

Norges Bank's Printing Works – 190 years of banknote production

Peter Ravnsborg-Gjertsen, production manager at Norges Bank's Printing Works, and Jens Olav Sporstøyl, adviser in the Communications Department

At the end of June 2007, Norges Bank's Printing Works was shut down and banknote production in Norway came to an end. The decision to discontinue operations was made by the Executive Board in 2002. The first banknotes were delivered the year after the establishment of Norges Bank in 1816. Thus, banknotes have been produced in Norway for 190 years. As of 2008, Norwegian banknotes will be delivered by commercial security printers in France and the UK. Closures or transferral to private operators have previously been implemented among state-owned/central bank-owned printing works in the UK, Germany, Sweden and Finland, and there are signs that other countries will follow suit.

The first banknotes

Norges Bank's Printing Works started its activities in 1816, using manual printing presses and private printers to perform the task on the Bank's premises in Christiania (now Oslo). Initially, only the printing of the form took place here. Numbers, dates and signatures (3–5 depending on denomination) were written by hand at the Bank's head office, which was located in Trondheim at the time. Transporting these notes with military escort was a complicated and time-consuming operation, using horse and carriage along the roads of that time, over the Dovre Mountains – and back when the signing was completed and the forms had become notes. It often took twelve days one way. In the first years, the quality was not always up to standard – neither when it came to the print, nor the paper. Norway lacked experience in banknote printing and replacing the old notes was a matter of urgency.

The first notes had the denominations 1 and 5 specie-daler and were issued in 1817. 10, 50 and 100 specie-daler notes were issued the following year. In 1822, 1/2 and 1/5 specie-daler notes were also issued as a result of a shortage of coins – the last of these were withdrawn in 1850. The notes were simple printed material with one-sided, black print on coloured paper and without any

particular security features. However, the watermark was already in place and has kept its position to this day. The main colours on the notes have also remained virtually unchanged from that time through all the later series: 100 notes (speciedaler and the krone) red, 50 notes green, 10 notes yellow and 5 notes blue. (The exception is the 10-krone note from 1972, which was printed in blue tones when the 5-krone note was discontinued.) The small denomination notes were printed on white paper. From 1822, banknote printing was transferred to Trondheim and production became more efficient with a new, in-house press.

Two-colour and multicolour printing

The next banknote series, from 1841, had two-coloured print (i.e. one colour in addition to black), but were still only printed on one side. The design had been improved, partly in order to combat counterfeiting (counterfeit notes were largely hand-drawn) and partly for artistic reasons. Numbers, dates and signatures were still written by hand, but printed numbers were eventually introduced.

In the 1860s, when Norges Bank wanted to produce notes with better paper quality and more modern production techniques (based on galvanoplasty and



Above: The first banknote type. One speciedaler, signed 1822.
Right: Print plate for the 100 speciedaler note.
The larger denominations had the same format (123 x 190 mm), the 1- and 5-speciedaler notes were slightly smaller, and the 1/2- and 1/5-notes about half the size





The first krone notes were issued in 1877 with the 1000-krone note as the highest denomination. Converted to today's value using the consumer price index, this corresponds to nearly NOK 50 000

mechanised engraving), Saunders, a paper and banknote manufacturer in London, offered to print the notes. The two parties entered into an agreement and in 1866 a new banknote series was introduced. The notes were printed and completed in London, with two colour prints, on both the obverse and the reverse, in addition to black intaglio print on the obverse. The obverse had a vignette with four men symbolising the main industries in Norway: mining, fishing, farming and shipping. However, after a short period, Norges Bank procured new equipment and all colour printing was gradually transferred to Trondheim, while the intaglio printing for this series continued to take place in London.

Krone banknotes

In 1875, the Storting (Norwegian parliament) decided to join the Scandinavian monetary union, which was based on the gold standard and the denominations krone and øre. One speciedaler was converted to NOK four. The first krone-notes were issued in 1877 with six denominations: 5, 10, 50, 100, 500 and 1000. The 1000-krone note was quite a fortune at the time – corresponding today to about NOK 50 000 when using a consumer price index. This series has later been referred to as Series I. The same colour code was used, but the new denominations 500 and 1000 included rainbow printing (gradually changing colours). In this series, the notes no longer had the same size. The 5- and 10-krone notes were of identical size, measuring 135 x 78 mm, the 50- and 100-krone notes were double the size, and the 500- and 1000-notes triple the size. The notes were printed on white paper with black intaglio print and two-coloured letterpress print on the obverse and letterpress print in one colour on the reverse. Initially, Saunders produced the obverse while the reverse was printed in Trondheim. From 1889, after the procurement of new equipment, the letterpress printing of the obverse was carried out in Trondheim, as was the intaglio printing from 1891. In the same year, the Bank switched to paper from Sveriges Riksbank's paper mill in Tumba, south of Stockholm. Series I is also the only Norwegian banknote series on

which the portrait of a monarch, King Oscar II (in a Swedish admiral's uniform), has been used. (As a result of the union between Norway and Sweden from 1814 to 1905, the Swedish king was also king of Norway.)

In 1894, a galvanoplasty workshop was established at the Printing Works, allowing the Bank to produce its own printing plates for both letterpress and intaglio printing. However, the originals were still engraved in England.

Moving, postage stamp printing and the end of gold redemption

From the year 1900, banknote Series I was replaced by Series II, in which the format was slightly smaller, but the relative size remained the same. The tradition of portraying prominent figures on the obverse began when Christie (former president of the Storting and chairman of the committee that achieved independence for Norway within the union with Sweden through negotiations in 1814) appeared on the 5-, 50- and 500-krone notes (alone), while Admiral Tordenskjold accompanied him on the 10-, 100- and 1000-krone notes. Apart from a small shipment delivered by Bradbury, Wilkinson & Co. Ltd. during the years 1900–1901, the notes were printed in Norway. The paper was supplied from Austria until 1907, when a switch was made to Alvøens paper mill close to Bergen. In 1907, banknote printing was moved to Oslo where the Bank's head office had been located since 1897. The Printing Works was then located in the Bank's new building which was inaugurated in 1906. In 1934, as both the Bank's and the Printing Works' activities had increased in volume over the years, the Printing Works moved to a separate building in Oslo.

During this period, Norges Bank's Printing Works produced its first postage stamps, using intaglio print. One stamp was produced for the centennial celebration of the Constitution in 1914 and another in 1930 commemorating Holy King Olav and the battle of Stiklestad which took place 900 years earlier.

Among the banknote series issued by Norges Bank, Series II is the one with the longest life. The series was not replaced until after the end of the war in 1945,



From the new head office at Bankplassen in Oslo when the Printing Works had moved in on the first floor in 1907. Many of the employees from Trondheim moved to Oslo with the Works.

although it was scheduled for replacement in the 1930s. The Bank's archives contain design drafts made by external designers, but due to turbulent times and the outbreak of World War II, they were never used. It was also during the life of this series that the Bank's duty to redeem banknotes for gold came to an end (1932), but the text "will pay the bearer [...] KRONER GOLD" was not removed.

War history, small denomination notes and monetary reform

During World War I, there was a shortage of coins and coin metals. In 1917, Norges Bank was again permitted by law to issue small denomination notes. These were unpretentious one- and two-krone notes which ceased to be legal tender in 1925/1926. Influenced by the upheaval in Russia, the red two-krone note was nicknamed "Red Guard" while the green one-krone note was called "Bolshevik". A shortage of coins quickly arose again during World War II and small denomination notes were produced as early as 1940. These notes were legal tender until 1950. This time, the nicknames were "usling" for the one-krone note and "quisling" for the two-krone note, as "it took two uslings to make a quisling."¹

In autumn 1942, a few trusted men at the Printing Works received a message through the resistance fighter Gunnar "No 24" Sønsteby, stating that the Norwegian Government in London requested printing plates in order to produce "counterfeit" Norwegian banknotes as a means of financing the resistance in Norway. When the message had been reassuringly confirmed from London, the stock manager and his supervisor set to work and Sønsteby managed to smuggle the plates over to Sweden in a sack of charcoal. When the material arrived in London, Waterlow & Sons Ltd. Printing Works produced NOK 20 million. However, the notes were not perfect enough for the Government to take the risk of letting the resistance movement use them. Later, about NOK 2 million was allegedly brought into the liberated areas of Finnmark in Northern Norway, replacing genuine notes from the local Norges Bank branch which then could be smuggled down to southern Norway.

Commissioned by Norges Bank's London Board, Waterlow & Sons Ltd. also printed both war notes, intended for the troops to use during a possible military reconquest of Norway, and replacement notes for a monetary reform after the war. However, the latter notes never entered into circulation and the war notes were only used to a limited extent during the first days after the liberation. Norges Bank in Oslo had in fact secretly started producing replacement notes as the war

¹ "Usling" is a despicable person: a louse, trash, scum. "Quisling" refers to the Norwegian fascist politician and traitor Vidkun Quisling, who led a coup d'etat on the day of the Nazi invasion of Norway, April 9, 1940.



Norges Bank's Printing Works in 1989. One of two printing presses

was drawing to a close – a very risky operation in those days, with several Nazi representatives both on the Board and the Supervisory Council.

During the war the occupational authorities requisitioned large quantities of Series II notes, and the Bank's management realised at an early stage that a monetary reform would be necessary when the war had come to an end. Thus, when the replacement of notes started on 9 September 1945, it was the notes from the Bank's in-house Printing Works that were to be used. These notes resemble a simplified version of Series II, with fewer colours and fewer prints and with the Norwegian national coat of arms and various rosettes instead of portraits and historical buildings. However, the 1000-krone note had the same motif, but the text GOLD had been printed over. This series, which has been designated Series III, did not include the 500-krone note.

Modernisation with trade and industry, women and "nynorsk" (New Norwegian) on the notes

Series III was very short-lived and the first notes in Series IV were ready as early as the end of the 1940s. This banknote series was very thoroughly prepared and the motifs on the reverse illustrated the main areas within Norway's industrial and community life. These were notes showing activities in fishing, trade and shipping, agriculture, forestry, manufacturing industry and cultural life, respectively. The notes still had the large

format from Series II (216 x 127 mm for the two highest denominations). They were costly to produce since only a few notes on each printing sheet resulted in inefficient utilisation of the printing presses. Large notes also required considerable space in people's wallets.

From the early 1960s the Bank began issuing Series V, in which the notes, especially in the higher denominations, were markedly reduced in size. In spite of this, the Printing Works gradually reached its maximum capacity. In order to keep pace with the increasing need for banknotes, Norges Bank's Printing Works introduced a web press in the early 1970s. This was a new technology in banknote production which was also introduced in the UK, Sweden and Denmark around the same time. The notes were completed and numbered in a single operation, as opposed to the earlier process which might require up to six or seven printing operations. This resulted in a radical reduction in requirements for space, operators and work in progress. The first note produced using this method was the 10-krone note from 1972 which carried a portrait of Fridtjof Nansen and which took over the blue tones when the 5-krone note was replaced by a coin.

At the end of the 1970s the Bank started producing a new series, Series VI, and this entire series is printed on the web presses. This series marked some particular milestones. For the first time in history, a Norwegian banknote carried the portrait of a woman, author Camilla Collett on the 100-krone note, and the 50-krone note (with the portrait of author Åsmund Olavson

Norges Bank's Printing Works – historical events:

1817	First banknotes printed at Norges Bank in Christiania (renamed Oslo in 1925)
1822	Printing is transferred to the head office in Trondheim
1842	The notes are pegged to silver at par
1841	New banknote series
1866	New banknote series
1873	Gold standard adopted
1875	Norway enters into the Scandinavian Mint Union
1877	Krone denominations are introduced along with a new banknote series (Series I)
1897	The Bank's head office is transferred to Christiania, the Printing Works remains in Trondheim
1900	The krone Series II is issued
1907	The Printing Works is moved to the new head office in Christiania
1932	Gold standard abolished
1934	The Printing Works moves into a separate building in Oslo (in Nedre Slottsgate)
1944	Series III, the replacement notes, printed in secrecy
1948	Production of Series IV begins
1962	Production of postage stamps printed in intaglio begins
1964	Production of Series V begins
1969	The Printing Works procures its first web press
1977	Production of Series VI begins with the 100-krone note, and eventually the whole series, printed on the web press
1980	A second web press is procured
1987	The Printing Works moves into the new head office, a third web press and a new web press for stamps are procured
1988	Production in Nedre Slottsgate is discontinued
1993	Printing and binding of a new passport form begins
1994	Production of Series VII begins with a 200-krone note
1996	All Norwegian stamps are printed at the Printing Works, new press procured
2000	Automatic quality control of banknotes introduced
2000	Production of postage stamps is discontinued
2002	Decision to discontinue operations at the Printing Works in 2007
2003	Passport production is discontinued
2007	The last sheet is printed (200-krone note) 28 February
2007	The Printing Works is shut down 29 June

Vinje) was the first note carrying the name of the central bank in “nynorsk”: Noregs Bank. (Nynorsk - New Norwegian - is one of the two official forms of written Norwegian, officially recognised through a parliamentary resolution in 1885 and currently used by 10-15 % of the population as their primary written language.)

The 10-krone note was replaced by a coin in 1983 and Series VI therefore only has four denominations.

Expanded range of products after the war

The post-war period was also marked by considerable activity with regard to other security printed material. There was extensive production of various tax and duty stamps, for instance to be used on tobacco and radio sets, stamps for holiday pay, the Norwegian Postal Savings Bank stamps and the like. Government premi-

um bonds (or so-called “goldfish”) were one of the largest products, along with cheques, traveller's cheques, primary capital certificates and shares. Norwegian passport printing was also begun during this period, a task which was performed until 2003. The Printing Works developed a new passport in 1992 when they also started producing the complete book, including cover and binding. In 1999, a new machine-readable passport was introduced and issued centrally. Until 2003, this was a joint project with the Ministry of Justice.

Norwegian stamps printed in intaglio represented another large product at the time. A separate web press was procured for this purpose and the first stamps were issued in 1962. In 1987, a new press was procured and for a period from 1996 Norges Bank's Printing Works was the sole supplier of all types of stamps to Norway Post. The Printing Works and Norway Post received

several international design awards for postage stamps printed in intaglio, engraved by the Printing Works' graphic designers. In 2000, production was discontinued as a result of decreasing volumes and a transition to self-adhesive stamps. At the same time, Norway Post decided to hold an international tender for the contract.

Moving to a new head office and measures to combat modern counterfeiting

In 1985, the Printing Works had over 140 employees and had long since outgrown its premises. For a long period, it was the intention to move the Printing Works out of Oslo. However, when the new head office was built in Oslo, it had room for a modern printing works. The move took place in 1987 and, at the same time, the machinery facilities were modernised and the working conditions were improved considerably. The basic machinery consisted of two large web presses for banknotes, one new web press for postage stamps and two machines for sorting and packaging, together with new equipment for the production of the Bank's other printed material and periodicals.

As the 1990s progressed, the need for a more efficient combination of denominations arose, one that could reduce the number of notes needed on a daily basis, especially with a view to the market for ATMs and payment terminals. This led to the introduction of a 200-krone note in 1994. This note became the first one in the present Series VII with a total of five denominations. This series has been through some upgrades as developments in computer technology, along with easy access to colour photocopiers, printers and scanners, provided new possibilities for counterfeiting. The Printing Works represented Norges Bank in an international collaboration project with a number of other central banks in order to combat this threat. Among other things, this has led to specific solutions which make copying, scanning and printing of banknote designs extremely difficult. In addition to this, Norges Bank's Printing Works was among the first to start using a holographic foil strip on banknotes. Thanks to the combined effect of these measures, the number of counterfeit notes in Norway has been very low in recent years.

The Printing Works is closed down

In the 1990s, Norges Bank's Printing Works attempted to utilise its spare capacity through involvement in the international banknote market. A few larger contracts were won and completed, but Norges Bank's discussions of strategic plans and core responsibilities concluded that this would not be pursued any further. As a result of similar assessments, The Royal Norwegian Mint was organised as a limited company and was later sold. In 2002, it was decided to discontinue operations at Norges Bank's Printing Works in 2007, and thus an

extensive reduction of the workforce has been completed. In the last couple of years, just over twenty employees have carried out a far more elaborate production programme than for many years, before the transition to purchasing banknotes from other countries. The last banknote was printed on 28 February this year and the last notes were inspected and packaged at the end of May. And so, 190 years of banknote printing in Norway is a closed chapter.

Literature:

Bang, Per and Jon Petter Holter (1991): *Norges Bank 175 år – mennesker og begivenheter (Norges Bank 175 years – people and events)*. Aschehoug. Oslo 1991

Erlandsen, Hans Christian (1992): *Penger av papir (Paper money)*. Grøndahl Dreyer. Oslo 1992

Jahn, Gunnar, Alf Eriksen and Preben Munthe (1966): *Norges Bank gjennom 150 år (Norges Bank through 150 years)*. Norges Bank, Oslo

Norges Bank (1996): *Banknotes in Norway*. Brochure

Norges Bank (1989): *Pengehistorie – Norges Bank-historie (Monetary history – the history of Norges Bank)*. Brochure

Norges Bank (1965): *Vår Bank nr. 2, (Our Bank no.2)1965* (Employee magazine for the Central Bank of Norway)

Norges Bank's web pages on banknotes: <http://www.norges-bank.no>. The pages contain descriptions and illustrations of all the banknote series since 1877, including information on those designers that have been involved in the design and production of the notes

Rygg, Nicolai (1918): *Norges Banks historie, første del (Norges Bank's history, Part I)*. Norges Bank, Oslo

Rygg, Nicolai (1954): *Norges Banks historie, annen del (Norges Bank's history, Part II)*. Norges Bank, Oslo

The University of Oslo Coin Cabinet (1975): *Den norske krone i hundre år (The Norwegian krone through 100 years)*. Brochure, Universitetsforlaget