of sardines – depending on the size of the fish. F/S Samfrost lies moored at the quayside. Norway Foods' other sardine factory is at Eikelandsosen to the South of Bergen.

F/S *Queen Frost* is the only freezer boat still in operation.

As Reinert's seaming machine was outdated by 1928, so now is the TAF 4 seaming machine also outdated, and it is time to update the seaming machine section of the two remaining Norwegian sardine factories. A machine has been selected which is produced by the Spanish company SOMMERTRADE. This is a company which started in 1908, with producing Reinert's seaming machines under licence. At that time Reinert's machines had a capacity of 15 cans per minute. Now the company can deliver to Norway ultra-modern machines with a capacity of 210 cans per minute. "The wheel has come full circle".

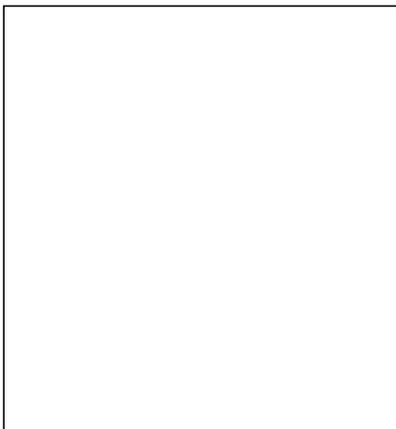


Fig. 50. Picture showing the SOMMERTRADE seaming machine, from Spain which is now in operation at both of Norway Foods' sardine factories in Norway. It is of interest that the company which makes these machines actually started with a REINERTS MACHINE, invented in Stavanger 100 years ago.

2002

According to the Stavanger newspaper *Stavanger Aftenblad*, 21st June 2002, Norway Foods have plans to "close the doors" at the Eikelandsosen factory. This will happen in 2003. **Then there will only be one sardine factory left in Norway.** In the same article it would seem that the storage and packing facility in Stavanger will also be closed in the same year.

Here ends the **Amazing Story of the Stavanger Sardine Industry.***

*Footnote

No, the story of sardines in Stavanger is not quite over. It is told in speech and writing at the Canning Museum. Here one can also see the machines which were used. The Museum is also the only place in the world where "Vintage Sardines" can be obtained – made of summer-caught brisling of the highest quality.

In about 1920 the number of sardine factories in Norway reached its highest point of about 140.

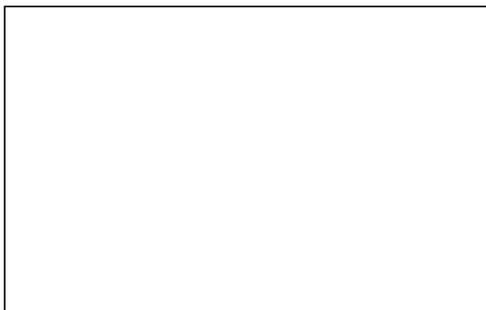
Half of these were in Stavanger.

By 1949 the number had sunk to 54.

Atlantic Canning Co. A.s, N. Banegt. 19-21
Avance, Sardinfabrikken, A.s, Avaldsnesgt. 68
Bjelland's fabrikk nr. 1, "Skagen", Skagen 32-36
Bjelland's fabrikk nr. 2, "Filialen", Nedre Strandgt. 67-69
Bjelland's fabrikk nr. 3, "Sardinen", Verftsgt. 22
Bjelland's fabrikk nr. 4, "Møllers Preserving", Sjøhusgt. 27-31
Bjelland's fabrikk nr. 6, "Star", Badehusgt. 27
A.s Buøen Packing Co. A.s, Bangarvågen, Buøy
Cape Canning Co. A.s, N.Banegt. 41
Central Canning's fabr., "Rosenberg", Sverdrupsgt. 27
Central Canning's fabr., A.B.C. Canning Ltd., Tanke Svilandsgt. 74
Central Canning's fabrikk, "Køhlerlåven", Hillevåg.
Corona Canning Co. A.s, Hillevåg
Engøy Packing Co. A.s, Engøy
Forgaard, Hans P. Packing Co. A.s, Normannsgt. 24
Grand Canning Ltd. A.s, Hillevåg
Hercules Canning Co. A.s, Haugesundsgt. 7
Holmens Preserving Co. A.s, Verftsgt. 24a/26a
Hundvaag Sardine Co. A.s, Hundvåg
Jadar Preserving Co. A.s, Hillevåg
Mercantile Canning Co. A.s, Støperigt. 31-32
Mogens Canning Co., Johannesgt. 21-23
Neptun Canning Co. A.s, Suldalsgt. 89
Norrig Hermetikkfabrikker A.S, fabrikk nr. 1, Lervigsv. 32-34
Norrig Hermetikkfabrikker A.S, fabrikk nr. 2, Kvitsøygt. 100
Norse Crown Canning Co., Ltd., Haugesundsgt. 60
Oversea Canning Co. Ltd. Haugesundsgt. 58
North Sea Packing Co. Ltd., Hillevågsv. 13
North Sea Packing Co. Ltd., Nedre Banegt. 40
Norway Preserving Co. A.s, Lervigsveien 25
Norwegian, The, Sardine Factories A.s, Banevigsgt. 5
Osmundsen, Brdr., Lervigsv. 16
Reform Preserving Co., A.s, Hillevågsv. 14
Reform Preserving Co., A.s, Lervig 48
Royal Canning Co. A.s, Duseviken

Rønneberg Preserving Co., Tanke Svilandsgt. 25
 A.s Sardinfabrikken "Ideal", fabrikk nr. 3, Galeivågen
 Standard Canning Co. A.s, Kalhammeren 52
 Standard Ltd.'s fabr. Preserving Co."Nor"A.s,nr.4, Nymannsv.140
 Standard Ltd.'s fabr. Preserving Co."Nor"A.s,nr.2,Haugesundsgt.39
 Standard Ltd.'s fabr. Preserving Co."Nor" A.s,nr.3,Nedre Banegst.51
 Standard Ltd. A.s, Verksgt. 29-31
 Stavanger Canning Co. A.s, Avaldsnesgt. 73
 Stavanger-Fjord Packing Ltd. Pedersgt. 93
 Stavanger Packing Co. A.s, Ryfylkegt. 33-35
 Stavanger Preserving's fabrikk, "Hermeten", Øvre Strandgt. 38
 Stavanger Preserving' fabrikk, N. Strandgt. 41
 Stavanger Preserving's fabrikk nr. 3, Verftsgt. 36-38
 Stavanger Preserving's fabrikk "Fram", Baneviksgt. 7
 Svithun Sardinfabrik, Kalhamm. 60
 Union Canning Co. Støperigt. 4/6
 Vestlandske Hermetikkfabrikker, Strandgt. 88 A (nå Norsk Hermetikkmuseum).
 Vestlandske Hermetikkfabrikker, Sverdrupsgt. 35
 Vestlandske Hermetikkfabrikker, Ryfylkegt. 30-32

Canning Factories in Stavanger 1880 – 1982



The number of factories grew rapidly until about 1930. There then began a period when the old factories were replaced by new, larger factories and the overall number dropped. By the 1960s the number had been dramatically reduced owing to the fact that freezer technology had been introduced, and thus the fish could be stored for many months, and production of sardines could be carried on year round rather than merely seasonally.

Postscript

After the Second World War there was a mood of great optimism among sardine factory owners. Many projects and organisations were started in order to improve organisation, quality, production and marketing. Among these were the "Threading Machine Committee", Hermetikkindustriens Kontrollinstitutt (The Official Norwegian Quality Control Institute for Canned Fish Products), Norges Hermetikkfagskole (The Norwegian Canning School), and the Canning Laboratory's Machinery Department. Amongst other things, production was rationalised, with modern equipment in larger factories. This resulted in a steady drop in the number of factories, such that around 1960 there were only 38 factories left in Stavanger, although this did not affect the volume of production. At that time there was still production of sardines using fresh brisling for brisling sardines and fresh young herring (called *mussa* – a Norwegian dialect word) for herring sardines.

Freezing and frozen storage of brisling began at the end of the 1960s. At the same time factories gradually went over to year round operation at the same time as the larger factories both built and concentrated their production in so-called "Central Factories". The total number of factories went right down until in 1968 there were only 13 factories left in Stavanger. The production figures for Norway as a whole however were largely unchanged, ranging between 100 – 170 million cans per year.

Then came the blow. After an exceptional year in 1973, production in 1975 was halved. This can be attributed to several factors: the people's "No" to the Common Market, very variable brisling catches, the rising price of brisling, the rise in wages, and unfavourable rates of exchange. All these resulted in higher prices for a can of sardines than the market could bear.

Today there are only two sardine factories left in Norway, with a combined production of about 20 million cans annually. Neither factory is in Stavanger. Both are in the Bergen area.

Support industries for the Canning Industry in 1949.
These provided the industry with cans, crates, rubber rings and gaskets, labels etc.

Factories for can-making machinery
TRIO Maskinindustri

Factories for making cans
Bjelland, Chr., & Co., A.s.
Hillevåg Blikemballagefabrikk A.s.
Stavanger Bliktrykkeri & Maskinværksted A.s.

Printing works for printing of decorated tinplate
Bjelland, Chr., & Co., A.s.
Hillevåg Blikemballagefabrikk A.s.
Stavanger Bliktrykkeri & Maskinværksted A.s.

Factories for cardboard and cardboard boxes
Dreyers Grafiske Anstalt, Aksjeselskap
Sand, Brødrene

Factories for rubber items (rubber rings for cans etc.)
Atlas Fabrikker
Kleiberg, Berge T., Gummipaknings-og Gummistrikkfabrikk
Stavanger Gummiindustri A.s.
A.s. Vestlandske Gummivarefabrikk

Lifts, conveyor belts and general canning machinery
Rydberg & Petterson A.s.

Factories for making keys for cans
Atlantic Nøgle- & Traadstiftfabrikk A.s.
Bjelland, Chr., & Co., A.s.
Stavanger Traadstiftfabrikk A.s.

Factories for making crates
Auestad Kassefabrikk & Tømmersagbruk
Bjelland, Chr., & Co., A.s.
Hillevåg Kassefabrikk A.s.

Jaasunds kassefabrikk A.s.
Jacobsens Kassefabrikk A.s.
Lervik Kassefabrikk A.s.
Rogaland Kassefabrikk A.s.
Trelastkompaniet A.s.

Boiler workshops (steam boilers)
Johannesen, Julius, & Sønner
Rosenberg mek. Verksted A.s.
Stavanger Elektr. Sveis

Chemical Laboratories
Grudes kjemiske laboratorium

Freezers
Norsk Kjøleindustri, A.s

Lithographic Establishments (Labels)
Aktietrykkeriet i Stavanger (Attrykk)
Dreyers Grafiske Anstalt, Aktieselskap
Johannesen, M.
Stavanger Lithografiske Anstalt A.s.

Factories for Machinery
Juell og Børve A.s.
Middelthon, C.
Nykirkebakkens Mek. Verksted
Rydberg & Petterson A.s.
Trio Maskinindustri A.s.

Machine Workshops and Iron Foundries.
Åkessons Mekaniske verksted
Aktiv Mek. Verksted
Birkemo, A.
Bjelland, Chr., & Co., A.s.
Bowitz, Carsten
Brynie, Harald
Christiansen, S.
Erga & Sveta
Evensen, M.

”Fyo” mek. Verksted
Gundersen, S.
Hallen, Nic
Herlofsen, Henrik
Hillevåg mek. Verksted A.s.
Isachsen, S. J.
Johnsen, L.
Klingsheim, Jens
Klosters, Theodor, Eftf.
Knudsen Willy
Larsen & Mortensen
Larsen, Olaf
Lode, Ludvig
Mekanisk Industri
Nykirkebakkens Mek. Verksted
Olsen, C.
Paulsen, Alfred
Rosenberg mek. Verksted, A.s.
Rydberg & Petterson A.s.
Seim, M. J.
Stangeland & Revheim
Stavanger Jernindustri A.s.
Stavanger Jernstøperi A.s.
Stavanger Kjedelverksted
Stavanger Stanceverksted
Trio Maskinindustri A.s.
Ørlands Mek. Industri

Rods for smoking

Beslagfabriken
Stavanger Traadstiftfabrik A.s.

Die-making factories

Isachsen, S. J.
Larsen & Mortensen
Lode, Ludvig
Norsk Hammerverk A.s
Stavanger Stanceverksted
Trio Maskinindustri A.s.

Sources and References:

Jørg Hviding, 1994, ”Kappløpet om falsemaskinen”* med litteraturhenvisninger, Norsk Hermetikkmuseum.

Jørg Hviding, 1995, ”Historien om røgede norske sardiner”* med litteraturhenvisninger, Norsk Hermetikkmuseum.

Gunnar Nerheim, Bjørn S.Utne, ”Under samme stjerne”, Peder Smedvig A/S

Carl Fred. Kolderup, ”Blad av hermetikkindustriens historie”, nr. 1 - 6

HERMETIKKINDUSTRIENS LABORATORIUM, Årsrapporter, 1932-1985. Detaljer i Interne meldinger, Interne rapporter, Meldinger, Særtrykk, Sirkulære, Publikasjoner og HL-Info

NORCONSERV, årsberetninger fra 1986-2001. Detaljer i Norconserv-Info.

BRANSJEFONDET, årsrapporter, 1984, 1986 og 1987.

HERMETIKKINDUSTRIENS LABORATORIUM: ”Teknisk vurdering av rasjonaliseringsmuligheter og behov i sardinindustrien”, 1976.

HERMETIKKINDUSTRIENS LABORATORIUM, ”Mellomlagring av sardinråstoff om bord i frysebåt”, 1986.

FAGFORTEGNELSE, NÆRINGSLIVET I STAVANGER, ROGALAND INDUSTRI, 1949. Aktietrykkeriet i Stavanger, 1948

JOHN GUNNAR JOHNSEN, ”Gatelangs i Hermetikkbyen”, Bind 1,2,3. 1996, 1998, 2000. Stavanger MESI A/S.

* Items marked with an asterisk are available in English

List of Illustrations

Fig. no.	Subject	Page
1.	Stavanger Hermetiske Fabrikk.....	6
2.	Martin Gabrielsen.....	7
3.	The first smokery at Sandvigå.....	7
4.	Founder of the sardine industry in Stavanger, Johan G. Mejlænder.....	8
5.	Wildhagen chamber smoking oven.....	8
6.	Chr. Bjelland & Co. A.s, Factory no. 1.....	9
7.	Norway's first seaming machine for sardine cans.....	10
8.	Interior of W. Nessler Machine Workshop.....	11
9.	Sardine can with soldered opening tongue.....	12
10.	Sardine can with "seamed" opening tongue.....	13
11.	Illustration of the first 3-in-1 cutting die.....	13
12.	Advertisement for "Reinertsmaskinen".....	14
13.	Seaming with the Reinertsmaskin.....	14
14.	Decapitating machine.....	15
15.	Brisling fishing boats in Ryfylkefjorden.....	16
16.	Hand threading of brisling.....	17
17.	Advertisement, Rydberg & Petterson A/S.....	19
18.	Benz & Hilgers labelling machine.....	21
19.	The Research Laboratory of the Norwegian Canning Industry.....	22
20.	Interior, the Research Laboratory.....	22
21.	Ham-Jern autoclave.....	23
22.	Rydberg & Petterson autoclave.....	23
23.	Kværner Smoking Oven.....	24
24.	Seaming with a Trio B machine.....	25
25.	Typical packing room of the 1950s.....	27
26.	Packers at work.....	27
27.	Checkers at work.....	28
28.	Rydberg & Petterson olive oil filling machine.....	28
29.	Threading by machine.....	29
30.	The Research Laboratory and the Norwegian Canning School.....	30
31.	Demonstration of the threading machine for King Haakon VII.....	30
32.	Canning School students at their microscopes.....	31
33.	Interior, Research Laboratory's Machinery Dept.....	31
34.	Machine for removing heads from the rods.....	33

35.	Interior, Bjelland's main factory, Stømsteinen.....	34
36.	Stacking machine for sardine cans.....	35
37.	Vertical plate freezer.....	36
38.	Thawing of frozen brisling.....	37
39.	Bjelland's freezer ships.....	38
40.	The freezer storage room.....	39
41.	The Freezer ship, F/S Samfrost.....	42
42.	Sorting of brisling on board the freezer ship.....	43
43.	Machine packing of sardine cans in crates.....	44
44.	Cross-section of a Freezer ship.....	45
45.	A modern production line.....	47
46.	The computerised counting machine.....	47
47.	Today's sardine can with the "ring pull" opener.....	48
48.	The first "Ring pull" opener.....	48
49.	Norway Foods' factory at Davanger.....	49
50.	A seaming machine from "Sommetrade".....	50

Sources of Illustrations

The Norwegian Canning Museum, figs. 1, 3, 5, 7, 8, 9, 11, 12, 47, 48
 Norconserv, figs. 10, 15, 19, 20, 21, 30, 31, 32, 33, 34, 36, 40, 42, 43, 45, 46
 Egil Forgaard, figs. 14, 16, 23, 25, 26, 27, 28
 Johan T. Østbø, figs. 12, 22, 24
Chr. Bjelland & Co. A/S 1882 – 1982, by Carl, F. Kolderup, figs. 6, 18, 29, 35, 37, 39
Tidsskrift for Hermetikkindustri, fig. 17
Sild i boks, by Ivar Vaage, fig. 38. Picture by Viggo Agdestein
 Stavanger Preserving Co. Jubilee volume, fig. 4
 Stavanger City Archive, fig. 2 and front cover, reproduced with kind permission
 Jørg Hviding, figs. 41, 44.