Scandinavian museums to be built as such, the collections of the Danish National Museum then as now being housed in the Prince's Palace in Copenhagen.

In an eclectical age, an architect might choose different historic styles for different buildings. Having used the Italian Romanesque for his University Library of 1855, J. D. Herholdt turned to the model of a Florentine palace for the Danish National Bank, begun in 1866 (figure 7.17).[27] Here is a compact and regular three-story building with rusticated lower story and two levels of broad arched windows, all crowned by a heavy cornice, an approach that was evidently thought appropriate for a banking establishment.

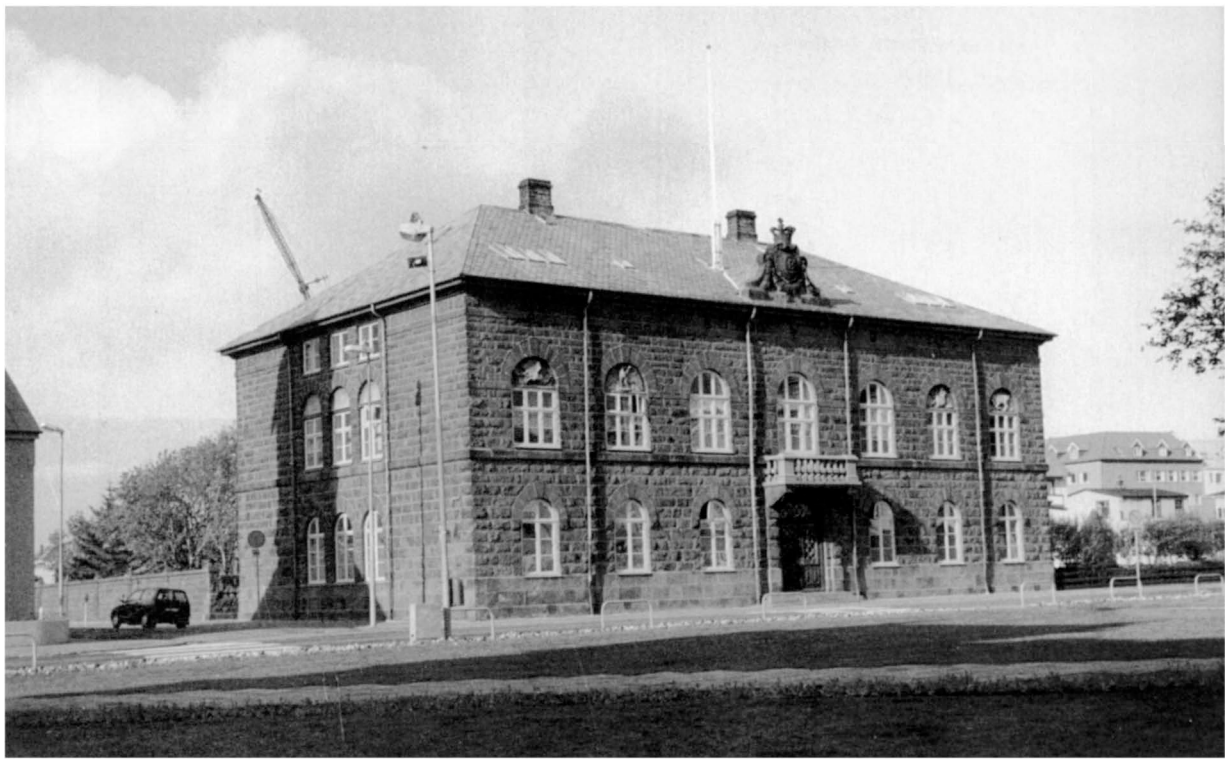
Much grander was the Royal Theater in Copenhagen, begun not far from the bank six years later. It was designed by Vilhelm Dahlerup and Ove Petersen to replace the one built by Niels Eigtved in 1748 (figure 7.18).[28] The grand façade, with its rusticated triple-arched entrance below and arched balcony above with double Ionic columns, is in the then established pattern for the European theater. Staircases lead to a foyer behind the balcony, decorated with Corinthian pilasters. The auditorium is U-shaped, with four tiers of boxes and galleries, the royal box between the proscenium and the first tier on stage right. An extensive program of remodeling for the stage and supporting facilities was carried out in 1983–1985. The simple elegance of the backstage and ballet quarters now contrasts with the exuberance of the auditorium.

Dahlerup was not solely interested in stately projects. In 1874 he designed the Pantomime Theater for the Tivoli Gardens, which had been founded by Georg Carstensen in 1843 (figure 7.19).[29] The brilliant, exotic use of Chinese motifs, so different from the Rococo elegance of the Chinese Pavilion at Drottningholm, is well suited to the theater's setting in the pleasure gardens. It also gave Dahlerup an opportunity to depart from the more formal Renaissance manner.

7.21 Reykjavik. Parliament. F. Meldahl. 1881.

7.22 Oslo. National Gallery. A. Schirmer. 1879–1881. Print, c. 1885. (Oslo, National Gallery.)

One major church project was at last brought to a conclusion in this Renaissance/Baroque group. We left Frederik's Church in Copenhagen unfinished at the time of N. H. Jardin's dismissal in 1771. Thanks to private funding the work was resumed in 1876 and completed in 1894 by Ferdinand Meldahl (figure 7.20).[30] Now instead of a ruin there is an imposing church at the end of Frederiksgade, the dome, based on that of St. Peter's in Rome, sitting rather heavily on the centralized building below. The inner circular room is divided into twelve parts along the walls, arched at the main level and rectangular windows in the drum of the dome above, all separated by pilasters, applied colonettes, and panels. The altar is placed against the wall opposite the main entrance, flanked by the pulpit and baptismal font, with seats arranged theater-fashion facing them. The overall effect is heavy, and Jardin might not be altogether pleased with the result. The use of marble and marbelized wood has given the church its other name of "The Marble Church."



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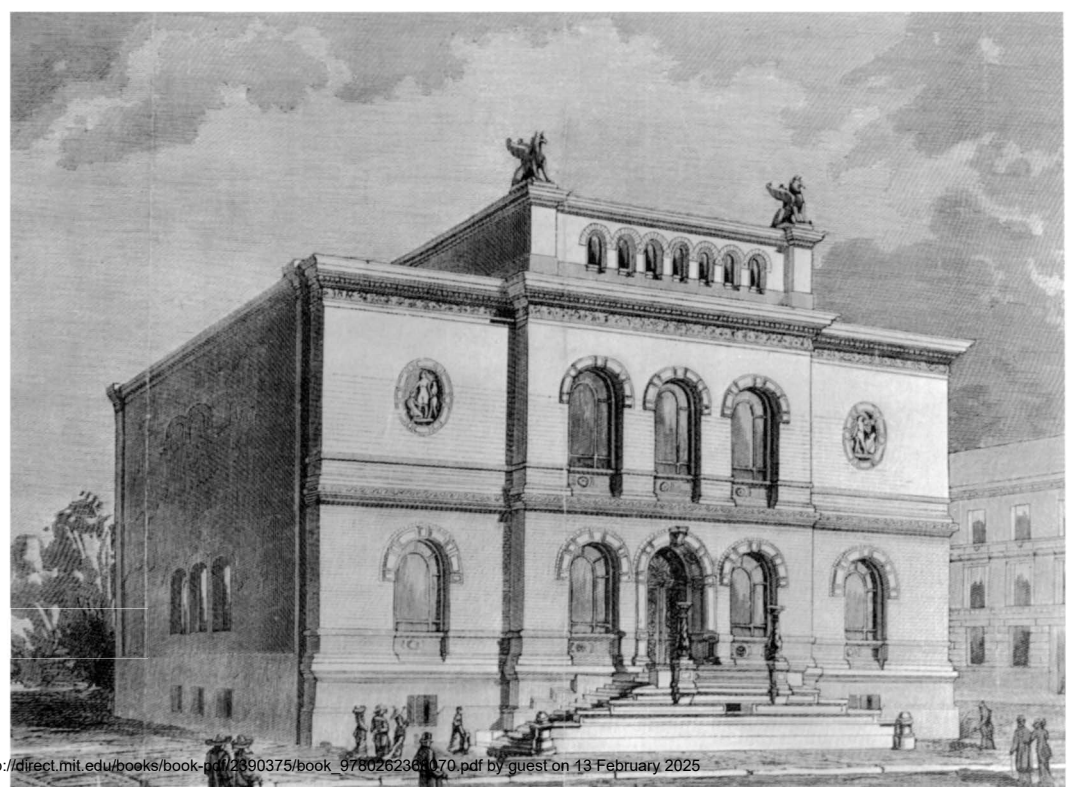

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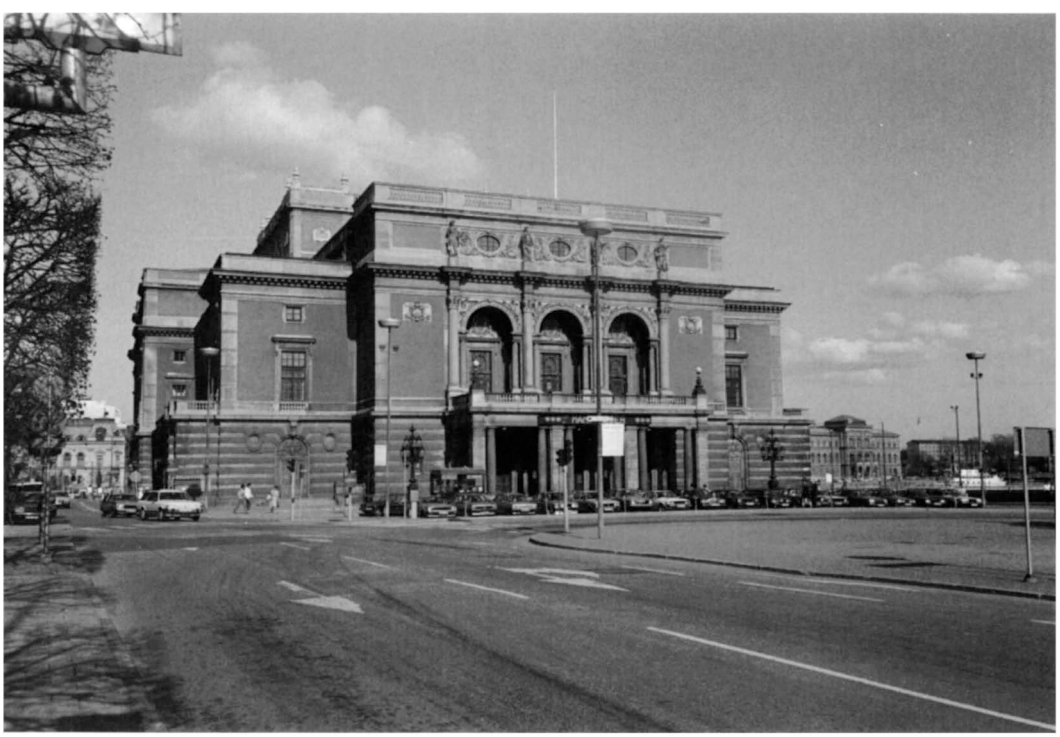
7.23 Stockholm. Royal Opera House. A. Anderberg. 1891–1898.



While work on Frederik's Church was in progress, Meldahl had another unique assignment. In Norway the Parliament, the Storting, had existed until the constitution of 1814. Iceland's Parliament, the Althing, on the other hand, was first assembled c. 930 at the dramatic site of Thingvellir. The Althing, only briefly interrupted, met there without permanent shelter until greater independence was won from Denmark by the constitution of 1874. In 1881 the Parliament building was built beside the lake in Reykjavik, according to Meldahl's design (figure 7.21). It is like an Italian palazzo, seven bays wide and two stories high, with large round-headed windows in both levels. The material is the dark Icelandic basalt. The central entrance, with its traditional balcony for official appearances, leads to a central staircase with handsome iron balusters. The legislative chambers are on the second level, with the larger for the lower house on the north, overlooking Parliament Square. The smaller chamber is on the west, and offices occupy the east end. A recent addition on the south provides a sitting room for members of the assembly.

A much less sober palazzo design was made for the contemporary National Gallery in Oslo. As early as 1836 the Norwegian Parliament had wanted a national art collection, and indeed Linstow had drawn up a proposal for housing it. It was not until 1879 that a building to house the sculpture collections was finally begun by Adolf Schirmer (figure 7.22).[31] The original building was designed as a palazzo, two stories high, with a three-bay central portion projecting slightly and an attic story finished with guardian griffins. The fine texture of the brickwork was repeated in the additions of the south wing, 1905–1907, and the north wing, 1918–1924, both by Ingvar M. O. Hjorth.

Shortly thereafter came a series of national theaters given much grander palatial expressions. In Stockholm the Opera House that Adelcrantz had built for Gustavus III in 1777–1782 was demolished in 1891 and replaced by the present Royal Opera from the designs of Axel Anderberg by 1898 (figure 7.23).[32] Some parts of the old foundations and walls were used, and the main entrance was again put on the square. Swedish granite was used to finish the walls at ground level, while the more economical rose-tinted stucco was used above. Details were carried out in Swedish limestone.

Anderberg planned the building in the traditional manner, with the axis of auditorium and stage in line with the main entrance. As it is now, there is a grand staircase beyond the vestibule, flanking staircases, and a richly decorated foyer above the vestibule. Since this is a royal theater, there is a royal staircase on the north side leading to a suite of rooms including the royal foyer, which has paintings by Prince Eugen. The royal box is here on stage left, just before the proscenium. This departure from the more frequent location, as in the Copenhagen theater, put the royal quarters on the side facing the Royal Palace. The auditorium is U-shaped, with three tiers of boxes and galleries.

At the same time, the National Theater in Oslo was being built from the designs of Henrik Bull (figure 7.24).[33] In 1891 Norway was still under the Swedish King Oscar II, and Bull undoubtedly knew the plans for the theater then under construction in Stockholm. The main entrance is again a three-part system, with an arcade below and an Ionic temple-front above. Although the original intention was to face the building with stone, economy dictated that granite could be used only for the ground level, with brick for the upper parts. On the interior Bull put the major staircases on either side of the vestibule, and as in Anderberg's Royal Opera the royal staircase, apartments,

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and box are on stage left. The auditorium, however, is horseshoe-shaped with two tiers of galleries and boxes. The performing and service areas were rebuilt in 1979–1985.

The combination of stone and stucco or brick in these two theaters illustrates the dilemma facing Nordic architects in the late nineteenth century. A desire for "truth in materials" led some to assert that native materials alone should be used for buildings of national significance, and stone was heavily favored. Problems of cost led to compromises such as those just described. In Oslo, in fact, the first project for the National Gallery in 1876 by Heinrich Ernst Schirmer, father of Adolf Schirmer, called for a stone façade. The

7.24 Oslo. National Theater. H. Bull. 1891–1899.

7.25 Stockholm. Royal Dramatic Theater. J. F. Lilljekvist. 1901–1908.

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elder Schirmer resigned from the project when his choice of material was turned down. Another problem was that of durability, since some stones proved not to weather well: the limestone of the National Museum in Stockholm very soon began to crumble. Such problems presented difficulties for those seeking to settle on the use of materials in order to develop a "national style."[34]

At the beginning of the twentieth century Scandinavian architects were exploring yet another possibility for ornamental vocabulary. Early identified as the "Art Nouveau" or "Jugendstil," its proponents were rejecting historical styles for a program of original motifs, depending for their success on references to natural forms and fluidity and sensitivity of line.[35] In the Scandinavian countries this style was not universally adopted, but found some instances of eloquent expression.[36] For example, the Royal Dramatic Theater in Stockholm, built in 1901–1908 by Johan Fredrik Liljekvist, is planned in the traditional manner (figure 7.25).[37] The façade, however, while perpetuating the central elements that we have observed on the earlier Scandinavian theaters, does not have the arcaded gallery in the second story. It depends for its effect on the enrichment of the marble surfaces with sculpture by Carl Milles and Art Nouveau motifs. The same is true of the National Theater in Bergen, 1906–1909, designed by Einer Oscar Schou (figure 7.26).[38] Clearly owing much to the Stockholm theater then being completed, Schou's competition de-

sign proposed richer surfaces than were actually built; but placed on a rise of ground in a park setting, the Bergen theater achieves a certain grandeur.

Perhaps more than the other Scandinavian countries, Finland seized upon the Art Nouveau, well represented in numerous houses and apartment blocks. One of the most interesting nonresidential buildings is the Valtion (National) Hotel at Imatra, built in 1903 by Usko Nyström (figure 7.27).[39] The whole setting is dramatic, as it is placed on the gorge formed by the Vuoksi River, where the steep rapids have been lessened by a large power station built in the 1920s. The view downward into the rocks remains spectacular, and Nyström's hotel with its irregularly jutting towers and asymmetrical window openings suits its location admirably.

One other major source of inspiration for design in the late nineteenth century remains to be considered, the rural Nordic traditions that evoked even more nostalgia than the medieval or the Renaissance and Baroque. A notable example for its use for a single dwelling is the Dunker Villa, designed for a wealthy lawyer by H. E. Schirmer and built in 1848 or 1851 on Malmøya near Oslo (figure 7.28).[40] The illustration by Dietrichson and Munthe shows a compact wooden building, two stories high, with a veranda on two sides and carved detail to give it a "Nordic" air. In Norway the inspiration is thought to have come not so much from traditional Norwegian rural building as from Germany and Austria, hence the popular classification of these buildings as "Swiss Style."[41] A number of small wooden churches were also built in Norway at this time.[42]

The restaurant became a place in addition to the theater where those who could afford it could be seen and entertained in splendid surroundings. In the city a palatial approach might be taken, as at Bern's Restaurant in Stockholm,

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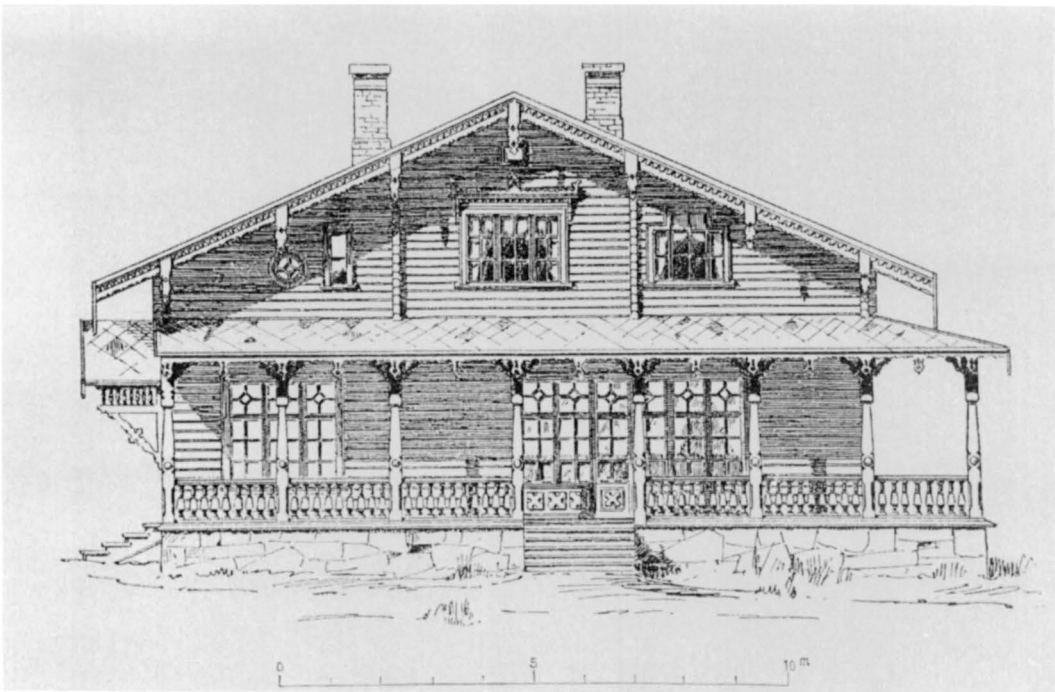
7.26 **Bergen. National Theater. E. O. Schou. 1906–1909. (Oslo, Riksantikvaren.)**

7.27 **Imatra. Valtion Hotel. U. Nyström. 1903.**



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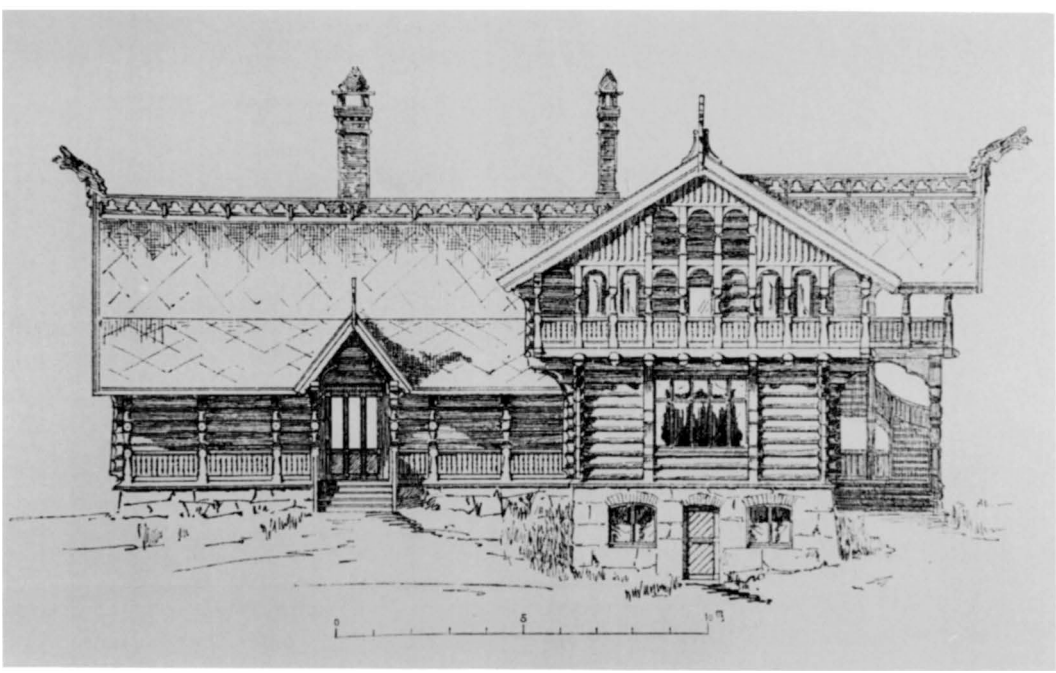

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7.28 **Oslo. Dunker Villa. H. E. Schirmer. 1848 or 1851. (Dietrichson and Munthe, *Holzbaukunst,* plate 12.)**

7.29 **Oslo. Frognerseteren. H. Munthe. 1890. (Dietrichson and Munthe, *Holzbaukunst,* plate 8.)**

7.30 **Dalen, Telemark. Hotel. H. L. Børve. 1894. (Bergen, University Library. Photo: K. Knudsen.)**

7.31 **Stockholm. Nordic Museum. I. G. Clason. 1892–1907.**

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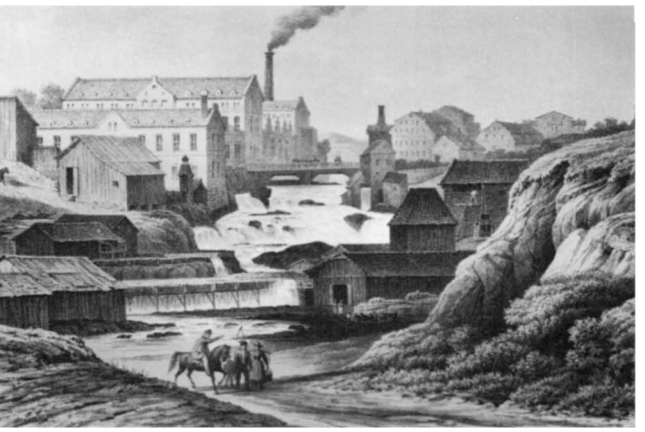
built in 1862 by Johan Fredrik Åbom. Those seeking enjoyment in a more nostalgic setting might dine at a restaurant built in the "Dragon Style," such as Frognerseteren, built by Holm Munthe in 1890 (figure 7.29).[43] The horizontal log walls and porches with open arcades were further romanticized by the Viking-inspired dragon heads at the roof peaks.

European efforts to provide hotels for the safety, comfort, and pleasure of travelers form a whole study in themselves.[44] Many grand buildings in Renaissance or Baroque style were constructed in the late nineteenth century, some in connection with railway stations. But there was also a growing desire to enjoy a resort hotel vacation, for which a rambling wooden structure adorned in the Dragon Style was an appealing solution. One of the most famous examples was the Dalen Hotel in Telemark, built in 1894 by Haldor Larsen Børve (figure 7.30).[45] Verandas and open porches with steeply pitched gables made for an informal airy appearance.

The Nordic Museum in Stockholm might properly be included in discussions of buildings in the Renaissance/Baroque manner. It was, however, founded in 1872 by Artur Hazelius, the founder of Skansen, and is devoted to the life of the Swedish people. Further, the aspect of the Renaissance chosen was not that of the palaces of Italy and France but rather the Netherlandish style of the early seventeenth century, a less formal and stately approach. Competition for the design began in 1883 and was finally won by Isak Gustaf Clason, under whom the museum was built from 1892 to 1907 (figure 7.31).[46] A much larger establishment was intended, with four wings around a courtyard and corner towers to resemble a castle, but the western main hall portion was the only part built. Brick was originally proposed for the exterior, but this was changed to red sandstone with gray sandstone trim. The building is four stories high, decked out with the towers, gables, pinnacles, and surface patterns characteristic of the Northern Renaissance. The main vestibule is dark, but the three main exhibition floors rise around a central open court that gives light. Circulation is through the galleries, with stairs in the entrance portion and in the four corner towers. The court is the largest interior space among the Scandinavian museums of this period, and its effect is to unite, not separate, the exhibition wings.

Up to this point we have taken the use of iron in building construction more or less for granted. In the early years of the nineteenth century a number of theater roofs had been built with iron, largely in hopes of preventing tragic fires, and later some of the great international exposition buildings were to display its potential in design. Train sheds were also ideal subjects for iron roofs. With these we come closer to industrial buildings than to "polite" architecture, and to the philosophical rift between "architecture" and "engineering."[47]

Another appropriate use of iron was in factory construction.[48] In spite of ideological problems, factories have engaged the attention of Scandinavian architects for nearly 150 years. The English textile industry had led the way in factory design for a century when Norwegian manufacturers began such complexes as developed at Akerselva in the 1840s (figure 7.32).[49] The plain blocklike buildings of two to four stories rose in contrast to the tumbling waters of the streams needed for their water power, establishing a new aspect of the urban landscape. Because of its fire-resistant and load-bearing advantages, iron came to be used for some of the beams and pillars of construction, and also for window frames and bars. Historicism was promptly felt, as shown by C. H. Grosch's design for the canvas factory in Oslo



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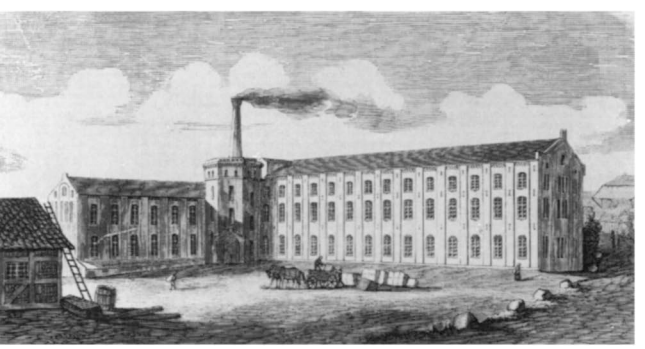
7.32 **Akerselva, Akershus. Textile factories. Begun 1835. Lithograph, 1857. (Oslo, City Museum.)**

7.33 **Oslo. Canvas factory. C. H. Grosch. 1856. Xylograph, c. 1860. (Oslo, City Museum.)**

7.34 **Copenhagen. Carlsberg Brewery. H. C. Stilling. 1847.**



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in 1856, with its echo of Lombard Romanesque pilaster strips and corbel tables (figure 7.33).[50]

In Denmark two important industries were developing and needed factories. For J. C. Jacobsen's brewery in Copenhagen, built 1847, his own drawing was the basis for the buildings by Harald C. Stilling. Two and three stories high, with attic vents, its long walls were relieved by panels framing the window bays (figure 7.34).[51] Another brewery, Marstrands Maltmølle (later Kongens Bryghus), was built in 1865, this time from drawings by Henning Wolff (figure 7.35).[52] This was given even greater expression, with a broad arched door in the central bay, four bays with arched windows at the ground level on either side, and end bays with narrow closely spaced windows in all four stories. The building was demolished in 1976, but it shows how an industrial building could be eloquent in appearance, even in the early years of industrial architectural design.

The other industry then developing in Denmark was the making of glass. After 1814 Denmark, whose glass had been made in Norway, sought her own means of production in order to avoid paying heavy duties on imports. A source of fuel was found in the peat bogs at Holme-Olstrup on Zealand, and a glassworks was begun in 1825. The oldest remaining building, from 1874, was given none of the stylistic

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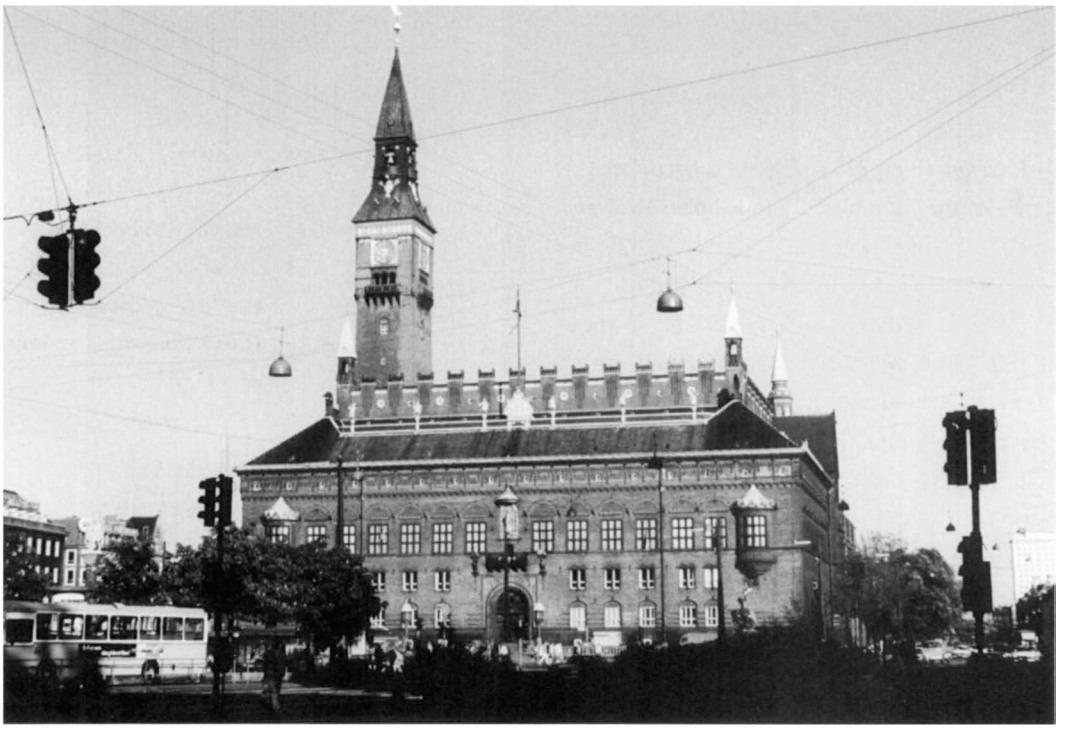
7.35 Copenhagen. Marstrands Maltmølle. H. Wolff. 1865. (Copenhagen, Academy of Art Library.)

7.36 Holme-Olstrup, Zealand. Glassworks. 1874. (Copenhagen, Academy of Art Library. Photo: Jørgen Sestoft.)

vocabulary of the two breweries: not all manufacturing establishments in nineteenth-century Scandinavia were architect-designed (figure 7.36).[53]

The 1890s brought the first of the three great Scandinavian town halls that are as much national as civic structures. Rapid growth of the population in Copenhagen had rendered C. F. Hansen's Råd-og-domhus too small, and of course its serene classicism was no longer in fashion. In 1852 the military authorities had abandoned the old ramparts, leaving the way open for their demolition and new uses for the land, badly needed because of overcrowding in the old city. The resulting rapid expansion be-



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yond the ramparts and moats was controversial and disorderly, with some park areas created but also with some poor-quality new tenement housing. The old Halmtorv, or straw market, had lain inside Vesterport, the west gate through the ramparts, and here was found the site for a new Town Hall.[54] The Tivoli Gardens had been laid out in 1843, and J. D. Herholdt's Central Railway Station had been built in 1863–1864.[55] The new Town Hall would therefore be placed between the busiest centers of the old city and its major railway.

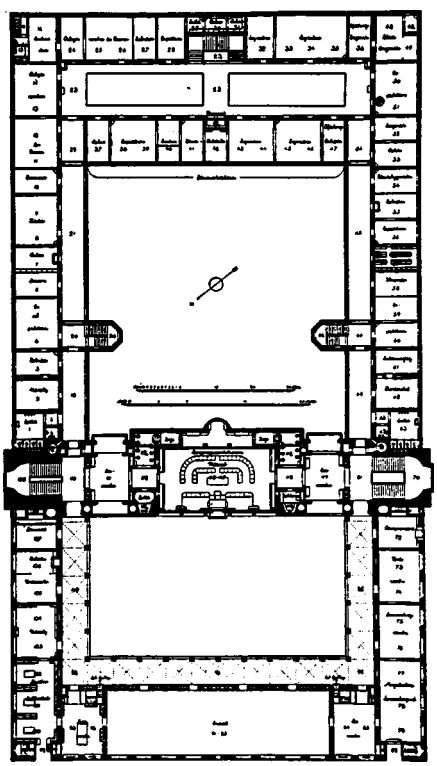
After competitions, Martin Nyrop was chosen to be the architect. Work was begun promptly, and the building was completed in 1905 (figure 7.37).[56] Built of red brick, the main block facing the Town Hall Square rises in

three stories above a basement and is finished with an attic story and battlemented roof. The main entrance is not emphasized by a projecting bay or portico, but is a broad arched opening, above which is a statue of Bishop Absalon, founder of Copenhagen. The resemblance to the Town Hall of Siena is heightened by the brick tower rising 326 feet on the northeast corner of the main block. The full plan involves two inner courts, one roofed and the other open to the sky (figure 7.38). The main entrance leads through a vaulted vestibule to the Assembly Hall, which is roofed but otherwise resembles the inner court of an Italian palazzo (figure 7.39). The cross wing on the east houses the Council Chamber in the second story. The Banqueting Hall, much like a Riddarsal, is also on the second floor, occupying the nine central bays of the front wing. Reception rooms are reached by corridors surrounding

7.37 Copenhagen. Town Hall. M. Nyrop. 1892–1905. (James A. Donnelly.)

7.38 Copenhagen. Town Hall. Plan. (Hansen, *Martin Nyrop,* p. 39.)

7.39 Copenhagen. Town Hall. Assembly Hall. (Copenhagen, Academy of Art Library.)



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7.40 Copenhagen. Christiansborg III. T. Jørgensen. 1907–1928.

7.41 Copenhagen. Christiansborg III. Portal.

the Assembly Hall, and the offices in the east, south, and west wings of the second part of the building surround the open court. The plan therefore is similar to that of a great palace, with its state spaces, corridors, grand staircase, and service rooms.

Nyrop did not restrict his use of historic materials to imitations of Italian palaces. In the details of woodwork, mosaics, and fresco decorations there are numerous references to traditional Danish motifs, such as the patterns from Bronze Age lurs used on lighting fixtures. Paintings and sculptures throughout the building refer to all of Denmark, not just to Copenhagen. The whole work celebrated Danish life and culture and was completed by a great many of her finest craftsmen.[57]

Nyrop's interest in Denmark's heritage in the arts and crafts was not an isolated phenomenon. His brother Camille was a trades historian who had participated in early proposals for a Danish museum of decorative arts, which was finally accomplished in 1885.[58] This was not the first such undertaking in the Scandinavian countries and was largely inspired by the Nordic Museum in Stockholm. Schools and associations for the encouragement of native handicrafts had already been founded as early as the 1840s in response to what were viewed as threats to quality from mass-produced industrial designs.

While all this work for a new Town Hall was moving forward, elsewhere Copenhagen suffered disfigurement and embarrassment. Fire broke out in the south wing of C. F. Hansen's Christiansborg on October 3, 1884, and by the next day the main building was in ruins. Heroic efforts saved the art collections and prevented the destruction of the Riding School, the Chapel, and Thorvaldsen's Museum. Not only were the royal State Rooms gone, but so were the chambers for Parliament and the Supreme Court. The constitution of 1848 established the Landsting, nominated by the king, and the Folketing, elected by the people. If the palace was to be reconstructed, therefore, a great many people instead of just the king would be deciding how it was to be rebuilt and by whom. Twenty years, ten legislative bills, and sixty-three proposals later, the choice fell on Thorvald Jørgensen in 1906, and the new building was more or less complete by 1928 (figure 7.40).[59]

The foundations of the previous building determined the plan, with the State Rooms, including Dining Room and Great Hall on the north of the first floor, the Throne Room in the center of the east wing overlooking the Palace Square, and the legislative chambers in the south wing. As the new building went up, many details were changed from the original plans so that it became a Baroque palace, as exemplified by the main east portal and balcony from which the Danish monarchs are proclaimed (figure 7.41). Jørgensen took advantage of the new availability of reinforced concrete for the roof and the 342-foot tower and spire. He also had much of the lower portions faced with granite, more durable than the plaster covering of the earlier palace. The old Slotsholm of Bishop Absalon's time had now grown to an elaborate ceremonial and administrative complex, still held somewhat aloof from the commercial and residential parts of the city by the surrounding canal.

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7.42 **Stockholm. Town Hall. R. Östberg. 1909–1923. (Stockholm, City Museum.)**

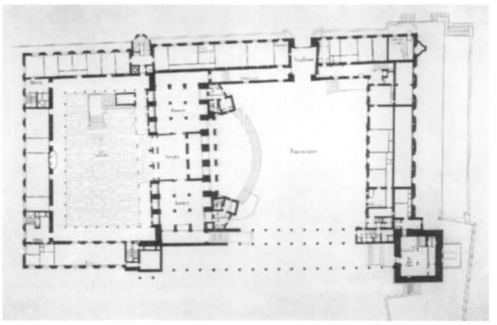
7.43 **Stockholm. Town Hall. Plan. (Stockholm, City Museum.)**

7.44 **Stockholm. Town Hall. Blue Hall. (Stockholm, City Museum.)**

The academic Baroque was clearly not yet dead in Scandinavia, nor was National Romanticism. A new Town Hall was built for Stockholm in 1909–1923 by Ragnar Östberg (figures 7.42 and 7.43).[60] After ten years of discussions and competitions it was placed to command the waters of Lake Mälar across from the Old Town. Like the Town Hall in Copenhagen it is composed of traditional elements. The Stockholm building is brick with obvious references to Italian palazzo designs, an open and a covered courtyard, and a high tower placed in one corner, but there the resemblances stop.

The Town Hall is entered at the northeast corner through an archway that leads into the open courtyard, but this entrance is not a central focal point as is the entrance to the Town Hall in Copenhagen. Östberg had a different concept for the most important aspect of the building: "The *main façade* of the Town Hall, which faces *east,* and towards the old city, had been treated differently from the other façades, and is on a monumental scale. It is intended to represent the government of the City from the Middle Ages down to the present day. . . . The main façade, with its entirely vertical articulation and its row of high windows, is the external facing of the Council Chamber (the big hall where the Municipal Council meets), which corresponds to it in height and breadth."[61]

From the north entrance one looks across the courtyard to arcades that open out to a terraced garden beside the water. A broad flight of stairs, suggesting use by large numbers of people, leads up to a vestibule through the center wing. This in turn leads to the large enclosed courtyard, called the "Blue Hall," which is palatial with its marble floor and red tile walls. The name comes from the original intention to have the brick stuccoed in blue. When built, however, the hall was so effective in color with the walls of machine-made brick



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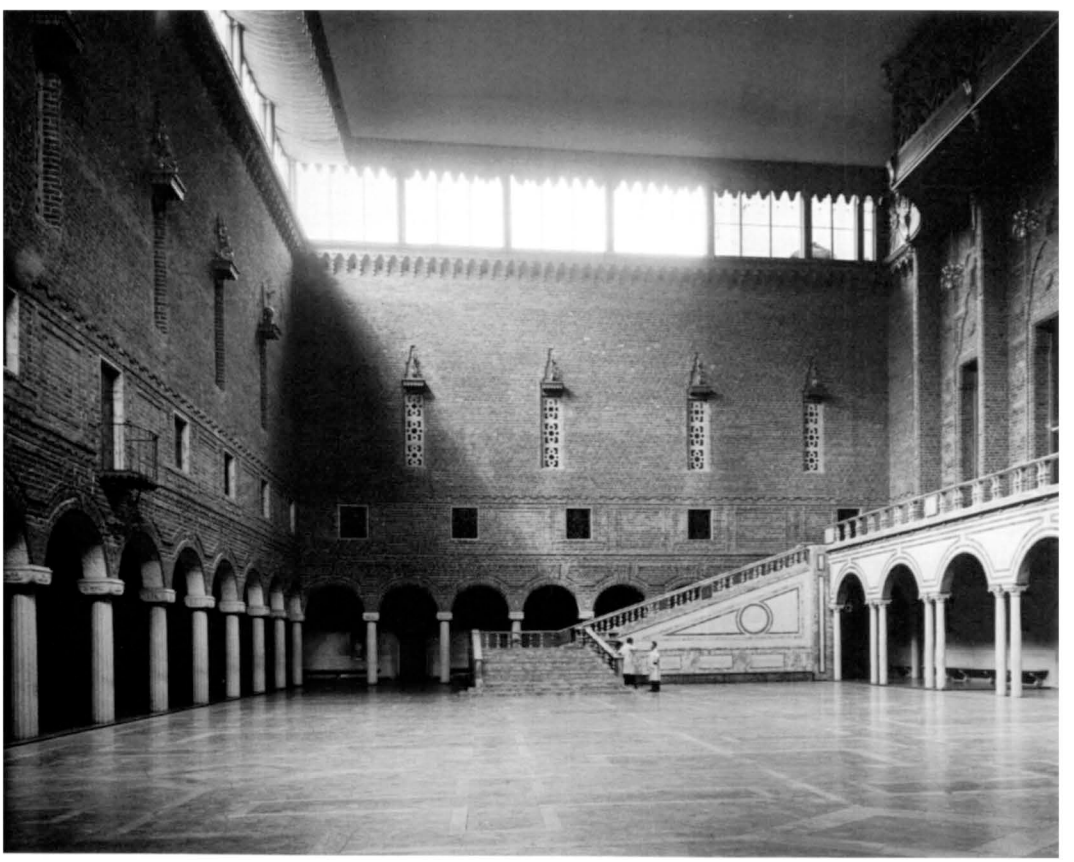

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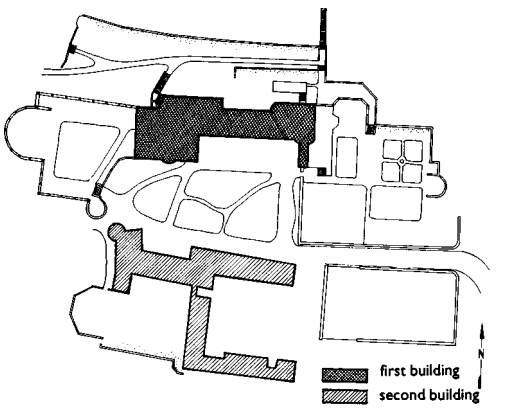
that the plan was changed to hand-chiseling the bricks to give a rougher texture (figure 7.44).[62] The staircase is grandly ceremonial although not placed symmetrically. It leads up to a balcony overlooking the Blue Hall and to the entrance to the major parts of the eastern portion of the building. The principal administrative offices are on the north side, and the Council Chamber on the east. The long reception room, with paintings by Prince Eugen, is on the south, its tall windows affording views of the city across the lake. The largest room is the Great Hall, or the "Golden Hall," in the central wing, covered with gilded mosaics depicting the history of Stockholm. The sumptuous furnishings and decorations throughout are the work of many craftmen, so that Stockholm's Town Hall is a national as well as a civic monument. For Östberg a vital part of the whole enterprise was the placing of the studios and workshops for architects, sculptors, textile designers, metalworkers, etc., on the premises as the building was under construction, thereby facilitating continual review of works in the locations for which they were being prepared.[63]

This was also a time when some Scandinavian architects were taking the ideas of National Romanticism a step further. While the Copenhagen Town Hall was under construction, in 1896, three architecture students at the Technological Institute in Helsinki formed a partnership: Herman Gesellius, Armas Lindgren, Eliel Saarinen.[64]

Three years later they won the competition for the Finnish Pavilion at the Paris Exposition of 1900. With their prize money they built the studio-dwelling complex at Hvitträsk, a rugged lakeside site west of Helsinki, beginning in 1901 (figure 7.45).[65] As one approaches from Helsinki, the buildings are concealed by trees bordering level farmland. It is not until one has entered the complex and explored the exterior and garden that the precipitous character of the planning becomes apparent. The wooded west side of the site falls steeply to the lake below, and the dwelling rises from the rocky hillside as if it were a miniature fortress. The combination of stone, wood, and the steep roofs gives the original building a nostalgic appearance that is not borne out by the plan (figure 7.46). The living room and sitting room are dark and cavelike, the bedchambers lighter and arranged seemingly at random, and the long light studio seems in great contrast. The visitor, for Hvitträsk is now a museum, experiences



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7.45 **Hvitträsk. Studio-dwelling. H. Gesellius, A. Lindgren, and E. Saarinen. Begun 1901.**

7.46 **Hvitträsk. Studio-dwelling. Plan. (After Richards, *800 Years*, p. 119.)**

narrow corridors and constant changes in direction and level. There is also a wealth of furnishings designed by Akseli Gallen-Kallela and others associated with the three architects.

Having caught public attention with the Paris pavilion in 1900, the architects also won a competition for the National Museum in Helsinki, built 1905–1912 (figure 7.47).[66] Plans for such a museum were begun in the 1880s, the first site chosen being on a hill near the Observatory, where a standard neo-Renaissance museum building was proposed. After several years of discussion, the present site was selected and a new architectural competition opened in March 1901. The winning design reflected new thinking about museum planning and contemporary desire for strong expressions of Finnish national character. Significantly, two leaders of National Romanticism in other Scandinavian countries were on the jury, Isak Gustaf Clason of Sweden and Martin Nyrop of Denmark.

The museum consists of two irregular, nearly square buildings, each with an interior courtyard, linked by the large square entrance hall. Around one courtyard are the wings for the several collections, with the offices in the other. The exterior reflects but does not imitate the historic architecture of Finland. The main entrance, on the south side, is through the base of the tall churchlike tower. The south wing, housing the collections of religious antiquities, has a paneled gable like that of a church. The wings projecting east and west recall Renaissance castles, with the great round tower similar to those of Olavlinna. Square rubble masonry and brick were chosen as characteristic Finnish materials for the exterior.

On the interior the entrance hall is dominated by the four heavy columns supporting the ceiling, originally closed but now with a small domed opening. Akseli Gallen-Kallela repeated

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7.47 **Helsinki. National Museum. H. Gesellius, A. Lindgren, and E. Saarinen. 1905–1912.**

7.48 **Helsinki. Railway Station. E. Saarinen. 1910–1920.**

here the striking paintings of subjects from the Kalevala that he had done for the Paris pavilion. Throughout, the decorative motifs are designed in the stylization of the Art Nouveau.

When in 1904 it came time to build the Railway Station in Helsinki, the competition was won by Gesellius, Lindgren, and Saarinen. Lindgren left the partnership in 1905, however, followed by Gesellius in 1907. As built from 1910 to 1920, the building is the work of Saarinen alone (figure 7.48).[67] As a terminal building its halls are perpendicular to the tracks, with the service facilities on either side of the tracks. It fronts on Kaivokatu on the northern side of the business district, but there is no avenue leading directly toward it. Consequently the oblique views obtained from most approaches together with the tall eastern clock tower suggest that the building is more asymmetrical than it is.

The projecting vestibule has a huge arched window above the actual entrances and is flanked by two pairs of sculptured figures carrying lights. The two side halls for ticket rooms and restaurant as well as the main hall are roofed with vaults in reinforced concrete, an innovation for a major public building in Finland. The broad windows in two stories are separated by narrow granite walls running the full height of the building with a unifying effect.

Specific use of traditional Finnish detail was diminished, but the design was still too much in the spirit of National Romanticism for one of the losers of the competition, Sigurd Frosterus. Strongly influenced by the work of Henry van de Velde in Holland, he had become a rationalist in his approach to planning and the use of the new materials that industrial technology was making available. After losing the Railway Station commission, Frosterus, together with like-minded architect, Gustav Strengell, wrote a pamphlet bitterly denouncing the National Romantics and calling for what he believed to be a more "honest" architecture.[68]

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7.49 **Helsinki. National Theater. O. Tarjanne. 1902.**

7.50 **Turku. St. Michael's Church. L. Sonck. 1894–1904. (Helsinki, Museum of Finnish Architecture. Photo: A. Salokorpi.)**

A combination of National Romantic use of Finnish granite and reference to the style of the American architect H. H. Richardson is evident in the National Theater in Helsinki by Onni Tarjanne, 1902 (figure 7.49).[69] Like the theaters in Copenhagen, Stockholm, and Oslo already noted, the theater in Helsinki is in the tradition of a symmetrical façade with triple entrance on the ground level and an arcaded balcony above. The twin towers of the façade give an almost fortresslike appearance. The Baroque of the earlier Scandinavian theaters is replaced by a Romanesque scheme, with walls of granite and arcading in the medieval Finnish manner. Carvings on the capitals of the piers may show influence of Richardsonian designs, appearing by then in English and Continental publications.

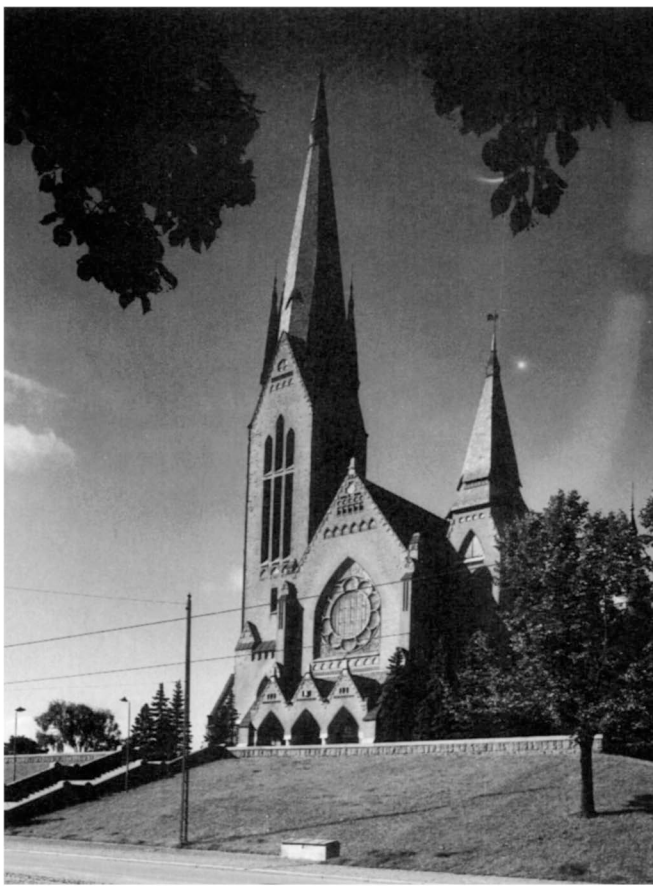
Having begun this chapter with medieval motifs used for the Copenhagen University, we

may close it with the work of a Finnish architect who used medieval principles in a different manner, Lars Sonck.[70] He was born on the western coast of Finland and when later living in the Åland Islands attended the Polytechnical Institute in Helsinki. He knew the stone and brick medieval churches of Swedish Finland and later saw the Karelian farmhouses of eastern Finland. Drawing upon these traditions, he developed a strong and distinctive personal style for his churches, public buildings, and villas.

Sonck was still a student in 1893 when a competition was announced for a major new church in Turku. His entry won first prize in May 1894, and the church, St. Michael's, was completed by the end of 1904 (figure 7.50).[71] It is basilical in plan, with a high square tower on the south side of the west façade and lower round towers flanking the polygonal apse. Sonck was clearly indebted to the brick Gothic churches of north Germany, which he saw during his travels. A large round window fills the west façade above the triple-arched portal. At first glance these portal openings appear to be conventional neo-Gothic arches. But Sonck here introduced a motif that was to characterize many of his designs: a stilted triangle, with sides only slightly curved if at all, which gives the effect of an arch without being one.

On the interior the nave is covered by domical vaults in the German manner, while the aisles are separated from the nave by short massive columns on the first level, repeated at the gallery level. The columns are widely spaced and the openings into the aisles low, giving the aisles a cavelike quality.

Then in 1899, while St. Michael's was under construction, a competition was announced for a church to be built in a newly planned extension of Tampere. Sonck won this, calling his entry "Aeternitas." When his plans were approved in 1902, the church was named St.



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John's, and it became the Cathedral of Tampere in 1923 (figure 7.51).[72] Sonck had earlier made sketches for a "country church," apparently inspired by the drawings of Protestant churches in England and America by K. E. O. Fritsch.[73] From these may have come the broad massive body of the church with its major tower placed at the northwest corner. The English and American churches were built with round-headed or pointed arches, whereas Sonck used his distinctive triangular "arch" at Tampere. For the exterior he used rubble granite in tones of red and gray to provide an appropriately Finnish material. In plan the church is basically square, with a central nave rising to a high and broad ribbed vault. Galleries on three sides are carried on heavy columns similar to those of St. Michael's. Paintings, carvings, and furnishings are the work of several Finnish artists.

7.51 Tampere. Cathedral. L. Sonck. 1902–1907. (Helsinki, Museum of Finnish Architecture. Photo: Iffland.)

While St. John's in Tampere was nearing completion, Sonck successfully entered the competition for a church to be built in the Kallio suburb of Helsinki. Superbly sited at the high end of Unionkatu, it was built in 1909–1912 of granite, but now with axial symmetry and a far more restrained surface (figure 7.52).[74] On the interior the Gothic vaults of the earlier churches give way to a high semicircular barrel vault, the arcades of the gallery are broad, and the light beige color of the interior is delicately ornamented with stenciled designs. The climax of this move toward clarity in Sonck's work came with the Mikael Agricola Church in Helsinki, which we shall consider in the next chapter.

Sonck designed villas in the Karelian style and engaged in some city planning projects. He also designed some office buildings, in which changes in his style can be clearly seen.

The Telephone Building in Helsinki, 1901–1905, like St. John's has an asymmetrical façade, the four strong levels of the main building set

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off by the left, or north, tower, similar to those of Tarjanne's National Theater (figure 7.53).[75] The granite of the Telephone Building is bolder than that of the theater, with large rough-hewn stones that Sonck chose to be in varying colors. He used his characteristic "arch" for the openings of the second level and an oculus for the fourth level of the south projection, the rest of the windows having lintels or shallow arches. The sense of this façade is Romanesque, but in a highly personal manner.

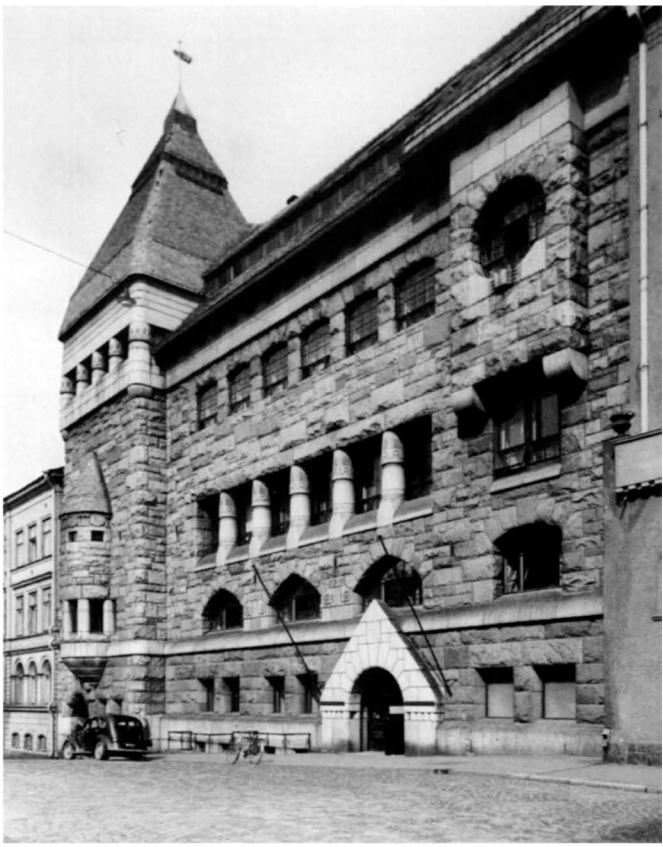
For the Finnish Mortgage Society in 1908 Sonck again provided a granite façade, but this time he chose a symmetrical scheme that echoes the façade of the National Theater.[76] The wide blocks of the triple-arched entrance are smooth, and the two-story colonnade above suggests Egyptian rather than Romanesque prototypes. The flanking sections on either side are also of smooth-cut granite, the irregularity of the ashlar the only suggestion of medieval quality.

Still more austere on the surface and almost like an organ façade with its columns is the Stock Exchange in Helsinki that Sonck built in 1911.[77] Perhaps the central columned portion was intended to establish the building as a temple of commerce. It is rather a pity that these three buildings, like the Railway Station, are so placed that their full impact as urban façades is difficult to appreciate fully. For the interior of the Stock Exchange Sonck designed a court rising through four stories, served by staircases and balconies (figure 7.54). Here is the palazzo once more, but without the historicizing motifs of the reception hall in the Town Hall in Copenhagen. Even more than on the exterior, the broad surfaces and sharply defined openings were prophetic of what was to come. A notable building, and a worthy successor to the exchanges in Copenhagen of 1619, Stockholm of 1767, and Oslo of 1826.

7.52 Helsinki. Kallio Church. L. Sonck. 1909–1912.

7.53 Helsinki. Telephone Building. L. Sonck. 1905. (Helsinki, Museum of Finnish Architecture. Photo: H. Havas.)

7.54 Helsinki. Stock Exchange. L. Sonck. 1911. Interior. (Helsinki, Museum of Finnish Architecture. Photo: H. Havas.)



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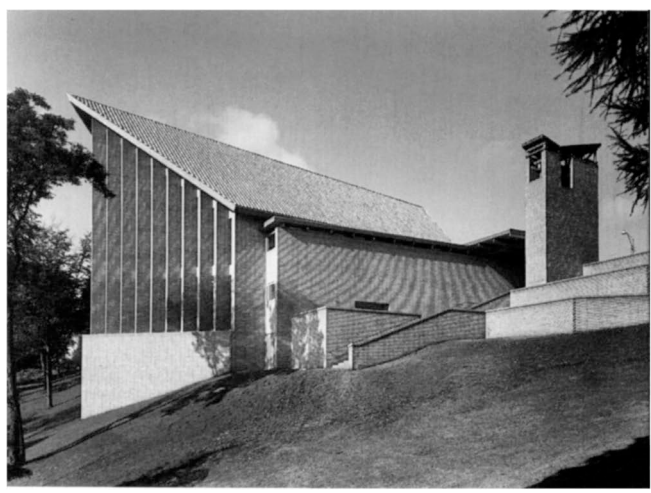
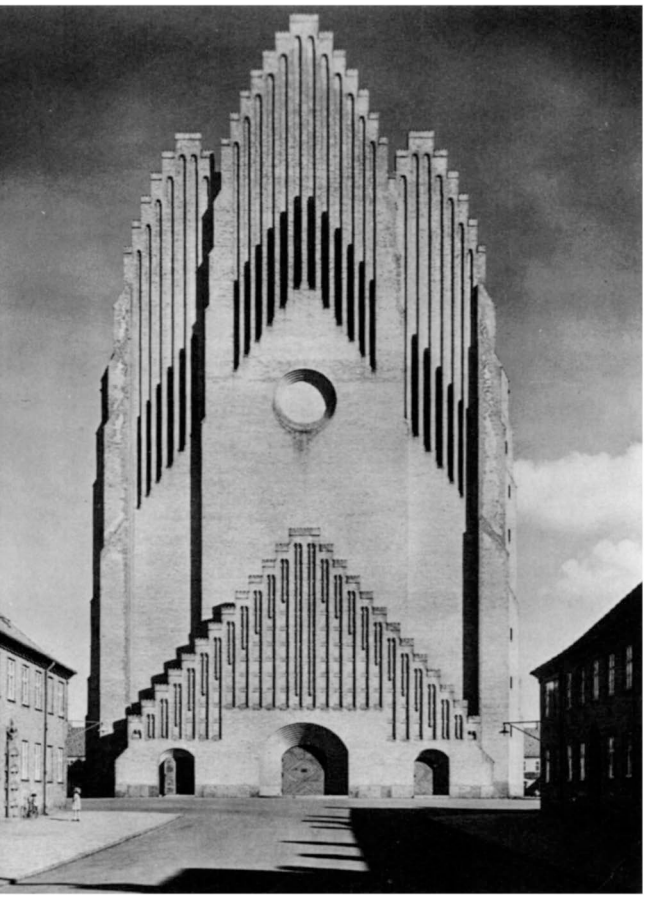


8 *Scandinavian Architecture since World War I*

Three years after Lars Sonck designed the Stock Exchange in Helsinki, World War I broke out in July 1914. For the next four years until the Armistice was signed in November 1918, the Scandinavian countries managed to stay out of direct military conflict. Denmark, Norway, and Sweden were, however, profoundly affected, to some extent with prosperity through the production of war materials, but increasingly with difficulty in food and supplies. In the wake of revolution in Russia, Finland declared independence in December 1917, and in December 1918 Iceland became an independent state under the Danish crown, complete independence not coming until 1944.[1]

The tensions and unrest that culminated in the war were not unlike the unrest we have observed in Scandinavian architecture during the fifteen or twenty years before 1914. Academic Historicism, National Romanticism, the Art Nouveau, and International Rationalism all had their advocates and exemplars, but in the political and social world of the early twentieth century there was no absolute standard of taste. After the war, architects were still seek-



ing appropriate expressions of contemporary life in their buildings, and we may consider three major directions taken: some continuing sentiments of National Romanticism, a second Neoclassical interlude, and the increasing leadership of International Functionalism. By the outbreak of World War II much of significance had been built.

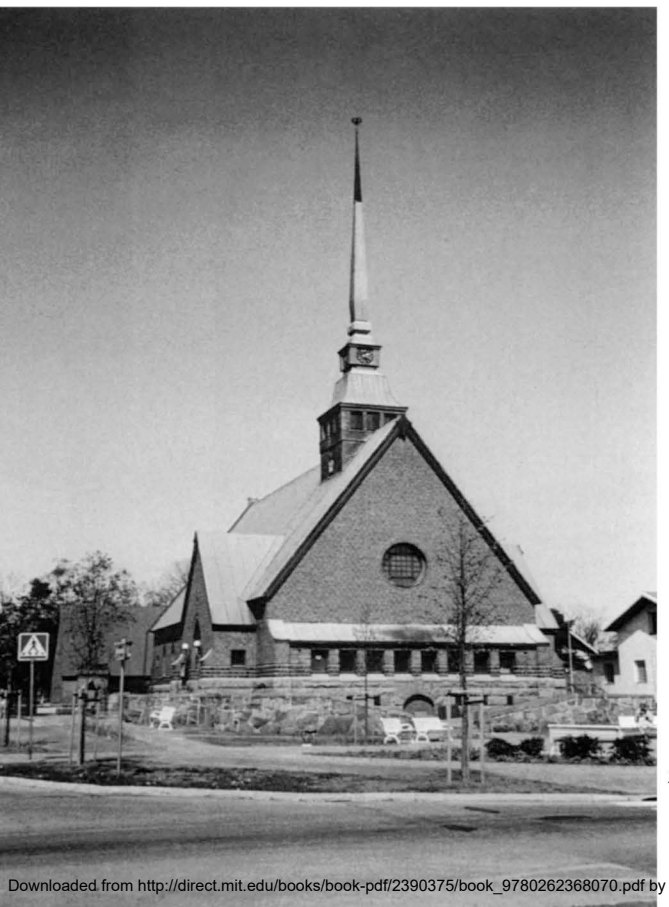
The growing desire for buildings free of direct historical references had its effect on those architects who still were using some traditional forms. Three churches built between the two world wars show how these forms could still be regarded as appropriate for individual projects if used in innovative rather than merely imitative ways. Perhaps the most astonishing of these is the Grundtvig Church in Copenhagen, built in 1920–1940 from the designs of P. V. Jensen-Klint (figure 8.1).[2] Bishop Nikolaj F. S. Grundtvig (1783–1872) was a poet and educational leader, founder of the Folk High Schools. The church was built as a memorial to him with funds raised by national subscription. The façade has a broad paneled and stepped gable covering three entrances, then a high wall with oculus and a paneled and stepped screen gable, almost like an organ façade. Similar gables are used over the side bays, as at St. Peter's Church in Malmö or the Cathedral in Århus. The apse, however, was designed with heavy buttresses such as those that by that time had been applied to Østerlars Church on Bornholm. This is all carried out in yellow brick, and the church was made to loom up over the nearby houses, also designed by Jensen-Klint, as if in a village. The interior is a direct reference to high Gothic churches, such as St. Knud's Church in Odense. Again finely crafted yellow brick was used, but even full sunlight does not compensate for the chilling effect of the unarticulated shafts of the piers and the built-in brick furniture.

While the Grundtvig Church was under construction, Lars Sonck designed two churches that reveal a turn toward Functionalism but still retain close ties to tradition. His family had moved to the Åland Islands when he was a young boy, and he had built a villa in the style of a Karelian farmhouse at Finström. Although settled from Sweden, the islands had been ceded to Finland in 1809, and this was upheld by the League of Nations in 1921. In that year the islands were granted self-government under the sovereignty of Finland, with their own Legislative Assembly and a representative to the Parliament in Helsinki. The capital, Mariehamn, had been founded by Czar Alexander II in 1861, and when in 1921 it became appropriate to build a new church there, Sonck provided the drawings. The church, built in 1927–1929, is basilical in plan, with north and south

8.1 Copenhagen. Grundtvig's Church. P. V. Jensen-Klint. 1920–1940. (Copenhagen, National Museum.)

8.2 Mariehamn, Åland Islands. Church. L. Sonck. 1927–1929.

8.3 Helsinki. Mikael Agricola Church. L. Sonck. 1933–1935. (Helsinki, Museum of Finnish Architecture. Photo: Saurén.)



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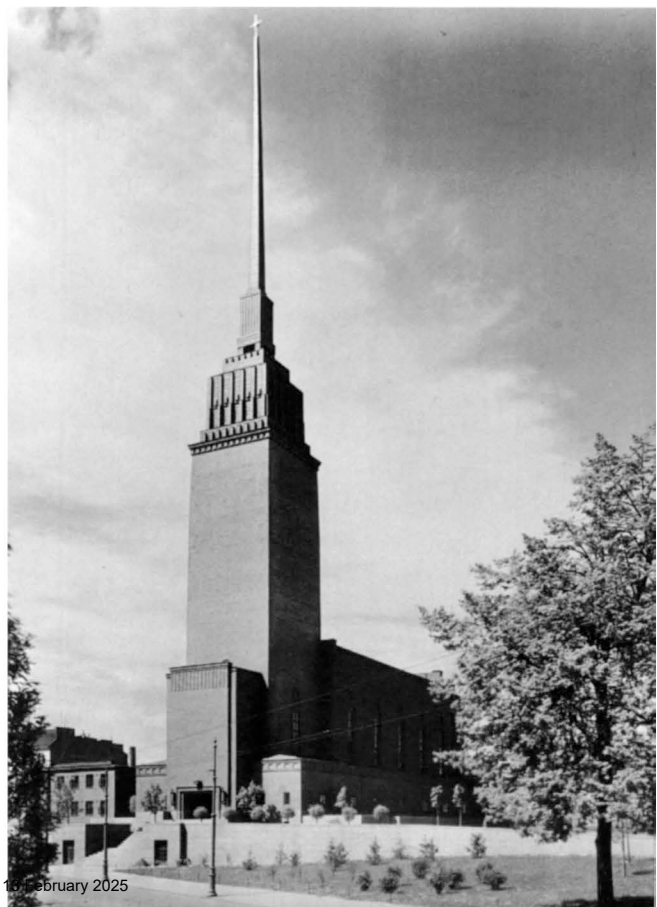

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8.4 **Copenhagen, Bellahøj. Bakkehusene. T. Henningsen and I. Bentsen. 1922.**

8.5 **Svinninge, Zealand. Power station. I. Bentsen. 1913. (Copenhagen, Academy of Art Library.)**

porches, a shallow east apse, and a spire rising above the roof of the western vestibule (figure 8.2).[3] It is built of red brick on a granite foundation, with broad plain surfaces completely different from the Romanesque formulas of Tampere Cathedral. The interior is divided into nave and aisles by heavy piers and is covered with a painted wooden roof. A telling detail is the shape of the arch into the western bay, which appears to imitate that of St. Mikael's Church at Finström, which Sonck knew well. This is more curved than the "arch" that Sonck had used at St. Michael's in Turku, and we may ask whether it was this medieval form that Sonck had modified in the earlier church. In the church at Mariehamn, Sonck gave his beloved Åland Islands a church of considerable dignity as

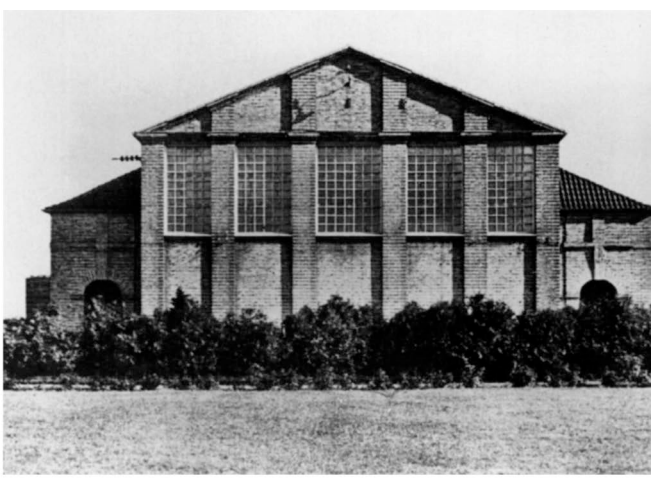
well as a continuation of their strong traditions.

Then in 1932 Sonck won the competition for the Mikael Agricola Church in Helsinki, built in 1933–1935 (figure 8.3).[4] The example of Grundtvig's Church in Copenhagen may have inspired this building, which was also constructed in honor of an early national religious and intellectual leader. Bishop Mikael Agricola (c. 1510–1557) had been responsible for the first books published in Finnish, an ABC book, a prayer book, and the New Testament. The single tower, nave, and sanctuary are clear shapes in unadorned red brick, the only accent being the metal belfry and spire.[5] The simplicity of the exterior is balanced by the grandeur of the interior, with cylindrical piers carrying the soaring parabolic arches of the nave. While the painted ornament of the capitals has an ancient Mediterranean flavor, the paintings on the ceilings of the aisles are biblical, after the manner of medieval Finnish painting. Structural references to medieval building details are smoothed down here in Sonck's response to Functionalism. The result is less romantic than in the Mariehamn church, and perhaps this is more suitable in the more formal urban situation.

Village traditions also found some expression in contemporary housing, notably at Bakkehusene, Bellahøj, in Copenhagen, built by Thorkind Henningsen and Ivar Bentsen in 1922 (figure 8.4).[6] The principle of such row or terrace houses was not new, as we have seen at Nyboder in Copenhagen and the houses in Møgeltønder. Henningsen and Bentsen reintroduced the principle for modern urban dwellings in these story-and-a-half houses of yellow stone, set back from the streets with small front gardens and larger private gardens at the back. The high wide roofs with ridges parallel to the streets unify the individual houses and help in the appearance of nostalgic comfort. The two sets of rows are on either side of a broad tree-lined esplanade, giving the effect of a small town.

Functionalism was not yet universally seized upon as the most appropriate architectural expression of twentieth-century society and technology. For a brief period, from about 1910 to 1930, architects in the Scandinavian countries reexamined the principles of classical antiquity in search of formulas for clarity and monumentality of design. That this search was not confined to the drawing boards but was also a matter of lively theoretical discussion is attested by numerous articles in contemporary Scandinavian architectural periodicals. The outcome was a group of buildings that has been designated as "Nordic Classicism" and that fifty years later has been the subject of fresh appraisal.[7]

The lead seems to have been taken in Denmark with Carl Petersen's Fåborg Museum of 1912–1915.[8] Its unassuming exterior belies the variation of the succession of brightly colored rooms behind it. Explicit classical references are in the coffered ceilings of the vestibule and the octagonal hall and the Ionic columns of the entrance to the latter. Otherwise Petersen was much concerned that the



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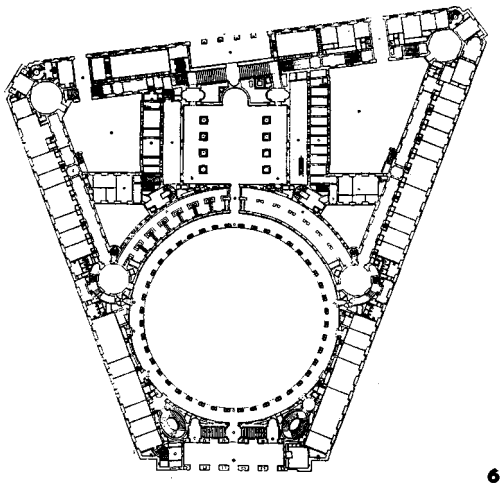

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geometrical aspects of the building should present a clear, rational image. In a famous essay in 1920 he said, "A factor of the utmost importance in architecture is proportioning. . . . To achieve monumentality, it is always best that the elements which establish the scale for the whole are of sufficient size in themselves."[9]

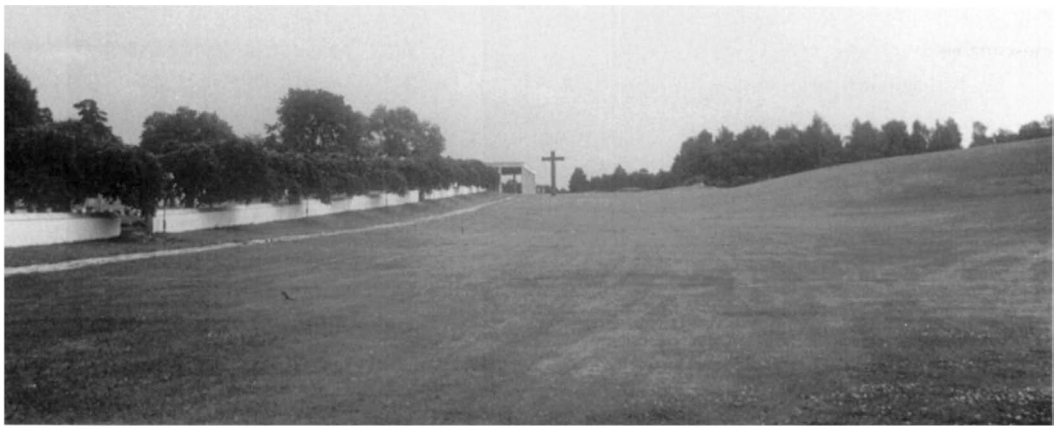
Although it is not dominant in Petersen's pioneering museum, the columnar support is essential to what Demetri Porphyrios has called "Scandinavian Doricism."[10] For the buildings of the power station at Svinninge on Zealand in 1913, Ivar Bentsen used the echo of the column, the pilaster, in a very individual manner (figure 8.5).[11] He turned the narrow brick walls between the wide windows into pilaster strips that articulate the lower walls and are continued into the attic levels or gables in defiance of the integrity of the classical pediment. Avoiding surface ornament, but using the standard base-shaft-capital system of the normal pilaster, Bentsen dignified this industrial building with something of a temple front.

Surfaces were also reduced for the Police Headquarters in Copenhagen, begun by Hack Kampmann in 1918.[12] Kampmann was collaborating with his sons Christian and Hans Jørgen and with Aage Rafn. Rafn became the leading member of the group, especially after Hack Kampmann's death, when Holger Jacobsen and Anton Frederiksen joined the project. The irregular site resulted in a nearly triangular plan, with a portico on the shortest side and long narrow wings enclosing courtyards and cross wings (figure 8.6). The purpose of the building was to provide a new police facility, since C. F. Hansen's detention part of the Råd-og-domhus of 1805–1815 was now inadequate. The plan of the latter, however, the vestibule with Doric columns and the courtroom on the same axis terminating in the magistrate's niche, may have had something to do with the plan of the Police Headquarters. Urged by Aage Rafn, Hack Kampmann planned his building with a large circular courtyard filling the south section and three courts on the north. While the courts of the Kampmann building are open to the sky, there is an axis from the portico across the large circular court to a smaller court that also terminates in an apse. The circular court is nearly as large as the Pantheon in Rome, and is surrounded by a colonnade of coupled Doric columns based on C. F. Hansen's columns for Christiansborg. The austere exterior has little to relieve its plain walls except for the string-courses marking the ground and uppermost stories. The façade, with a seven-arched portico and simple windows above, may contain another Roman reference, for it recalls the Tabularium (figure 8.7). The exterior is fortresslike and forbidding, and if the courtyards were to provide grace and sensitivity of proportions, these would not be evident in the open landscape of the city.

8.6 Copenhagen. Police Headquarters. H. Kampmann and others. 1918. Plan. (Copenhagen, Academy of Art Library.)

8.7 Copenhagen. Police Headquarters.

A distinctive early project in Sweden was for the Woodland Cemetery in Stockholm, where landscape and buildings were developed in an unusually well reasoned mortuary program. In 1912 a tract of 75 acres in the Enskede district of south Stockholm was set aside for a new cemetery, and a competition for its design was held in 1914. The first prize went to the Swedish architects Gunnar Asplund and Sigurd Lewerentz.[13] Over the next twenty years the site was developed with burial grounds, chapels, crematorium, and supporting buildings. For the landscape itself, perhaps the most compelling feature is the approach from the portals to the cross erected before the Chapel of the Holy Cross (figure 8.8). Lewerentz, who was to design other notable cemeteries, left an open space at the top of the rise



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so that the visitor is under the "dome of heaven" more truly than in any domed building. A comparison with such ancient burial sites as Troldkirken and Lindholm Høje seems inescapable.

Among the buildings of the cemetery, the Woodland Chapel by Asplund, built 1918–1920, has drawn much attention (figure 8.9).[14] The deep columned portico and the chapel itself are covered together with a high hipped roof. Asplund saw Kirkerup's Liselund on Møn, which he greatly admired. Certainly the great roof of the chapel suggests those of south Scandinavian farmsteads. The columns of Liselund, however, wrap around the rear extension of a T-shaped house, this extension being roofed separately from the main house. The columns of the chapel, on the other hand, form a portico, four columns wide and three deep, before the chapel itself. Given Asplund's interest in antiquity, the Tuscan temple as described by Vitruvius would seem to be an additional obvious prototype. The overall proportions of the Woodland Chapel do not correspond to those stipulated for the Tuscan temple, but those of the cella of the chapel are very close to the 6:5 proportions of the temple plan. On the interior eight Doric columns support a "dome of heaven," ornamental vocabulary is avoided, and the impression of the entire building is of simple support and shelter, dignified and timeless.

Later, in 1935–1940, Asplund's Chapel of the Holy Cross at the Woodland Cemetery set a much more prominent colonnaded porch in the landscape (figure 8.10).[15] Classical ornamental vocabulary was again omitted and monumentality was achieved by the wide spacing of the square columns, which provides a broad shelter swept with light and air. Within the chapel is a broad basilica in form, its shallow dome carried on eight round columns with simple cubical capitals. The otherwise austere space is given warmth by the frescoes by Sven Erixon.

8.8 Stockholm. Woodland Cemetery. G. Asplund and S. Lewerentz. Begun 1915.

8.9 Stockholm. Woodland Cemetery, Woodland Chapel. G. Asplund. 1918–1920.

Another way in which classical principles might be sought was in predominant emphasis on mass rather than on detail. Earlier in his career Gunnar Asplund had moved in this direction, notably with the Central Library in Stockholm, 1924–1928 (figure 8.11), perhaps inspired by Fischer von Erlach's view of the Tomb of Hadrian in Rome.[16] Above terraces containing shops he placed a cubical building with a circular unit above. Unadorned windows pierce the flat walls, with concession to ornament in the surrounds of the doorways and the shallow terracotta frieze below the second range of windows. The work of Ledoux and Boullée also comes to mind here, as well as C. L. Engel's University Library in Helsinki. When one enters the circular main reading room, however, the impression is entirely different from Engel's interior. Asplund's room is a high soaring space, bookshelves lining the walls only part of the way, with blank walls above pierced with windows and then the dome floating above.

A major example of Nordic Classicism in Norway is the Town Hall at Haugesund, built in 1922–1931 by Gudolf Blakstad and Herman Munthe-Kaas, using columns more explicitly (figure 8.12).[17] The town is a fishing and export center on the west coast of Norway between Stavanger and Bergen. A hillside site was chosen for the Town Hall, with a park adjacent. A rusticated gray granite lower story with small arched openings fills out the slope, and the two wings for offices rise above, finished somewhat astonishingly in pink stucco. The Council Hall is not centralized but occupies the corner uniting the two wings. On the park side its location is dramatized by three large rusticated arches at the ground level and four pairs of Doric columns rising through both principal stories, with an attic story covered by a saucer dome above. The nature of the site would cause the traditional town hall formula, symmetrical with central tower, to look lopsided. The centrality of the Council Hall is retained by its corner location, but the traditional axial view across an urban open space is not attained.

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8.10 Stockholm. Woodland Cemetery, Chapel of the Holy Cross. G. Asplund. 1935–1940.

8.11 Stockholm. Central Library. G. Asplund. 1924–1928.

8.12 Haugesund, Rogaland. Town Hall. G. Blakstad and H. Munthe-Kaas. 1922–1931. (Oslo, Norwegian Museum of Architecture.)

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8.13 Bergen. Torvalmenningen Square. F. Berner. 1922–1929.

8.14 Helsinki. Parliament. J. S. Sirén. 1927–1931.

For another way in which the Norwegian architects attempted to put classical principles to work we may look briefly at Torvalmenningen Square in Bergen by Finn Berner, 1922–1929 (figure 8.13).[18] After a destructive fire in the center of town in 1916, Vester Torv Gatu was widened in the business district, creating a broad open space with regular business buildings rising on either side. With some arcades on the ground level and stringcourses giving classical horizontality to the stories above, this part of the old merchant city took on an aspect quite different from that of Bryggen on the water front. The broadened vista increased the dominance of St. John's Church on the hill above.

In Finland the site of the Parliament building in Helsinki, on the west side of Mannerheimintie, also precludes a grand vista (figures

8.14 and 8.15).[19] Johan Sigfred Sirén won the competition for this building in 1924. Of red granite, it sits like a palace above a high flight of stairs. Behind the Corinthian colonnade is a long vestibule with stairs at either end. In the central wing is the Delegates' Chamber, a high circular hall with tall niches for statuary in the smooth walls and a low domed ceiling above. The niches make one think of C. F. Hansen's Vor Frue Kirke. There is a large formal reception hall above the entrance hall and three wings for offices, each level designed in a different color. As in the Copenhagen and Stockholm town halls, leading Finnish artists contributed to the interior details and furnishings, using some references to traditional Finnish motifs.

Some of the other Finnish architects of this generation were traveling to Italy, and their interest in local Italian building types is reflected in their approach to composing in terms of mass. A simple blocky church building with contrasting high bell tower, such as the one that Alvar Aalto designed for the church at Muurame in 1929, for example, satisfied the desire for classical Mediterranean inspiration and was also sympathetic to the long Finnish tradition of the church and bell tower group (figure 8.16).[20] Here the façade is based on the late Roman motif of an arch penetrating the pediment. The plain white walls of the church are marked by a stringcourse below the window level, and the belfy atop the tower is set off with similar moldings. The overall impression comes from the mass of the church itself with tower rising above.

This second Neoclassical moment in Scandinavian architecture found expression in a very different manner from the first. Those devoted to eclecticism did of course continue to pick and choose among the historical styles. But some who were leaders of the Nordic Classicism movement, teaching and writing as well as designing buildings, found their efforts to understand the principles of classicism leading in another direction. Emphasis on proportion, the importance of surfaces, and simple statements of support and shelter were all factors that brought the turn to Functionalism in the 1920s.[21]

Lars Backer was one of the earliest to advocate the new style of Wright, Le Corbusier, and Mies van der Rohe, writing in 1923 that "we will shape an architecture in contact with the time we live in, natural for the materials we build with."[22] For the Ekeberg Restaurant in Oslo, 1927–1929, he used broad wall surfaces pierced by plain windows, some large expanses of glass, and wide Wrightian eaves (figure 8.17). If some vestiges of classicist detail appear on the interior, the building as a whole speaks of a change in direction.

In like manner Alvar Aalto moved to Functionalism. His tuberculosis sanatorium at Paimio, east of Turku, 1929–1933, was marked not only by the adoption of reinforced concrete as a means of aesthetic expression as well as structure but also by a significant departure from standard hospital design (figure 8.18).[23] A goodly number of hospitals had been built in the Scandinavian cities, carried out in the var-

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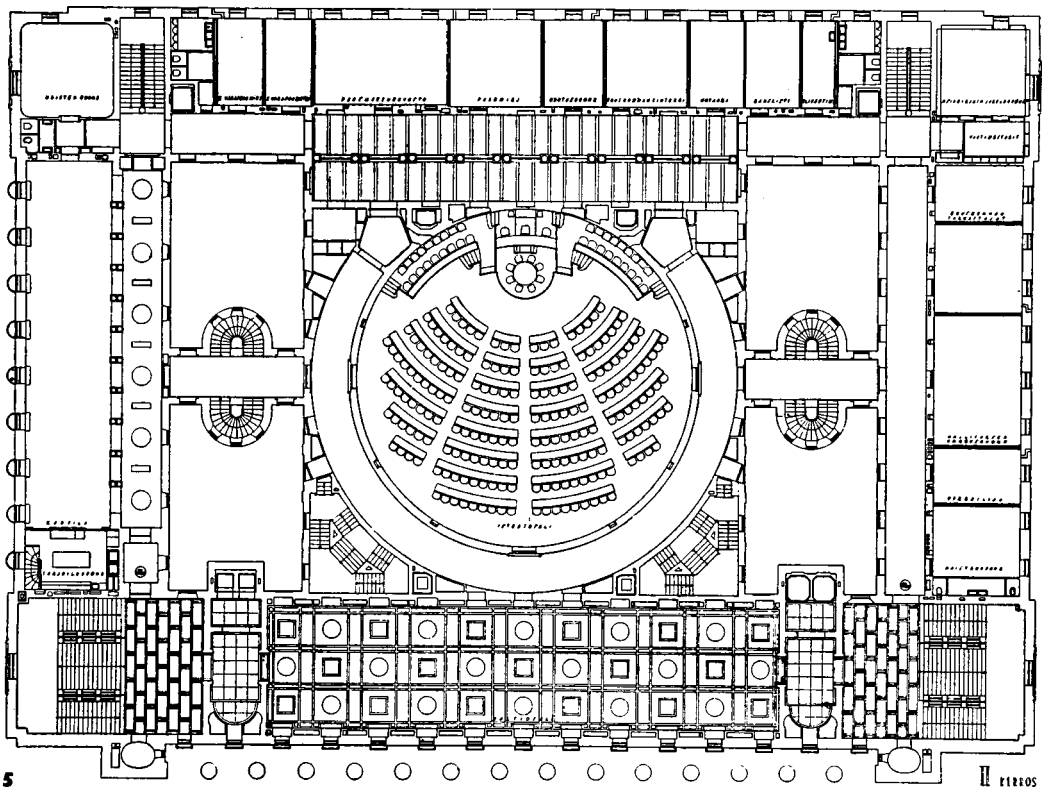

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8.15 Helsinki. Parliament. Plan. (Helsinki, Museum of Finnish Architecture.)

8.16 Muurame. Church. A. Aalto. 1929.

8.17 Oslo. Ekeberg Restaurant. L. Backer. 1927–1929. (Oslo, Norwegian Museum of Architecture. Photo: Teigens.)

8.18 Paimio. Sanatorium. A. Aalto. 1929–1933. (Helsinki, Museum of Finnish Architecture.)

8.19 Oslo, Blindern. University. F. Bryn and J. Eliefsen. 1929–1935. (Oslo, Norwegian Museum of Architecture. Photo: Teigens.)

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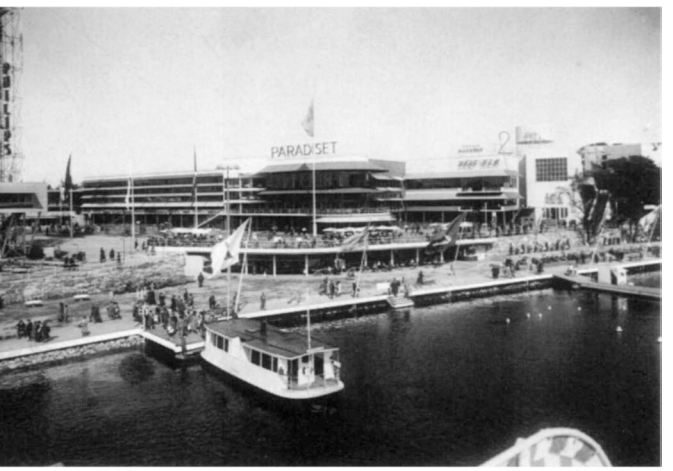

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ious historical styles. They tended to be massive, symmetrical buildings, in some cases hardly distinguishable from school or hotel buildings, and indeed there were certain similarities of function between these building types.[24] At Paimio, the remote forested site was chosen according to then current practices in the treatment of tuberculosis. Instead of a blocky mass, Aalto built the sanatorium with long tall wings, asymmetrically placed, for patients' rooms and for social areas, connected by the administrative offices. While the exterior is severe, it is closely surrounded by the natural forest, a relationship that was to become a hallmark of Aalto's work. On the interior he also characteristically planned many details for circulation, lighting, heating, and ventilation with an ingenuity that reminds one of Thomas Jefferson.

Another institution to have a building program in the early days of Functionalism was the University of Oslo, which built a new campus at Blindern, on the edge of the city, in 1929–1935 (figure 8.19).[25] The buildings designed by Finn Bryn and Johan Ellefsen show the classicist details of the first designs giving way to more severity as the work progressed, still with symmetrical planning. The plain brick walls are pierced with rows or groups of windows that furnish all the exterior pattern except for discreet stringcourses at the basement and attic levels. If these façades are compared with those of the Haugesund Town Hall, for example, we can see that even within the decade, architects were taking bolder approaches to the use of fenestration for the total aesthetic effect.

While all these approaches to a Nordic Classicism were being undertaken, a very serious problem was being addressed in the Scandinavian countries, that of housing, especially low-cost urban housing. The Swedish government, for example, sent a delegation to the Interallied Housing and Town Planning Congress

in London in 1920. The published report stated the case firmly: "there has been a real shortage of dwellings since the War—a shortage which it becomes more necessary every day to make good if the industrial productive power of Sweden is again to be restored to its full capacity."[26] State and municipal subsidies for housing were already in effect in Sweden, and in Denmark a Government Housing Fund was established in 1922.

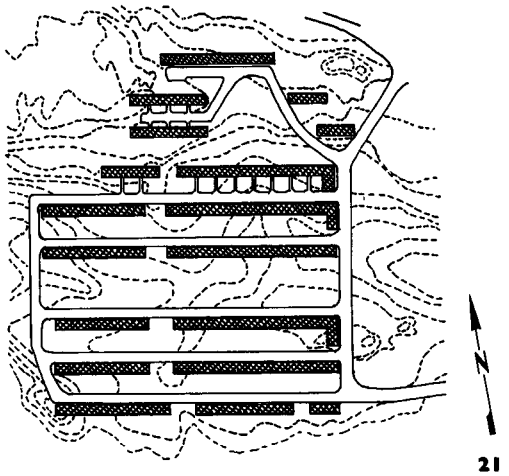
The demand in the cities was for large blocks of flats that would be economical to build, provided with developing systems of indoor plumbing and central heating, and preferably grouped around open spaces. The long multistoried blocks by Povl Baumann and Kay Fisker depended for their aesthetic effect on the rhythms and proportions of doors and windows, but monotony was difficult to avoid.[27] Then ten years after the London congress came the Stockholm Exhibition of 1930.

Planned to display industrial art, crafts for the home, and new designs for houses and apartments, it was proposed by the Swedish Crafts Council in 1927. Gunnar Asplund was on the original committee and in 1928 became the principal architect.[28] A waterside location had been chosen on Djurgårdsbrunnviken, east of the center of the city. For the exhibit areas Asplund departed from the usual format of separate halls and created a series of wide and narrow spaces, using slender supports and generous walls of glass. Festive colors were enhanced by flags and balloons. Knowing the work of the Continental leaders of Functionalism, especially that of Le Corbusier, Asplund set forth this new international style in Scandinavia so that it could not be, and was not, ignored (figure 8.20).

8.20 Stockholm. Exhibition. G. Asplund. 1930. (Stockholm, City Museum.)

In the decade before the outbreak of World War II the Scandinavian architects continued their efforts to devise better housing on a modest scale.[29] In Sweden Hakon Ahlberg developed the "lamella" block for workers in the Stockholm gas works at Hjorthagen (figure 8.21).[30] In this a long narrow building was planned so that all rooms in each unit could have direct sunlight, the blocks being only 23 feet wide. Again a certain monotony was inevitable in groups of such buildings, which Povl Baumann and Knud Hansen tried to relieve with the balconies of their Storgården in Copenhagen, 1935 (figure 8.22).[31] These balconies were also in response to fire regulations. They are indeed repetitious when seen from a distance, but on closer view many such buildings will reveal the variety of their residents' tastes in colorful awnings and flower boxes.

Meanwhile in Finland Alvar Aalto had also designed housing for the workers at the Sunila factory (figure 8.23).[32] Here the blocks are not parallel to each other, as at Hjorthagen, but are placed at slightly different angles. The site chosen is a forested hillside, with the buildings scattered here and there among the abundant trees. Aalto also broke up the south façades of most of the blocks with terraces formed by



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8.21 **Stockholm, Hjorthagen. "Lamella" houses. H. Ahlberg. 1930s. Plan. (After Paulsson, *Scandinavian Architecture,* figure 74, p. 223.)**

8.22 **Copenhagen. Storgården. P. Baumann and K. Hansen. 1935.**

8.23 **Kotka. Sunila housing estate. A. Aalto. 1936–1939.**

8.24 **Copenhagen, Gentofte. Lassen House. M. Lassen. 1934. (Copenhagen, Academy of Art Library.)**

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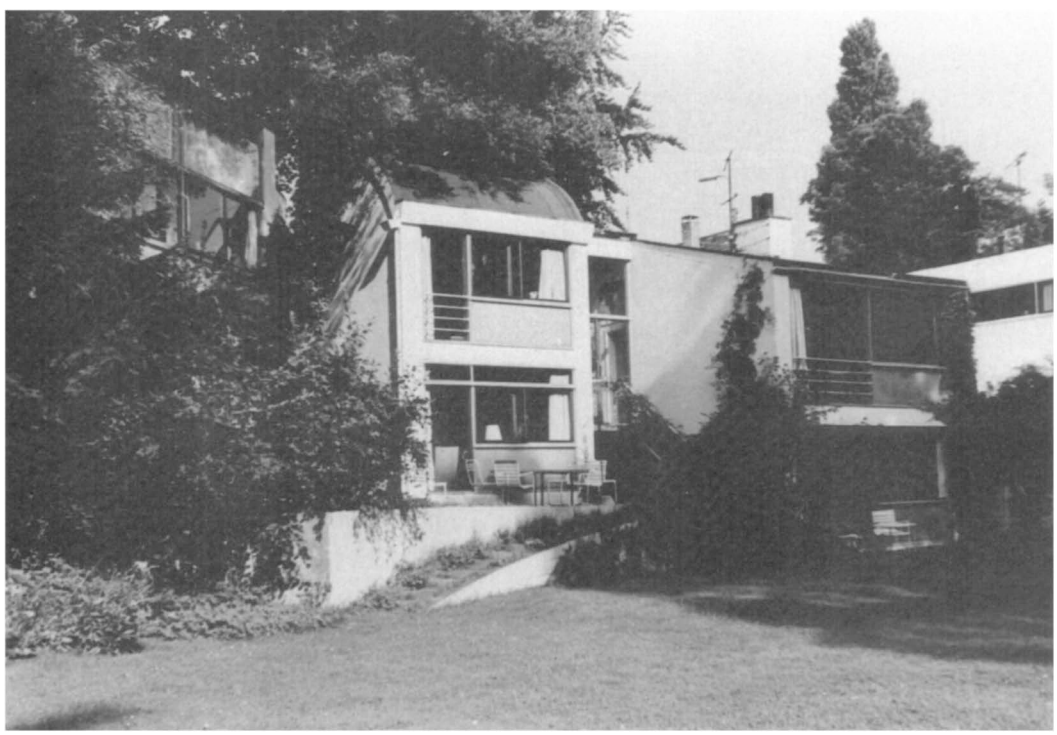

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setting back the upper floors. This solution to multiple housing seems more personal because the blocks are comparatively small and appear more like row houses than apartment buildings.

In its report of 1920 the Swedish delegation to London acknowledged that individual industrial workers were unlikely to be able to afford their own houses. Those more affluent, however, also applied the principles of Functionalism to individual dwellings. In Denmark, Mogens Lassen had clearly been thinking about the work of Le Corbusier when he designed several villas, including his own in the Gentofte suburb of Copenhagen in 1935 (figure 8.24).[33] Built of ferro-concrete, it is whitewashed to set off the clear planes of the walls and the sharp window openings. It is four stories high, the top being a roof garden, open to the sky.

Similarly Ove Bang developed the ideas of Le Corbusier in Norway, as for example in the villa at Ullern in Oslo, built in 1937–1938 for the shipowner Ditlev-Simonsen (figure 8.25).[34] The glazed areas of the lower level are recessed in a sheltering, almost cavelike way, while the severity of the upper wall is offset by the stone wall of the terrace. Behind the principal block, seen in the illustration, extends a bedroom wing. The plan is convenient, and symmetry has been avoided.

Even more personal is Villa Mairea at Noormarkku in Finland, designed by Alvar and Aino Aalto in 1939 (figure 8.26).[35] This is one of the most famous recent examples of a collaboration between architect and client. The villa was built for Harry Gullichsen, head of the Ahlström industrial group, to which the Sunila factory belongs. Named for Mairea Gullichsen, it is the third residence on the Ahlström estate, which includes the old sawmill. Three purposes were fused into the final design: a family home, a gallery for a growing art collection, and a meeting place for cultural gatherings.

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8.25 Oslo, Ullern. Villa Ditlev-Simonsen. O. Bang. 1937–1938. (Oslo, Norwegian Museum of Architecture. Photo: Teigens.)

8.26 Noormarkku. Villa Mairea. A. and A. Aalto. 1938–1939.

8.27 Århus, Jutland. University. K. Fisker, C. F. Møller, and P. Stegmann. 1931–1946. (Copenhagen, Academy of Art Library.)

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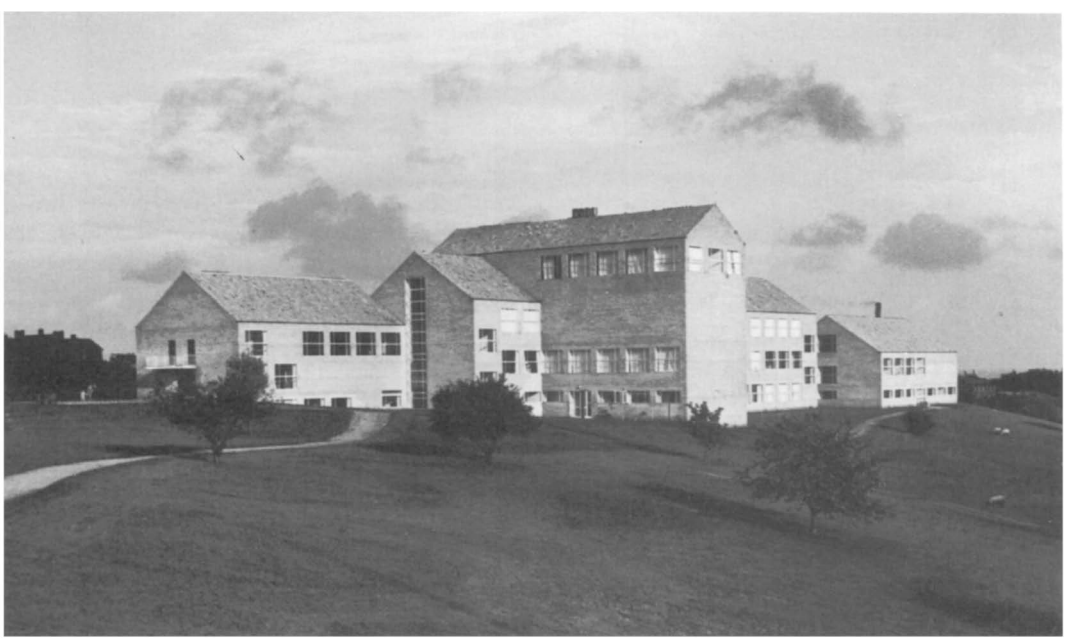

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8.28 **Oslo. City Hall. A. Arneberg and M. Poulsson. 1931–1950.**

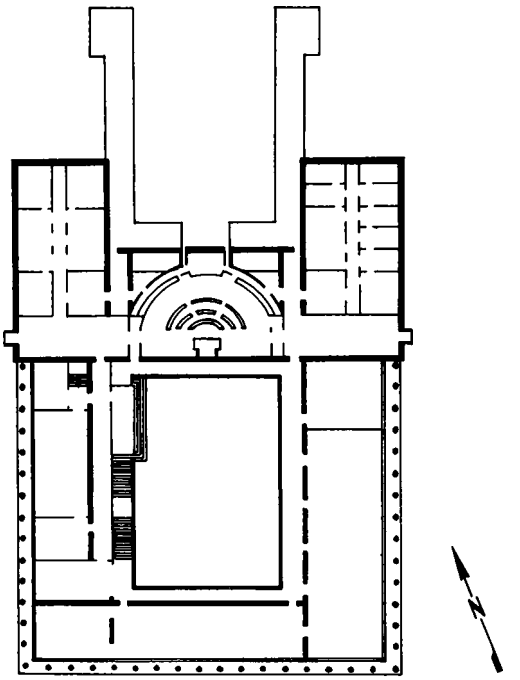
8.29 **Oslo. City Hall. Plan. (After Kavli, *Norwegian Architecture*, p. 117.)**

Generous use of glass walls and of supporting posts on the first level creates a flow of space without and within, and a warm personal atmosphere is achieved in the use of many contrasting and complementary kinds of stone, tile, and wood. Many experimental details and refinements were included here, made possible by the wealth of the owners, but the architects expressed hope that some of these could be adopted at reasonable cost for the benefit of all homes.[36]

Principles of Functionalism were of course widely applied in major projects other than housing. In 1931 Kay Fisker, together with C. F. Møller and Povl Stegmann, won the competition for the University at Århus.[37] The irregular site was designed into a park by C. Th. Sørensen, into which the individual buildings are set without formality. Unity was sought by having the principal buildings aligned north-south, with their roofs pitched at 30 degrees (figure 8.27). Construction went on over a period of

several years until the professors' houses, student residences, and classroom buildings were completed by 1946. In this unpretentious group of buildings important accents are given by the octagonal assembly hall and the tower of the library. Altogether the university might be called an "academical park" in the spirit of Thomas Jefferson's "academical village."

At the same time the fourth great municipal/national building in Scandinavia was under construction. The City Hall in Oslo, designed by Arnestein Arneberg and Magnus Poulsson, was begun in 1931 and completed in 1950 (figure 8.28).[38] Its twin towers rise high over the waters of the Pipervik at the head of the Oslo Fjord, a commanding position like that of the Town Hall in Stockholm. The immediately surrounding area of the city was redesigned to regularize some of the streets and clear the building site. New buildings were restricted to six stories in height so that the City Hall has no nearby competition for attention. The plain red brick walls make a background for fountains and other sculptures by Norwegian artists. The patterns of windows and stringcourses emphasize the horizontality of the lower south block and the verticality of the office wings. In its external appearance the City Hall has none of the palazzo-like historical references of its counterparts in Copenhagen and Stockholm.



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The organization of the interior is similar to those two buildings in the inclusion of a large Festival Hall rising in two stories in the lower portion (figure 8.29). A grand staircase leads to the second level containing the Banqueting Hall, gallery, registry rooms, and board room. The Council Chamber occupies the north wing connecting the office towers. As is the case in the other two Nordic capitals, the Oslo City Hall is richly furnished with paintings, sculptures, tapestries, and other works by the country's leading artists, making it a monument

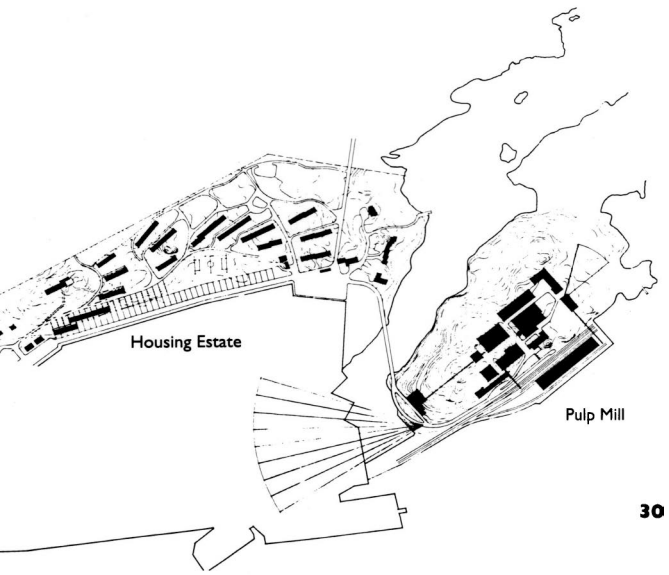
to national as well as civic artistic pride.

For an industrial building we may consider the Sunila wood pulp factory near Kotka on the Gulf of Finland (figures 8.30 and 8.31).[39] Designed by Alvar Aalto in 1936–1939 and enlarged in 1951–1954, the entire complex included the workers' housing that we have already noted. For the factory itself Aalto made use of a rocky site with a good deep harbor. From the storage pond for logs from the great system of lakes in Finland to the docks, the various sections of the factory descend the slopes. The bold masses of the brick or concrete buildings rise directly from the rocks and the native vegetation. The Sunila factory was a powerful declaration that industrial architecture need no longer depend on even the most stylized historical references, as at Svinninge, but could exhibit its own authority.

A final example from the 1930s is the design for the Copenhagen Airport at Kastrup, the competition having been won by Vilhelm Lauritzen in 1936 (figure 8.32).[40] In the first days of air travel a terminal had been built here in 1925, but the rapid development of this new means of transportation made a new facility necessary a decade later. Like the railway station, the airport presented a new challenge to architects. A long narrow building, such as Lauritzen designed, seemed then a reasonable solution, making a relatively short distance for passengers to cross between the entrance to the terminal and the aircraft, and vice versa. Whereas trains were entered by numerous doors from long platforms, aircraft were entered through single doors and could be lined up on the departure side of the terminal. Many changes in the technologies of air travel have taken place since the 1930s, and indeed Lauritzen was called upon for the remodeling of his building into the present one in the 1950s. His original building was lightly constructed, with long clean lines, considerable flexibility in planning of the interior spaces, and ample use of glass.

With the outbreak of World War II in September 1939, much that was being hoped and planned in the Scandinavian countries came to be delayed by the many effects of the war, including invasion and occupation. The uneasy peace in 1945 did not entirely restore the status quo. The German occupation of Denmark was of course ended, but Iceland, which had been under the Danish crown since 1380, established its independence as the Iceland Republic in June 1944. The territories of Norway were not affected, but Finland lost Karelia in the southeast and also Petsamo on the Arctic coast to Russia.[41]

Much rebuilding and new building followed upon the cessation of hostilities. Several developments are especially notable in response to the new challenges. Among the architects moving away from strict Functionalism, for example, was Knut Knutsen, who built the Norwegian Embassy in Stockholm in 1952 (figure 8.33).[42] At first glance it appears to be a spacious, irregularly planned residence set into a gentle slope. It is in fact the home of the Ambassador as well as the official office building. The domestic quarters have their principal rooms looking across the bay toward the park on Djurgården, while the office wing is set farther back from the main boulevard. The open planning and provision for large gatherings of people recall the Villa Mairea with its special purposes, while the studied proportions of the windows, heavily framed in wood, and the pronounced cornices recall the Prairie Style in American building. Knutsen himself, following some of the principles of Frank Lloyd Wright and Alvar Aalto, wrote of closeness to nature in materials and of spaces organized so that buildings might be harmonious and with a humanistic content.[43]



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8.30 **Kotka. Sunila Cellulose Factory. A. Aalto. Begun 1936. Site plan. (Helsinki, Museum of Finnish Architecture.)**

8.31 **Kotka. Sunila Cellulose Factory.**

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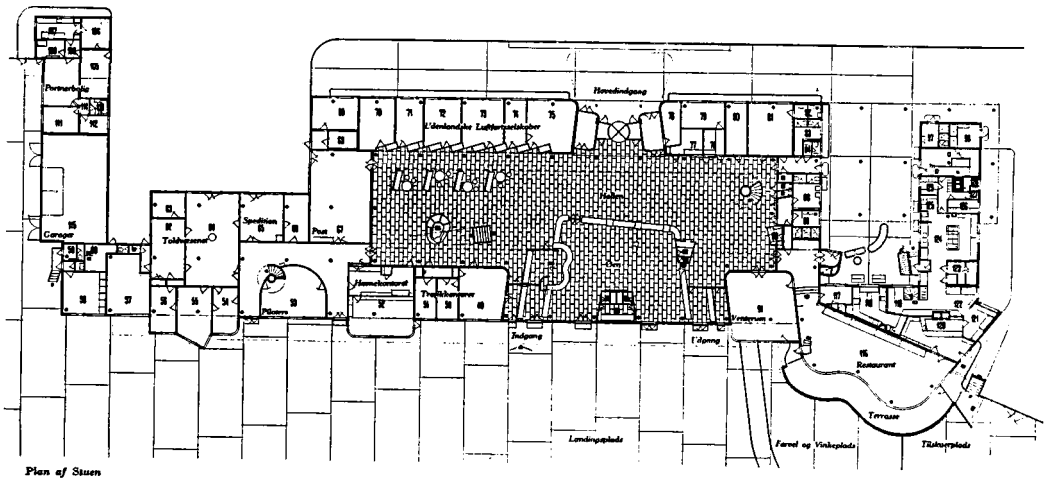

Plan af Stuen

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Similarly the Danish architect Jørn Utzon sought a closer relation of his buildings to the natural environment than had characterized Functionalism. A particularly notable project was the Kingohusene housing estate near Helsingør, developed in 1957–1960. Economically built houses of yellow brick are here grouped around irregular courtyards on a hilly site so that wide glass areas look out onto a landscape view.[44]

An even more decisive effort to deal with forces of the environment was made by the English-born Ralph Erskine in Sweden. In the 1960s he experimented with designs for housing in the subarctic conditions of northern Sweden. His recommendation for "town plans which allow considerable south exposure of buildings and windows to encourage positive solar gain" reminds us of the characteristic south porch of the medieval Swedish church, placed on the warmest and most sheltered side. Erskine also noted that "while buildings have to be heated in the cold they have to be cooled in the heat," saying that certain techniques could be used in both extremes of climate.[45]

8.32 Copenhagen. Kastrup Airport. V. Lauritzen. 1937–1939. Plan. (Copenhagen, Academy of Art Library.)

8.33 Stockholm. Norwegian Embassy. K. Knutsen. 1952.

The search for a humane approach extended to several of the multiple-dwelling projects in postwar Scandinavia. An early example in Denmark is the Bellahøj community in Copenhagen, for which a competition was won by Mogens Irming and Tage Nielsen in 1945 (figure 8.34).[46] The apartment blocks, begun in 1950 and designed by several different architects, were built as much smaller units than the lamella blocks and placed for the maximum use of sunlight. The whole community includes two groups of these "point houses," as they are called, separated by a park containing an open air theater and a restaurant. A lake at the south end is balanced by the community center on the north, where the church, school, library, and theater are grouped together, reflecting

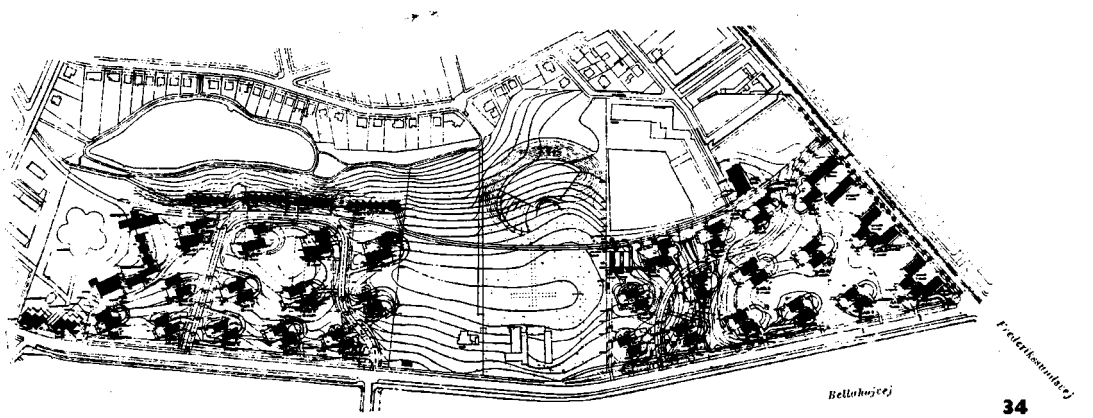
the emphasis on communal life that was intended. Ample space between the housing blocks and considerable planting help to create a parklike setting, and the whole project was designed with families with small children in mind.

Bellahøj is a residential suburb of Copenhagen. In Finland in 1952 several housing and welfare organizations founded the Housing Foundation, a building society for a new satellite town as a western suburb of Helsinki. The result was Tapiola, already planned in part, for which Aarne Ervi won the competition for further planning.[47] The purpose was to create a nonprofit community with an administrative, shopping, and cultural center (also designed by Ervi), and groups of housing of different types: single residences, terrace houses, and flats (figure 8.35). Three groups were planned, separated by natural forested areas, each to have its own school and shopping facilities. What makes the Tapiola project different from many others is the grouping of the buildings in a community deliberately planned to house people of widely varying occupations and incomes.

By the time these communities were being built, the "garden city" idea as such was already

8.34 Copenhagen, Bellahøj. Housing estate. M. Irming and T. Nielsen. 1945–1956. Site plan. (Copenhagen, Academy of Art Library.)

8.35 Helsinki, Tapiola. Apartment blocks. V. Revell. 1958. (Helsinki, Museum of Finnish Architecture. Photo: H. Havas.)



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half a century old. In 1898 Ebenezer Howard published *Tomorrow: A Peaceful Path to Real Reform,* reissued in 1902, slightly revised, as *Garden Cities of Tomorrow.*[48] Controversial and slow to exert wide influence, Howard's fundamental concept was that of a town surrounded by agricultural land and having its homes and simple gardens supported by its own local industries. This is of course different from the "garden suburbs" just described. Planning for better urban housing was also of concern in Sweden, as we have seen, and Lewis Mumford's *Culture of Cities* aroused enough interest to warrant a Swedish edition in 1942.[49] An attempt in 1955 at such a subcommunity is at Vällingby outside Stockholm, designed by Sven Backström and Leif Reinius (figure 8.36).[50] Here business and industries were included with the residential quarters and community facilities. As it has turned out, most of the residents have come to work elsewhere, usually in the city of Stockholm, making this attempt less successful than the first "garden city" at Letchworth, England, of 1903.[51]

One of the most admired community complexes is the civic center at Säynätsalo in south central Finland, built by Alvar Aalto in 1950–1952 (figure 8.37).[52] The town, on an island in Lake Paijänne, was founded by the Enzo-Gutzeit wood products company, and Aalto won the 1949 competition for a center to house Council Chamber, town offices, library, and some staff residences. The buildings are grouped around a court, all on a sloping site. The court is raised to the second level by fill from the excavations and may be reached by a conventional stair at the southeast corner or a dramatic boarded earth set of steps at the

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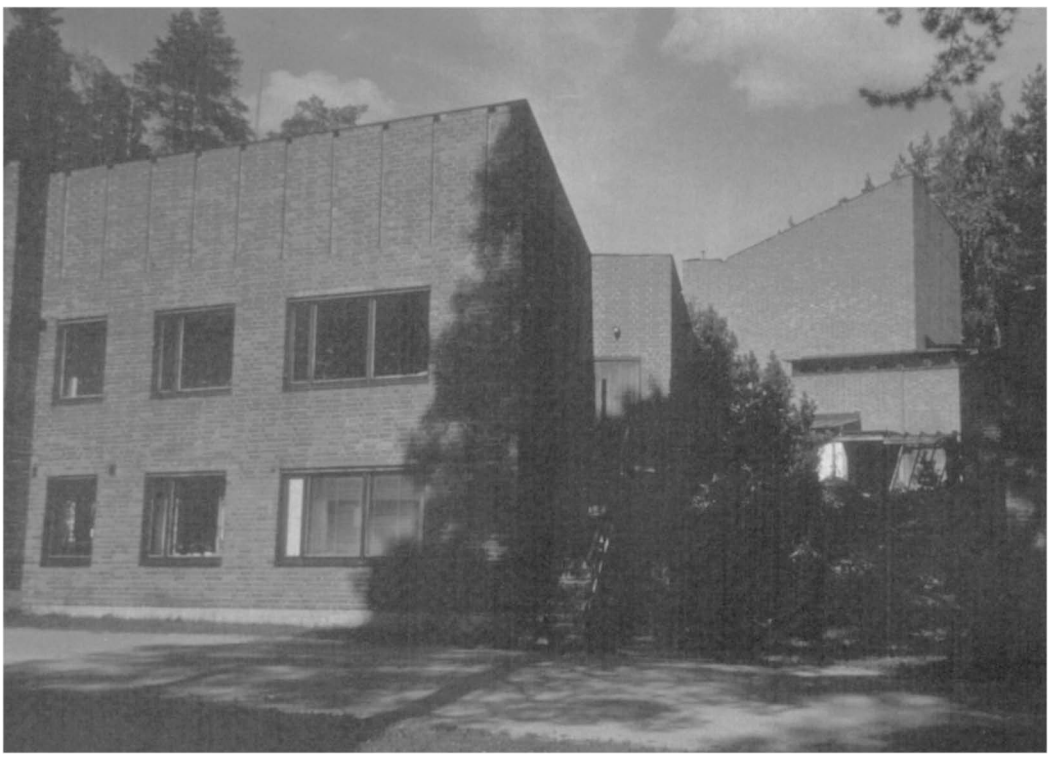
8.36 **Stockholm. Vällingby. S. Backström and L. Reinius. 1955. Air view. (Stockholm, City Museum. Photo: Oscar Bladh.)**

8.37 **Säynätsalo. Civic Center. A. Aalto. 1950–1952.**

8.38 **Otaniemi. Technical University. A. Aalto. Begun 1949.**



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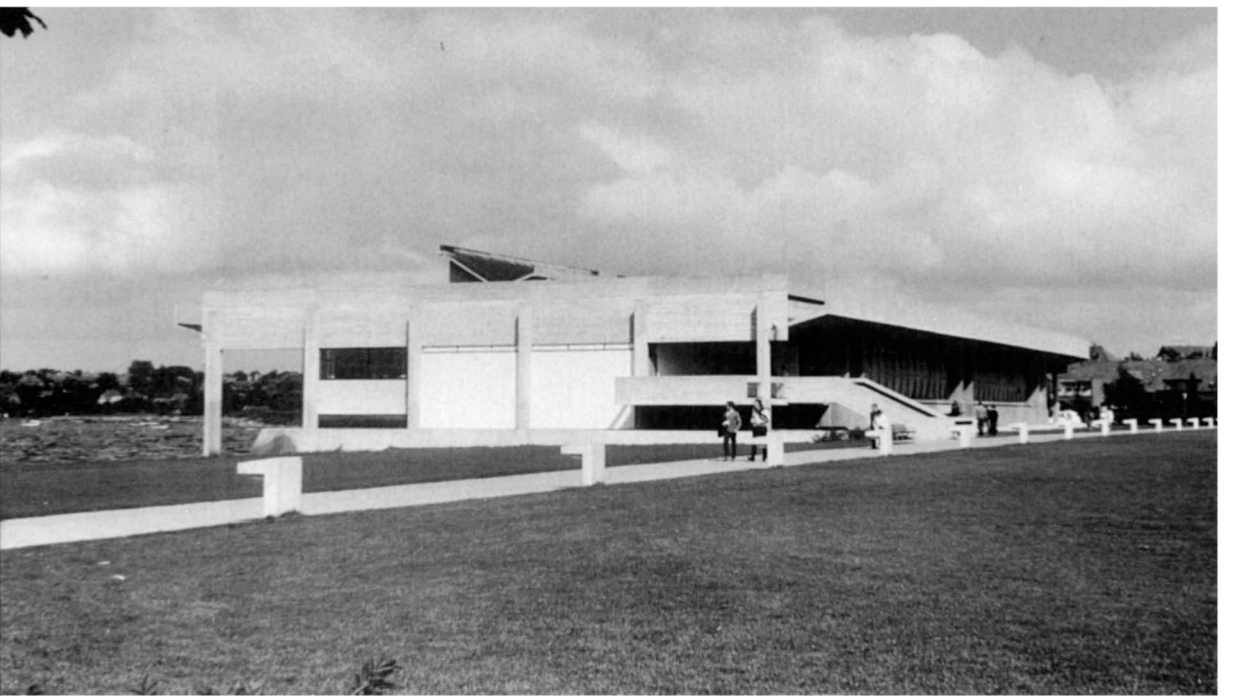

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8.39 Roskilde, Zealand. Viking Ship Museum. C. T. Sørensen. 1966–1968.

8.40 Bergen. Bryggens Museum. O. Maurseth. 1974.

southwest corner. At this time Aalto was building in brick, and the combination of the broad expanse of walls and the glass and wood elements of window walls and pergolas creates seemingly countless views, all closely linked to the surrounding forest. Wood and brick are boldly juxtaposed in the Council Chamber, where the great timber trusses are left exposed. The Säynätsalo center is small but monumental, as if it were the urban version of a Finnish courtyard farmstead.

We have already looked at two twentieth-century university projects, those at Århus and Blindern. A third example that has attracted much attention is the Technical University at Otaniemi, west of Helsinki. For this a competition was announced late in 1948, when Alvar Aalto was in the United States in connection

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with his designs for the Baker Dormitory at MIT.[53] Since 1942 he had been involved with plans for the town of Säynätsalo, and the projects for Otaniemi and Säynätsalo were closely linked to events in Aalto's personal life. His first wife, Aino, who collaborated with him, was able during her last illness to contribute to the competition designs for Otaniemi. The first prize, awarded several months after her death early in 1949, was made in both their names. Then when Aalto turned his attention once more to Säynätsalo in 1949 he was assisted by Elissa Mäkiniemi, a young architect in his office, who became his second wife in 1952.

At Otaniemi the plans were for the main auditorium and adjacent buildings for the general departments, the Geodetic Institute, and the School of Architecture.[54] The site chosen was formerly a private estate, with broad parklands already partly landscaped. As the project was finally developed, the auditorium dominates the high area, with the classroom buildings descending in terrace fashion (figure 8.38). The auditorium, also planned for conferences, was originally intended to be wedge-shaped, but as built it is a quadrant and resembles a Greek theater outside because of the terraced windows lighting the simple but striking interior. As at Säynätsalo, the warmth of red brick prevails, except in the School of Architecture for which Aalto used a thin cladding of Carrara marble. The student dormitories, designed by other architects, are placed in a more wooded area to the east of the main complex, and the library, a long rectangular block, is in a grove of trees on the west. This leaves the wide open

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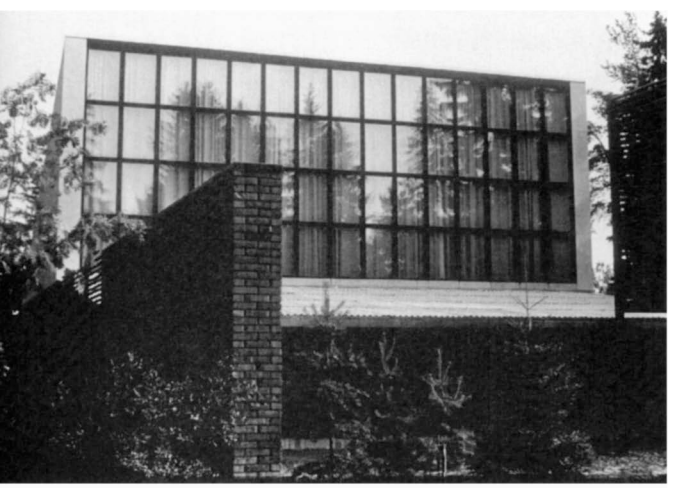
8.41 **Reykjavik. Hallgrims Church. G. Samúelsson. 1946–1986.**

8.42 **Otaniemi. Chapel. K. and H. Siren. 1954–1957. (Photo: Jay C. Henry.)**



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terraces between, giving a sense of breadth and expansion unusual in Aalto's work.

In addition to the universities as educational institutions, a number of museums have been built in the Scandinavian countries since World War II. Among those built for quite special purposes are the Viking Ship Museum in Roskilde and the Bryggens Museum in Bergen. Both are planned so that the visitor sees a "working" facility, in contrast to earlier museums in which collections were simply displayed on walls or in cases.

That the Roskilde Fjord had been blocked at Skuldelev had long been known, but it was not until 1957 and 1959 that the Danish National Museum underwater excavations revealed five Viking ships as the cause of the blockage. After they were salvaged, in thousands of pieces, in 1962 a closed competition was held for a museum, and the winning design was by Erik Chr. Sørensen.[55] The building was constructed from 1966 to 1968 and is a long low structure set at the edge of the water. Built of glass and concrete, it is a distinctive landmark in the lower part of the city (figure 8.39). Window walls on the north and south light the exhibition area, where the fragments of the ships are being mounted on full scale metal frames. From walkways at different levels the visitor can see the work being done and gain impressions of the size and shape of the ships. Sørensen himself spoke of his concern that the regularity and broad surfaces of the building should set them off effectively.[56]

Another special case developed in Bergen, where excavations from 1955 to 1972 revealed extensive remains of the twelfth-century town on the sloping land south of St. Mary's Church. To shelter the reconstructed remains of several buildings on the site, the Bryggens Museum was built by Oivind Maurseth in 1974 (figure 8.40).[57] Like the Viking Ship Museum it is composed of clear geometrical elements of walls and windows, but here of brick, and with the internal sections clearly marked by vertical projections on the exterior. The site includes an outdoor area where masonry foundations of the medieval buildings are exposed. Wood predominates for the interior, where the visitor is led by a series of ramps to the rear portion housing reconstructed wooden dwelling remains and thence to the area for the display of artifacts.

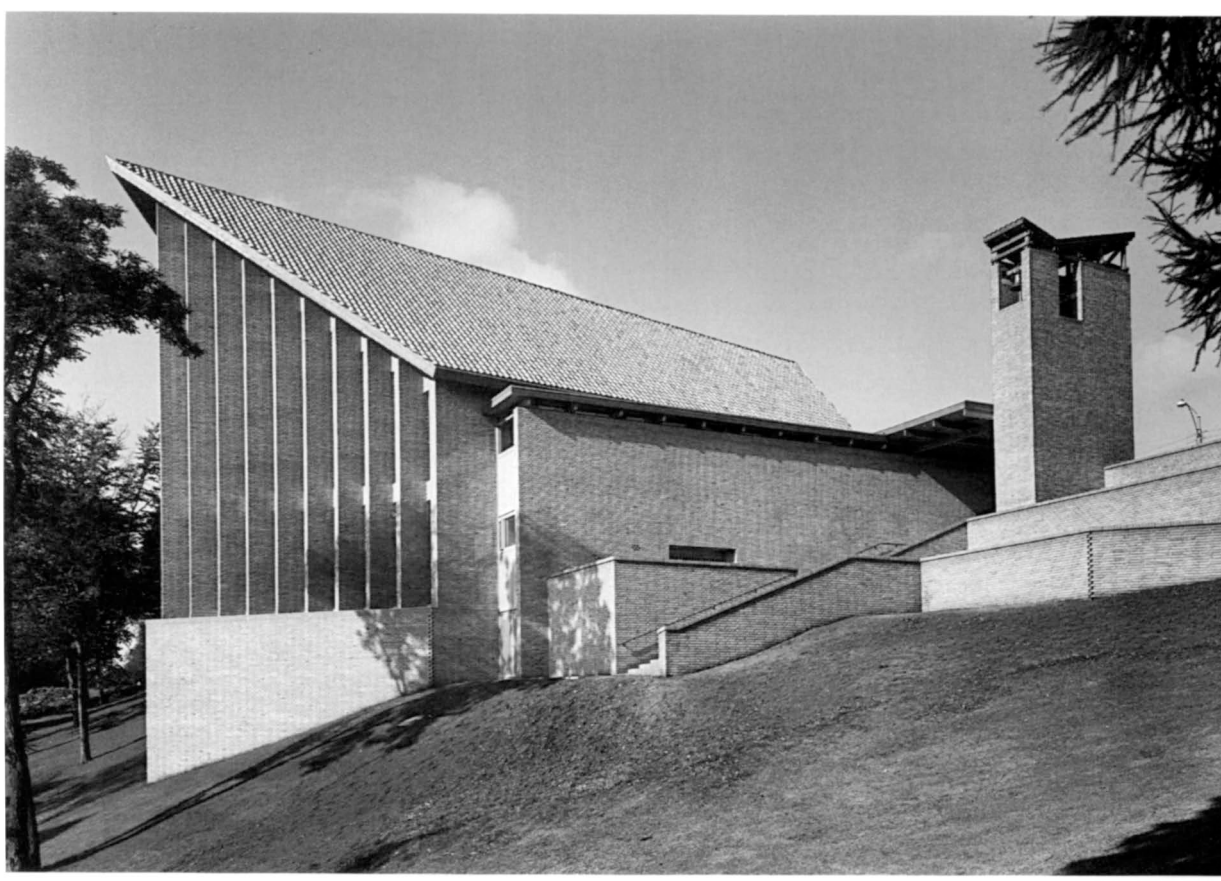
Scandinavian churches built since World War II show some striking transformations of traditional elements together with innovative designs. Perhaps the one longest in building and certainly the one making the most impact on the landscape is Hallgrimskirkja in Reykjavik (figure 8.41).[58] From the beginning in 1946 it has dominated the height of Skólavörduhaed and can be seen from nearly everywhere in the city. The tower and transepts were completed in 1974, and the church was finally consecrated in 1986. The State Architect Gudjón Samúelsson sought to evoke Iceland's glaciers and columns of basalt while providing a traditional setting for Christian worship. Curiously enough, even without the projected stained glass windows the severe interior is warmer than that of Grundtvig's Church in Copenhagen. The church is named for the Reverend Hallgrim Pétursson, the seventeenth-century religious poet. If we reflect on the other churches honoring national leaders, Engelbrekt in Stockholm, Grundtvig in Copenhagen, and Mikael Agricola in Helsinki, it is only fitting that Iceland should have chosen to so honor a figure from her great literary tradition.

For an entirely different approach, at Otaniemi we find the Chapel of the Technical University set on a forested hill near the student dwelling quarters (figure 8.42).[59] Built by Kaija and Heikki Siren in 1954–1957, it is a

8.43 **Randers, Jutland. St. Clement's Church. I. and J. Exner and K. E. Larsen. 1963. (Photo: T. and P. Pedersen.)**

8.44 **Bodø, Sør-Hälogoland. Church. G. Blakstad and H. Munthe-Kaas. 1956.**

8.45 **Tromsdalen, Nord-Hälogaland. Church. J. I. Hovig. 1959–1966. (Oslo, Norwegian Museum of Architecture. Photo: Teigens.)**



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simple rectangular building of red brick, with a high upper window wall on the west and the roof sloping to a window wall on the east. Slatted screens and bell tower emphasize the woodland setting. The entire east wall of glass means that the woods outside serve as an ever-changing backdrop for the altar, according to season and weather. Although expressed in a different architectural idiom, the setting, the small size, the simplicity of its means, and the sense it gives of personal quiet all give this little building much in common with Asplund's Woodland Chapel.

Another use of a glazed east wall was made at St. Clement's Church in Randers on Jutland in 1963 (figure 8.43).[60] This is built dramatically on a hillside, the main auditorium en-

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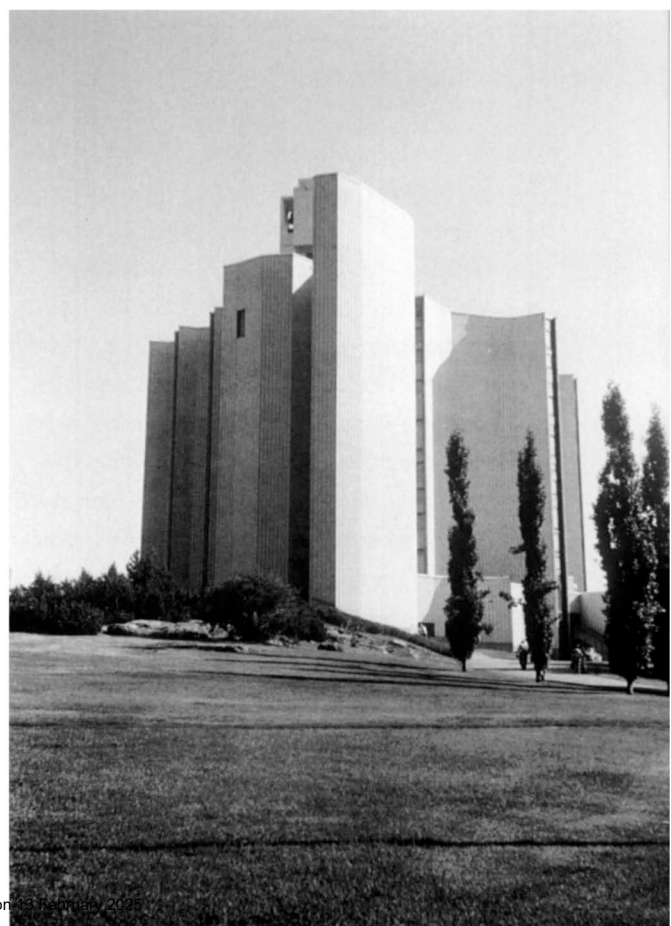
tered from the higher ground. The parish rooms are in the level below, and the tall windows of the east wall serve both levels. Again a view over a park landscape forms a backdrop to the altar. The three architects Inger Exner, Johannes Exner, and Knud Erik Larsen chose a wedge-shaped plan so that the interior of the church widens out to the altar. Most of the liturgical furnishings were designed especially for this place. The organ is by the Danish builder Frobenius, built by deal, as are the other wooden furnishings. The altar is of Norwegian marble, and like the organ case is composed of straight lines and flat surfaces, far removed from the Baroque and Rococo furnishings of earlier churches. The Romanesque baptismal font is mounted on a plain stainless steel base.

Certain parts of Scandinavia suffered more damage than others during World War II. Among them were the Norwegian port towns that were attacked by German bombers while they were centers for Allied shipping. Bodø in Sør-Hälogoland, above the Arctic Circle, thus lost its church on May 27, 1940. The present one was finally begun in 1956, designed by Gudolf Blakstad and Herman Munthe-Kaas (figure 8.44).[61] More than thirty years after designing the Haugesund Town Hall, they again used familiar patterns, but this time in the overall conception of the building rather than in surface detail. The church on the exterior appears to be a five-aisled basilica, together with the traditional separate belfry, carried out with modern materials in almost stark simplicity. The interior, with a high barrel-vaulted ceiling and no internal posts, is similarly uncluttered.

Another Norwegian church drawing on tradition in a different way was built by Inge Hovig at Tromsdalen in Nord-Hälogaland in 1959–1966 (figure 8.45).[62] This building is triangular in cross section, with a cross rising to the peak of the west gable. The nave roof de-

8.46 Tampere. Kaleva Church. R. Paatelainen and R. Pietilä. 1964–1966.

8.47 Copenhagen. SAS-Royal Hotel. A. Jacobsen. 1959–1960.



creases in height in several stages, and then the apse rises behind it. The spaces between the slanting roof-wall panels are glazed. The two steep masses of nave and apse remind one of the steep shapes of the stave churches, here reduced to a very simple statement, like a piece of architectural sculpture. Stairs in the west gable lead up to a gallery and down to a lower level for the parish rooms. In spite of acoustical difficulties coming from its length and height, the church has attracted much attention. It is also called the Ishavkatedral, or the cathedral of the icy sea, appropriate to its northern location.[63]

Another sculptural shape is the Kaleva Church in Tampere, built by Reima Pietilä and Raili Paatelainen in 1964–1966 (figure 8.46).[64] Its white tiled walls rise boldly from the ground, with dramatic contrasts in sunlight and artificial light at night. The plan, basically an irregular pentagon like that of St. Clement's Church in Randers, is said to represent a fish, an important Christian symbol. The interior has the same soaring quality, lighted by tall narrow windows on the sides. Unlike St. Clement's the church does not terminate in a large window wall, but rather has a single tall narrow window, filled with a sculpture by Pietilä called *The Shattered Cane*. The interior fittings, including the organ case, are of Finnish pine, left in its natural color.

The number of distinctive commercial and industrial buildings constructed since 1945 is equally formidable. The few examples to be introduced here have been chosen for the contrasts they offer to earlier buildings with similar purposes. One very great contrast is that between the romantic wooden hotel in a small community, such as the Dalen Hotel in Telemark of 1894, and the concrete and glass city skyscraper such as the SAS-Royal Hotel in Copenhagen. Designed by Arne Jacobsen and built

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in 1959–1960, the latter is a major landmark (figure 8.47).[65] It consists of two parts, a long horizontal two-story building, faced with gray-green enameled steel plates, and an eighteen-story hotel tower with gray-green glass and aluminum panels. What might seem too severe is modified by the play of reflections from adjacent buildings and the sky. The lower section, which was built first, was designed to house the downtown SAS terminal as well as the hotel lobby and a series of shops surrounding it at the street level. Within the lobby the black marble walls set off the spiral staircase to the restaurant, while light and the relief of plants were given by a conservatory. The latter was of course in the best tradition of the grand hotels. The long series of windows gives the guest rooms panoramic views over the city. Throughout, the carpets, furniture, curtains, and accessories were also designed by Jacobsen, continuing a distinguished tradition of work by Scandinavian architects in the decorative arts. Vilhelm Dahlerup, J. H. Nebelong, G. F. Hetsch, P. V. Jensen-Klint, Kay Fisker, Alvar Aalto, and others have made notable contributions in furniture, glass, metalwork, ceramics, and textiles, from the historically inspired objects of the nineteenth century to the "Scandinavian Modern" of wares popular all over the world today.[66]

By the same architect we have another major business building in Copenhagen, the Danish National Bank, for which Jacobsen won the competition in 1961 (figure 8.48).[67] It was begun in 1965 and finished after his death by his associates Hans Dissing and Otto Weitling in 1978. Six stories high, with two basement levels, its exterior rises in long marble slabs behind a high wall that surrounds the whole site. There is only one entrance, an unpretentious one on Havnegade. Two major surprises await the person entering for the first time, however.

8.48 **Copenhagen. Danish National Bank. A. Jacobsen. 1964–1978.**

8.49 **Lesjöfors, Värmland. Rope yard. L. Bergström. 1960. (Photo: Lennart Olsson/TTO.)**

A huge vestibule rises with tall windows on the street side, an open stair partly filling the wall opposite the door; and a high blank wall stands on the interior side, through which there is a passage to the banking offices. From this almost grim introduction one passes to the center of the bank, which is built around a patio filled with planting.

The vestibule was intended to have its decorative scheme restricted to the architectural elements. By 1977, however, it was apparent that as built the hall seemed too cold and severe. The Danish weaver Kim Naver designed five red and gold tapestries for the deep niches of the first level, having the sections of gold increasing toward the stair wall to heighten the effect of opening light and perspective.[68]

Finally, three recent designs for factories involve products for which we have noted earlier facilities. The first is the rope yard at Lesjöfors in Sweden, built by Lennart Bergström in 1960 (figure 8.49).[69] For a seafaring nation rope is still as essential as it was in the heyday of Luostarinmäki at Turku. Bergström designed the necessary long building like a tent, with five

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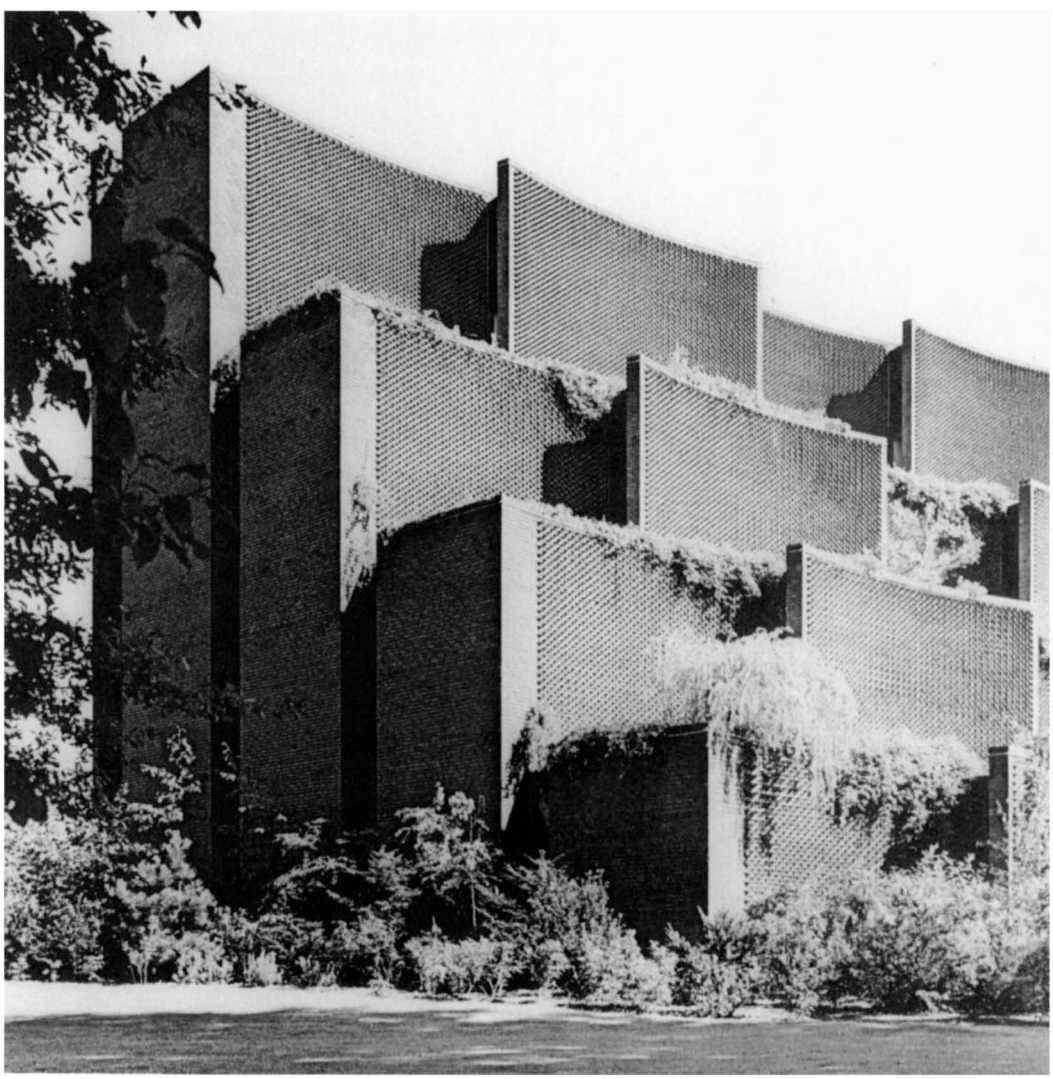
8.50 **Copenhagen. Carlsberg Bottling Works. S. E. Kristensen. 1967–1969. (Photo: S. E. Kristensen.)**

8.51 **Holme-Olstrup, Zealand. Holmegård Glassworks. S. E. Kristensen. 1971–1972.**

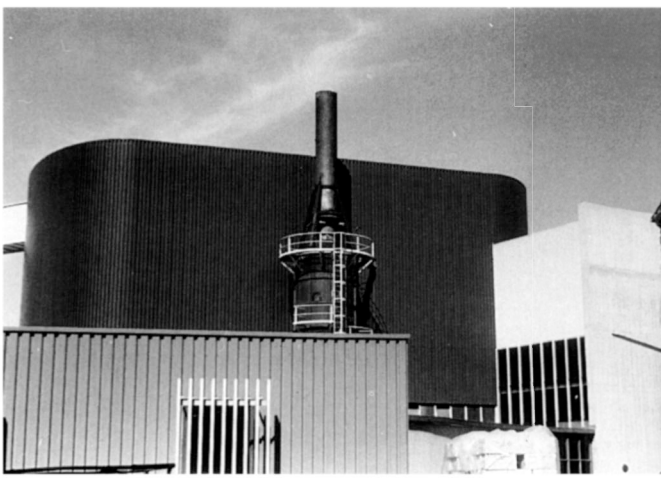


major bays marked by posts supporting the roof and with eleven glazed peaks as skylights. The building stretches across the landscape in a dramatic manner.

Then it became necessary to build an extension of the bottling plant at the Carlsberg brewery, carried out by Svenn Eske Kristensen in 1967–1969 (figure 8.50).[70] The site to be used posed a special dilemma: it sits next to the garden of the J. C. Jacobsen house, now used as a "mansion of honor" for distinguished scholars. To avoid placing windows overlooking the garden and also to avoid monotony, Kristensen designed the side facing the garden with four curving terraces, each with a walkway outside the windows and outer brick walls to shield the view toward the garden. Planting was included to enhance the views of the terraces from the working areas.

Having provided the Carlsberg breweries with a new bottling works, Kristensen turned his attention to a factory to supply the bottles. For the Holmegård glassworks an addition was needed, and Kristensen's designs resulted in the new buildings of 1971–1972 (figure 8.51).[71] Steel frames and outer cladding made for wide interior spaces, flexibility in planning, and dramatic exterior shapes. The contrasts of shapes and surfaces on the exterior is matched by the contrasts of sound within. (Like many Scandinavian manufacturing plants, the Holmegård works is open to visitors.) The characteristic crash tinkle of rejected pieces in the art glass area is mild compared to the thunderous racket of beverage bottles descending through the processing racks of the commercial area.

Perhaps it may seem surprising that a history of architecture in the Scandinavian countries should conclude with a factory. Let us remember, however, that building in the Nordic countries began, as at Ulkestrup, with the most elementary shelters for human activity. Fragments of tools and weapons, made of less perishable materials than was clothing, indicate the production of goods for use at the very outset of human habitation in this region. To the shelters for meeting individual physical needs were added shelters for individual and communal social and spiritual needs, and these fundamental human requirements have not changed over 10,000 years.



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According to many factors, builders in the Scandinavian countries have found numerous ways in which to meet these needs. Some have been indigenous, some imitative, and some innovative. Asko Salokorpi has pointed out the difficulty in defining what is "Finnish" about architecture in twentieth-century Finland.[72] This review of building in the Nordic countries since prehistoric times should indicate that "Scandinavian architecture" as a whole is difficult to define if one is seeking a common stylistic approach. We do better, I think, to use "Scandinavian architecture" as a regional designation and then enjoy and learn from the great breadth of building activity that it represents.

Note on Alphabetizing

In the appendix, bibliography, and index, the extra letters in Danish, Norwegian, and Swedish are treated alphabetically as if spelled out: *å* as *aa*, *ä* as *ae*, and *ø* and *ö* as *oe*. These letters normally appear at the end of the alphabet in Scandinavian dictionaries, encyclopedias, bibliographies, and the like. English-speaking readers should bear this in mind when consulting sources in the Scandinavian languages. Conversely, readers in the Nordic countries will find names of persons and places listed here as indicated above, instead of in the arrangement more familiar to them.

Appendix: Architects and Builders

This list covers architects and builders of the Scandinavian buildings included in the text, with their dates if known. Citations are to dictionary and encyclopedia articles and principal monographs that treat their work. Dictionaries and encyclopedias are abbreviated as follows:

MEA Adolf K. Placzek, ed., *Macmillan Encyclopedia of Architects*, 4 vols. (New York: The Free Press, 1982)

NK Leif Østby, et al., eds., *Norsk kunstnere leksikon*, 3 vols. (Oslo: Universitetsforlaget, 1982–1987)

SK Gösta Lilja, Bror Olsson, and S. Artur Svensson, eds., *Svenskt konstnärs lexikon*, 5 vols. (Malmö: Allhems Förlag, 1952–1967)

TB Ulrich Thieme and Felix Becker, *Allgemeines Lexicon des bildenden Kunstler . . .*, 37 vols. (Leipzig: W. Engelmann, 1907–1950)

TBV Hans Vollmer, ed., *Allgemeines Lexicon der bildenden Kunstler des XX. Jahrhunderts*, 6 vols. (Leipzig: E. A. Seemann, 1953–1962)

WK Merete Bodelsen and Povl Engelstoft, eds., *Weilbach's konstnerlexikon*, 3 vols. (Copenhagen: Aschehoug, 1947–1952)

WWA James M. Richards, ed., *Who's Who in Architecture* (London: Weidenfeld and Nicolson, 1977)

Åbom, Johan Fredrik, 1817–1900

Aalto, Aino, 1894–1949

Aalto, Alvar, 1899–1976
MEA 1:1–13; TBV 1:1; WWA 131–136; Pearson 1978; Miller 1984; Schildt 1984

Adelcrantz, Carl Fredrik, 1716–1796
MEA 1:34; SK 1:24–25; TB 1:80–81; Fogelmarck 1957

Ahlberg, Hakon, 1891–1984
MEA 1:36–37; TBV 1:16

Ahrenberg, Jakob, 1847–1914
TB 1:143–144; TBV 1:18

Anderberg, Axel, 1860–1937

Arndt, J. C.

Arneberg, Arnstein, 1882–1961
NK 1:76–79; TBV 1:66

Aspaas, Sven, 1736–1816
NK 1:91–92; TB 2:184

Asplund, Erik Gunnar, 1885–1940
MEA 1:110–112; TBV 1:73; WWA 26–27; Maré 1955; Wrede 1980; Caldenby and Hultin 1986

Backer, Herman Major, 1856–1932
NK 1:125; TBV 1:90

Backer, Lars, 1892–1930
TBV 1:90

Backström, Sven, b. 1903
TBV 1:91

Bang, Ove, 1895–1942
NK 1:147–149; Blakstad and Munthe-Kaas 1943

Bassi, Carlo Francesco, 1772–1840
TB 3:13; WWA 30–31

Baumann, Povl, 1878–1963
MEA 1:156; TBV 1:135; WK 1:60

Bentsen, Ivar, 1876–1943
TBV 1:173; WK 1:82–83

Berg, Axel, 1856–1929
WK 1:86–87

Bergström, Lennart

Berner, Finn, 1891–1947

Binck, Jakob, fl. c. 1560–1569
SK 1:181; TB 4:36–37; WK 1:98–100

Bindesbøll, Michael Gottlieb
MEA 1:211–212; TB 4:38; WK 1:100–102; Wanscher 1903; Bramsen 1959

Blakstad, Gudolf, 1893–1985
NK 1:247–250; TBV 1:225

Blasius, Leonhard, fl. 1640–1644
TB 4:104; WK 1:116–117

Blom, Fredrik, 1781–1851
SK 1:107; TB 4:130

Børve, Haldor Larsen, 1857–1933
NK 1:374–375

Bonneuil, Etienne de
SK 1:216; TB 4:313

Borch, Martin, 1852–1937
TB 4:338–339; WK 1:134–137

Boy, William, c. 1520–1592
SK 1:228–229; TB 4:490–491

Brandenburger, Ernst, d. 1713
WK 1:143

Brockam, Heinrich, fl. 1690

Bryggman, Erik, 1891–1955
MEA 1:318; TBV 1:339; WWA 58

Bryn, Finn, 1890–1975
NK 1:337–338; TBV 1:339

Bull, Georg Andreas, 1829–1917
NK 1:349–351; TB 5:215

Bull, Henrik, 1864–1953
NK 1:351–352; TB 5:215

Bussert, Morten, d. 1552
SK 1:256; WK 1:171

Chateauneuf, Alexis de, 1799–1853
MEA 1:410; NK 1:395–396; TB 6:425–426; Lange 1965

Cicignon, Johan Caspar von, d. 1698
NK 1:413–415

Clason, Isak Gustav, 1856–1930
MEA 1:422–423; SK 1:310; TB 7:57; TBV 1:448; WWA 74; Edestrand and Lundberg 1968

Cöllen, Heinrich von, fl. 1512–1592
TB 7:304

Collett, Christian Ancher, 1771–1833
NK 1:419–420

Coucheron, Wyllem, d. 1689
NK 1:427–428

Cronstedt, Carl Johan, 1709–1799
SK 1:323–324; TB 8:161

Dahlberg, Erik, 1625–1703
SK 2:16–20; TB 8:276–277

Dahlerup, Vilhelm, 1836–1907
TB 8:278–279

Desprez, Louis Jean, 1737–1804
SK 2:50–53; TB 9:147–149

Dieskau, Hans von, fl. 1541–1563
WK 1:254

Dieussart, François, d. 1711
WK 1:252

Dissing, Hans, b. 1926

Döteber, Christian Julius
SK 2:67; TB 9:378

Donatus
SK 2:59–60; TB 9:431

Düren, Adam von
TB 10:60

Edelsvärd, Adolf Wilhelm, 1824–1919
SK 2:72; TB 10:338

Ehrensvärd, Augustin, 1710–1772
SK 2:86–88

Eigtved, Niels, 1701–1754
MEA 2:19; TB 10:416–417; WK 1:283–285

Ellefsen, Johan, 1895–1969
TBV 2:30

Engel, Johan Carl Ludwig, 1778–1840
MEA 2:26–27; TB 10:529; Meissner 1937; Wickberg 1970

Ernst, Johan Conrad, 1666–1750
TB 11:7; WK 1:296
Erskine, Ralph, b. 1914
MEA 2:30; TBV 5:454
Ervi, Aarne, 1910–1977
MEA 2:30
Exner, Inger, b. 1926
Exner, Johannes, b. 1926

Fisker, Kay, 1893–1965
MEA 2:86–87; TBV 2:116; WK 1:319–320; Langkilde 1960
Förster, Hans, d. c. 1653

Gesellius, Herman, 1874–1916
MEA 2:188; TB 13:492–493
Grosch, Christian Heinrich, 1801–1865
NK 1:784–789; TB 15:93

Hårleman, Carl, 1700–1753
MEA 2:317–318; SK 3:210–212; WWA 137–138; Stavenow 1927
Häusser, Elias David, 1687–1745
WK 2:203–204
Hanno, Andreas Friedrich Wilhelm von, 1826–1882
NK 2:52–55; TB 15:594–595
Hansen, Christian Frederik, 1756–1845
MEA 2:301–303; TB 16:3; WK 1:441–446; WWA 133–134; Rubow 1936; Jakstein 1937; Lund and Küster 1968
Hansen, Knud, 1898–1964
TBV 2:371; WK 1:406
Harsdorff, Caspar Frederik, 1735–1799
TB 16:66; WK 1:482–484; Weilbach 1928
Haven, Lambert von, 1630–1695
TB 16:159–160; WK 1:492–493
Henningsen, Thorkild, 1884–1931
TBV 2:421; WK 1:518
Herholdt, Johan Daniel, 1818–1902
MEA 2:359; TB 16:464; WK 1:525–526
Hetsch, Gustav Friedrich, 1788–1864
MEA 2:370; TB 16:599; WK 1:531–532
Hjorth, Ingvar Magnus Olsen, 1862–1927
TB 17:121–122
Hjorth, Ragnar, 1887–1971
SK 3:153; TBV 2:449
Hovig, Jan Inge, 1920–1977
NK 2:287

Irming, Mogens, b. 1915
WK 2:6–7
Isaeus, Per Magnus Reinhold, 1841–1890
SK 3:242

Jacobsen, Arne, 1902–1971
MEA 2:474–475; TBV 2:578; WK 2:14–15; WWA 155–156; Pedersen 1957; Faber 1964; Kastholm 1968; Dyssegaard 1971
Janssen, Evert, fl. 1665–1690
WK 2:25–26
Jardin, Nicolas-Henri, 1726–1799
MEA 2:479; TB 18:428–429; WK 2:27–29; WWA 156
Jensen-Klint, Peder Vilhelm, 1853–1930
MEA 2:496; TB 18:520; WK 2:57–60; WWA 167
Jørgensen, Thorvald, 1867–1946
MEA 2:515; TBV 2:552; WK 2:104–105
Jørgensen, Valdemar, b. 1893
TBV 2:552; WK 2:106

Kampmann, Christian, 1890–1955
Kampmann, Hack, 1856–1920
MEA 2:552; TB 19:511; WK 2:110–111
Kampmann, Hans Jørgen, 1889–1966
Kirkerup, Andreas, 1749–1810
TB 20:371; WK 2:124–125
Klein, Vilhelm, 1835–1913
TBV 2:447–448; WK 2:131–133
Klint, Kaare, 1888–1954
MEA 2:571; TBV 3:65; WK 2:136–137
Knutsen, Knut, 1903–1969
MEA 2:576; WK 2:144
Krieger, Johan Cornelius, 1688–1755
TB 21:532; WK 2:174
Kristensen, Svenn Eske, b. 1905
MEA 2:584; WK 2:175
Kristler, Hans Jacob, d. 1645
TB 21:544–545

Lange, Bertel, d. 1619
TB 22:324

Lange, Philip de, 1704–1766
TB 22:329; WK 2:214–215
Langlet, Emil Victor, 1824–1898
NK 2:708–710; SK 3:456; TB 22:346–347
Larsen, Knud Erik, b. 1929
Lassen, Mogens, 1901–1987
WK 2:241
Lauritzen, Vilhelm, 1894–1984
TBV 3:185–186; WK 2:245–246
La Vallée, Jean de, 1620–1696
TB 22:471–472; WWA 84
La Vallée, Simon de, d. 1642
Lewerentz, Sigurd, 1885–1975
MEA 2:698–699; SK 3:503; TBV 2:223; WWA 184–187; Ahlin 1987
Liljeqvist, Johan Fredrik, 1863–1932
SK 3:515; TBV 3:231
Lindgren, Armas, 1874–1929
MEA 3:12; TB 23:245; TBV 3:236; Nikula 1988
Linstow, Hans Ditlev F., 1787–1851
NK 2:774–780; TB 23:158

Malling, Peder, 1781–1865
TB 23:597; WK 2:332–333
Markelius, Sven Gottfrid, 1889–1972
MEA 3:107–108; SK 4:85; TBV 3:327; WWA 201
Mathiesen, Albertus, d. 1668
TB 24:264
Maurseth, Oivind, b. 1928
NK 2:804–805
Meldahl, Ferdinand, 1827–1908
TB 24:357; WK 2:365–367; Stemann 1926
Møller, Carl Oscar, 1857–1933
SK 4:163; TB 25:8
Møller, Christian Friedrich, 1898–1988
SK 4:163; TB 25:8
Møller, Erik, b. 1909
TBV 3:405; WK 2:419–420
Munthe, Holm, 1848–1898
NK 2:1017–1019
Munthe-Kaas, Herman, 1890–1977
NK 2:1022–1023; TBV 3:449

Nebelong, Johan Henrik, 1817–1871
MEA 3:272; NK 3:21–24; TB 25:371; WK 2:438–439
Nielsen, Tage, b. 1914
WK 2:467
Norden, Jacob Wilhelm, 1824–1892
NK 2:266
Nyrop, Martin, 1849–1921
MEA 3:309–310; TB 25:545; WK 2:483–486; WWA 235; Beckett 1919
Nyström, Per Axel, 1793–1868
SK 4:290–291; TB 25:546
Nyström, Usko, 1861–1923
TB 25:546

Östberg, Ragnar, 1866–1945
MEA 4:329–330; SK 5:812–813; TB 25:573–574; TBV 3:508; WWA 238–239
Opbergen, Antonius van, 1543–1611
TB 25:547; WK 2:507–508

Paatelainen, Raili, b. 1926
Paeschen, Hans von, fl. 1561–1582
TB 26:112; WK 2:520–521
Pahr, Domenicus
SK 4:348; WWA 242
Pahr, Franciscus
SK 4:348; WWA 242
Palmstedt, Erik, 1741–1803
SK 4:363; TB 26:186; WWA 247; Setterwall 1945
Petersen, Carl, 1874–1923
MEA 3:407; TB 26:482
Petersen, Ove, 1830–1892
TB 26:485; WK 2:565–566
Pietilä, Reima, b. 1923
Piper, Fredrik Magnus, 1746–1824
MEA 3:420; SK 4:430; TB 27:77
Poulsson, Magnus, 1881–1958
NK 3:231–239; TBV 3:618

Rafn, Aage, 1890–1953
TB 27:565; TBV 4:12; WK 3:11–12
Rawert, Jørgen Henrik, 1751–1823
NK 2:228; TB 28:55–56; WK 3:29–30
Rehn, Jean Eric, 1717–1793
TB 28:95–96; Wahlberg 1983
Reinius, Leif, b. 1907
TBV 4:42

Revell, Viljo, 1910–1964
MEA 3:553; TBV 4:53; WWA 267–268
Rüse, Henrik, 1624–1679
TB 29:222–223; WK 3:99

Saarinen, Eliel, 1873–1950
MEA 3:625–633; TBV 4:139; WWA 278–281; Christ-Janer 1948; Hausen, Mikkola, and Amberg 1984
Samúelsson, Gudjón, 1887–1950
TBV 4:152
Schirmer, Adolf, 1850–1930
NK 3:466–467; TB 30:87
Schirmer, Heinrich Ernst, 1814–1887
NK 3:468; TB 30:268
Scholander, Fredrik Wilhelm, 1816–1881
MEA 4:4; SK 5:77–79; TB 30:241
Schou, Einar Oscar, 1877–1966
NK 3:495–497; TB 30:268
Schütz, Paul, d. 1576
SK 5:102; TB 30:318
Siren, Heikki, b. 1918
MEA 4:74; TBV 4:291; WWA 300
Sirén, Johan Sigfred, 1889–1961
MEA 4:74; TBV 4:291; WWA 299–300
Siren, Kaija, b. 1920
MEA 4:75; TBV 4:291; WWA 300
Sørensen, Carl Theodore, 1893–1985
MEA 4:105–106; TBV 4:310
Sonck, Lars, 1870–1956
MEA 4:104–105; TBV 4:317; WWA 306–307; Kivinen, Korvenmaa, and Salokorpi 1977
Steenwinckel, Hans van I, c. 1550–1601
TB 31:517–519; WK 3:269–271; Allgulin 1932
Steenwinckel, Hans van II, 1587–1639
TB 31:519–520; WK 3:270–272; WWA 308–309
Steenwinckel, Hans van III, 1639–1700
TB 31:520; WK 3:270–272
Steenwinckel, Lorenz van, 1585–1619
TB 31:521; WK 3:272–273
Stegmann, Povl, 1888–1944
MEA 4:121–122; TBV 4:351; WK 3:277–278
Stilling, Harald Conrad, 1815–1865
TB 32:53; WK 3:386–387
Stuckenbrock, Joachim Andreas, 1698–1756
TB 32:234
Stüler, Friedrich August, 1800–1865
MEA 4:147–148; TB 32:238–239; WWA 310
Sundvall, Carl Fredrik, 1754–1831
SK 5:321; TB 32:294

Tarjanne, Onni, 1864–1946
Tempelman, Olof, 1745–1816
TB 32:515; WWA 318
Tengbom, Ivar, 1878–1968
MEA 4:192–193; TB 32:525–526; WWA 318–319
Tessenow, Heinrich, 1876–1950
MEA 4:196–197; TB 32:552–553; TBV 4:429–430
Tessin, Nicodemus I, 1615–1681
MEA 4:197–199; TB 32:554; WWA 318
Tessin, Nicodemus II, 1654–1728
MEA 4:197–199; SK 5:410–414; TB 32:555; WWA 319–321
Thurah, Lauritz de, 1706–1759
TB 33:116–118; WK 3:399–401; WWA 323; Weilbach 1924
Tuscher, Marcus, 1705–1751
MEA 4:232; TB 33:503–504; WK 3:427–430

Utzon, Jørn, b. 1918
MEA 4:246; TBV 6:458; WWA 326–327

Vinckeboons, Justus, fl. 1651–1670
MEA 4:324; TB 34:388–389

Wahlman, Lars Israel, 1870–1952
MEA 4:361–362; SK 5:548–549; TB 35:59–60
Weitling, Otto, b. 1930
Wolff, Henning, 1828–1880
TB 36:200; WK 3:558–559

Notes

1 Prehistoric Scandinavia

1. The brief historical summaries given in this chapter are based on a vast literature of prehistoric studies. For general discussions of European prehistory the following may be consulted: Renfrew, *Before Civilization;* Clark, *World Prehistory;* and Phillips, *Prehistory of Europe.* The detailed accounts of archaeological investigations in Scandinavia are generally to be found in reports and journals in the Scandinavian languages. Useful introductory summaries in English, with bibliography, may be found in Stenberger, *Sweden;* Hagen, *Norway;* Kivikoski, *Finland;* and Klindt-Jensen, *Denmark before the Vikings.*

As for the dates in this chapter on prehistoric architecture, the traditional "BC" has been adopted, the dates themselves being those used by the National Museum in Copenhagen. This is admittedly an arbitrary choice, but it has been taken in order to spare the reader the complexities of what is in fact an enormous controversy. Consulting Renfrew, Clark, and Phillips on the subject of carbon-14 dating alone will reveal the extent of the problem. For a discussion of the Danish chronology see Tauber, "Radiocarbon Chronology," which predates the recalibration discussions of the later 1970s. A more recent summary of the whole matter is to be found in Ottaway, *Archaeology, Dendrochronology and the Radiocarbon Calibration Curve.*

Finally, since archaeological sites are perhaps not as easy for the would-be visitor to find as extant buildings in town or countryside, the reader is referred to two guidebooks for Denmark. Munksgaard, *Denmark: An Archeological Guide,* is in English. Thorvildsen and Kehler, *Med Arkaeologen Danmark rundt,* is in Danish. Both are supplied with maps and organized and indexed so as to be easy to use.

2. Becker, "Late Paleolithic Finds."

3. Becker, "En 8000-Årig stenalder boplads," and Clark, *Earlier Stone Age Settlements,* pp. 102–105.

4. See Skaarup, *Stengade;* Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* p. 16; Iwar Anderson, "Contribution"; and Drury, ed., *Structural Reconstruction,* pp. 1–5.

5. Winther, *Troldbjerg,* and Klindt-Jensen, *Denmark,* pp. 45–46.

6. Stenberger, *Sweden,* pp. 40–42. For fuller accounts see Florin, "Bauernhöfe und Fischerdörfer," and Florin, *Vråkulturen.*

7. Hagen, *Norway,* p. 60, and Reimers and Anker, "Trearkitektur," pp. 357–359.

8. Gjessing, *Circumpolar Stone Age,* pp. 46–54, and Hagen, *Norway,* pp. 370–371.

9. Ibid., pp. 73–74 and figure 22.

10. Kivikoski, *Finland,* pp. 36–37. For discussion of the later pyramidal tents of the Lapps, see Manker, *Lapsk kultur,* pp. 106–119, and Erixon, *Svensk byggnads kultur,* pp. 36–47.

11. The earlier view is set forth in Glob, "Barkaer," and Glob, *Danish Prehistoric Monuments,* pp. 72–75. The view that Barkaer is more probably a burial site is given in Madsen, "Earthen Long Barrows," pp. 3–6.

12. Stenberger, *Sweden,* pp. 42–44, and Glob, *Danish Prehistoric Monuments,* pp. 53–75.

13. Ibid., p. 65.

14. Elton, *Saxo Grammaticus,* pp. 13–14.

15. Stenberger, *Sweden,* pp. 45–47, and Glob, *Danish Prehistoric Monuments,* pp. 77–100.

16. Becker, "Grav eller temple?," and Glob, *Danish Prehistoric Monuments,* pp. 95–96.

17. Becker, "Hal og hus," and Lomborg, "Vadgård."

18. Glob, *Mound People,* pp. 127–131, and Larsen, "Gravhøje."

19. Stenberger, *Sweden,* pp. 107–109.

20. Becker, "To landsbyer," and Glob, *Danish Prehistoric Monuments,* pp. 240–242.

21. Stenberger and Klindt-Jensen, eds., *Vallhager,* 2:140–154, 997–998, and 1033–1064; and Stenberger, *Sweden,* pp. 140–143.

22. Todd, *Northern Barbarians,* pp. 95–112.

23. Myhre, "Gårdsanlegget på Ullandhaug"; Reimers and Anker, "Trearkitektur," pp. 358–361; Myhre, "Development of the Farm House"; and Myhre, "Views on the Building Techniques."

24. Glob, *Danish Prehistoric Monuments,* pp. 236–241.

25. Stenberger, *Sweden,* p. 138, and Cohen, *Viking Fortresses,* pp. 59–60.

26. Hagen, *Studier i jernalderens gårdssamfunn,* pp. 136–139, and Hagen, *Norway,* pp. 138–139.

27. Clark, *World Prehistory,* figure 68, p. 140; and Meist and Paasche, *Hannoverisches Wendland,* pp. 32–35.

28. Because so much has been written about Viking ships, settlements, and art, only a few general works are noted here. Among those readily available in English with good bibliographies are Jones, *History of the Vikings;* Foote and Wilson, *The Viking Achievement;* Magnus Magnusson, *Vikings!;* Randsborg, *Viking Age in Denmark;* Wilson, *The Vikings and Their Origins;* Sawyer, *Kings and Vikings;* and Logan, *The Vikings in History.* A detailed discussion of Viking art may be found in Wilson and Klindt-Jensen, *Viking Art,* while numerous good color photographs of Viking artifacts are included in Graham-Campbell and Kidd, *The Vikings,* and Magnus Magnusson, *Viking: Hammer of the North.* Two earlier works that may also be consulted are Brøndsted, *The Vikings,* and Arbman, *The Vikings.* More recent are the publications of two series of lectures and symposia, *Vikings in the West,* edited by Eleanor Guralnick, 1982, and *The Vikings,* edited by R. T. Farrell, 1982. Included in the latter is "Norsemen in America: A Select Bibliography 1950–1980," compiled by Louis A. Pitschmann.

29. Hamilton, *Excavations at Jarlshof,* pp. 102–111; Small, "The Norse Building Tradition in Shetland," pp. 248–150; and Crawford, *Scandinavian Scotland,* pp. 140–141.

30. Sverri Dahl, *Fornar toftir i Kvívík;* Sverri Dahl, "Survey of Archaeological Investigations"; Jones, *History of the Vikings,* pp. 269–272; Sverri Dahl, "Norse Settlement," pp. 66–71; Thorsteinsson, "Development of Faroese Settlements"; and Logan, *The Vikings in History,* pp. 58–61.

31. Roussell, "Stöng"; Roussell, "Det nordiske hus i vikingetid"; Eldjárn, "Viking Archaeology in Iceland"; Foote and Wilson, *The Viking Achievement,* pp. 149–158; Ingólfsson, "Saga-Age Farmhouse"; and Logan, *The Vikings in History,* pp. 61–70. See also Thór Magnússon, "Viking Age Settlement of Iceland." For the

dating of Stöng, a technique was used that perhaps does not often come to mind: tephrochronology, or dating by means of layers of airborne volcanic materials. See Eldjárn, "Two Medieval Farm Sites."

32. Nørlund, *Viking Settlers;* Roussell, *Farms and Churches;* Jones, *Norse Atlantic Saga,* pp. 50–54; Krogh, *Viking Greenland,* pp. 52–69; Albrethson, "Development of the Norse Farm"; and Logan, *The Vikings in History,* pp. 71–80.

33. An early description of this discovery is in Helge Ingstad, *Westward to Vinland.* The official excavation report is in Anne Stine Ingstad, *Discovery of a Norse Settlement.* For other commentary see Magnus Magnusson, *Viking Expansion Westward,* pp. 125–148, and Wahlgren, *Vikings and America,* pp. 122–125.

34. Magnus Magnusson, *Vikings!,* p. 244.

35. Ramskou, *Lindholm Høje,* and Foote and Wilson, *Viking Achievement,* pp. 150–152.

36. West, "Anglo-Saxon Village of West Stow," and Anne Stine Ingstad, *Discovery of a Norse Settlement,* pp. 185–192, 210–215.

37. Foote and Wilson, *Viking Achievement,* pp. 191–231; Randsborg, *Viking Age in Denmark,* pp. 71–96; Skovgaard-Petersen, "The Historical Context"; and Blindheim, "Emergence of Urban Communities."

38. Ramskou, *Hedeby;* Foote and Wilson, *Viking Achievement,* pp. 210–213; Magnus Magnusson, *Vikings!,* pp. 67–71; and Randsborg, *Viking Age in Denmark,* pp. 85–90. A recent report on the extensive excavations undertaken at Hedeby is Schietzel, *Stand der siedlungsarchäologischen Forschungen in Haithabu.*

39. James and Jameson, eds., *Journal of Jasper Danckaerts,* p. 63.

40. Benson, ed., *Peter Kalm's Travels,* 1:272.

41. Foote and Wilson, *Viking Achievement,* pp. 220–229.

42. De Paor, "Viking Towns of Ireland," and Murray, *Viking and Early Medieval Buildings,* pp. 1–2.

43. Harbison, *Archaeology of Ireland,* pp. 76–89, and Murray, "Houses and Other Structures." For an account of the controversy over the portion of the excavations known as the Wood Quay Site, see Bradley, ed., *Viking Dublin Exposed.*

44. Hall, *Excavations at York.*

45. Ibid., pp. 67–76.

46. The examples at West Stow have already been mentioned. See also Davison, "The Late Saxon Town of Thetford," pp. 191–192.

47. Tienhoven, "Information."

48. A large body of literature on the Viking camps has developed since the beginning of excavations at Trelleborg under Poul Nørlund in 1934. His own publication of the site, *Trelleborg,* and Cohen, *Viking Fortresses,* are major works in English. A discussion not only of Fyrkat but of all four of the camps, their relation to each other, and the many theories and speculations about them is given, along with extensive bibliography, in Olsen, Schmidt, and Roesdahl, *Fyrkat,* including English summaries, 1:205–241 and 2:185–207. The Roman foot, or more precisely a "reduced" Roman foot, has been assumed to be the basic unit of measurement for these camps. It has recently been suggested that this unit was instead the "Northern rod" (Huggins, Rodwell, and Rodwell, "Anglo-Saxon and Scandinavian Building Measurements," pp. 38–52).

49. Roesdahl, "Aggersborg," p. 119.

50. Schmidt, "Trelleborg House Reconsidered."

51. Roesdahl, "Aggersborg," pp. 118–119.

52. Harvey, *Medieval Architect,* pp. 19–21.

53. Vitruvius, *Ten Books,* pp. 22–27, and Vegetius, *Military Institutions,* pp. 82–85.

2 The Middle Ages

1. Derry, *History of Scandinavia,* pp. 36–63.

2. Ekhoff, *Svenska stavkyrkor,* pp. 148–179, and Lagerlöf and Stolt, *Hemse kyrkor,* pp. 181–191. The latter is one of the volumes in the inventory series called *Sveriges Kyrkor,* a province by province official survey of the churches of Sweden, including their structural history (and that of their predecessors), their liturgical furnishings (even if now in museums or other locations), and their paintings and sculptures. Begun in 1912, the individual parts of the volumes are being issued irregularly and are being written by authorities in the various fields of Swedish church art and architecture. In some cases there are English, French, or German summaries, and in some cases there are also figure captions in English. References to other parts in this series will be indicated by *SK.*

3. Anders Bugge, *Norwegian Stave Churches,* pp. 15–18, and Gunnar Bugge, *Stave Churches in Norway,* pp. 20–21.

4. Ekhoff, *Svenska stavkyrkor,* pp. 79–128, and also pp. 66–70 for fragments of similar eleventh-century planks at St. Andrew's Church, Greensted, Essex.

5. For notes on early Danish wooden churches see Elna Møller and Olaf Olsen, "Danske traekirker"; Krins, *Frühen Steinkirchen Dänemarks,* pp. 126–134; and Hugo Johannsen and Claus M. Smidt, *Danmarks Arkitektur. Kirkens huse,* pp. 10–13. The early wooden churches in Sweden are discussed in Ekhoff, *Svenska stavkyrkor;* Lundberg, *Byggnadskonsten i Sverige,* pp. 169–172; Andreas Lindblom, *Sveriges konsthistoria,* 1:45–52; and Ullén, *Medeltida träkyrkor I (SK),* pp. 225–229.

6. A recent account of the stave churches with an extensive bibliographical note is Håkon Christie, "Stavkirkene-Arkitektur." For discussions of the stave churches in English see Anders Bugge, *Norwegian Stave Churches;* Kavli, *Norwegian Architecture,* pp. 15–22; Dan Lindblom, *Stave Churches in Norway;* Anker and Aron Andersson, *Art of Scandinavia,* 1:200–447; and Gunnar Bugge, *Stave Churches in Norway.*

7. Dietrichson, *Norske stavkirker,* pp. 212–226; Anker and Aron Andersson, *Art of Scandinavia,* 1:201–225; Håkon Christie, "Stavkirkene-Arkitektur," pp. 212–213, 249–250 n7; and Gunnar Bugge, *Stave Churches in Norway,* pp. 52–53.

8. Detailed analyses of this system may be found in Aune, Sack, and Selberg, "The Stave Churches of Norway," and Gunnar Bugge, *Stave Churches in Norway,* pp. 7–18.

9. Dietrichson, *Norske stavkirker,* pp. 314–326; Anker and Aron Andersson, *Art of Scandinavia,* 1:273–274; and Gunnar Bugge, *Stave Churches in Norway,* pp. 66–67.

10. Dietrichson, *Norske stavkirker,* pp. 280–287; Anker and Aron Andersson, *Art of Scandinavia,* 1:225–235; Håkon Christie, "Stavkirkene-Arkitektur," pp. 149–153; and Gunnar Bugge, *Stave Churches in Norway,* pp. 64–65.

11. Dietrichson, *Norske stavkirker,* pp. 337–345.

12. The various theories are reviewed in Olsen, *Hørg, hov og kirke;* Anker and Aron Andersson, *Art of Scandinavia,* 1:386–394; and Håkon Christie, "Stavkirkene-Arkitektur," pp. 197–219. Theories of pagan origin for the mast type of stave church are largely based on the discovery in 1926 of postholes beneath the present church at Gamla Uppsala, together with the famous description of the "nobilissimum templum" at Uppsala by Adam of Bremen in the 1070s (Jones, *History of the Vikings,* pp. 326–327). There have been attempts to reconstruct this "temple," such as that by Conant (*Carolingian and Romanesque Architecture,* pp. 35–36), based on that by Lindqvist (*Gamla Uppsala Fornminnen*). Given that the remains are scanty at best, that Adam of Bremen was writing from hearsay rather than from his own observation, and that when the "temple" was built in the mid-eleventh century Christian churches had already been built in Scandinavia, is it not possible that the Gamla Uppsala building was not a prototype but a copy?

13. Moltke and Elna Møller, *Danmarks Kirker. Københavns Amt (DK),* 3:1267–1268. This volume is in

the Danish counterpart to the inventory series *Sveriges Kyrkor* described in note 2 above, beginning 1933. When it is not otherwise apparent, reference to other volumes in this series will be indicated by *DK* following the title. For Roskilde see also Bolvig, *Bykirker,* p. 182.

14. Exner, *Landsbykirker,* pp. 83–84, and Horskjaer, ed., *Danske kirker,* 13:201–203. The latter reference should not be confused with the *Danmarks Kirker* series. It is much smaller in size, also geographically arranged, well illustrated, and includes bibliographical references.

15. A general history of the wall paintings of this period is Nørlund, *Danmarks romanske kalkmalerier.* A guide to the medieval church paintings including the Gothic is found in Saxtorph, *Jeg ser på kalkmalerier.* The National Museum in Copenhagen has announced a forthcoming series on the church paintings, *Danske kalkmalerier,* to be published in seven volumes. The paintings at Råsted were analyzed for their possible relation to religious drama by Lise Gotfredsen in *Råsted kirke—spil og billede.*

16. Exner, *Landsbykirker,* p. 116, and Horskjaer, ed., *Danske kirker,* 11:263–264. For the portal sculptures see Mackeprang, *Jydske granitportaler,* pp. 211–217.

17. Bennett, *Botkyrka kyrka (SK).*

18. Muri, *Norsk Kyrkjer,* pp. 87–88.

19. Kristjánsson, *Churches of Iceland,* pp. 6–13.

20. Nørlund, *Viking Settlers,* p. 30.

21. Ibid., pp. 34–40.

22. Moltke and Elna Møller, *Danmarks Kirker. Københavns Amt,* 3:1285–1299.

23. Exner, *Landsbykirker,* p. 104, and Horskjaer, ed., *Danske kirker,* 2:15–20.

24. Lundberg, *Byggnadskonsten,* pp. 205–221; Cornell, *Svenska konstens historia,* 1:17–19; and Krins, *Frühen Steinkirchen* pp. 34–37.

25. Rydbeck, *Lunds domskyrkas byggnadshistoria,* pp. 15–48; Wrangel, *Lunds Domkyrkas konsthistoria,* pp. 141–201; and Hugo Johannsen and Claus M. Smidt, *Danmarks Arkitektur. Kirkens huse,* pp. 24–28.

26. Johnny Roosval, *Baltiska nordens kyrkor,* pp. 44–47.

27. Rydbeck, "Italienske inflytande"; Graebe, *Kyrkorna i Vä (SK),* pp. 11–117; and Lundberg, *Byggnadskonsten,* pp. 231–235.

28. Horskjaer, ed., *Danske kirker,* 17:19–49; Bolvig, *Bykirker,* pp. 166–171; Villadsen, *Ribe Domkirke;* and Elna Møller, *Danmarks Kirker. Ribe Amt,* 1/2:61–84 and 3/4:145–272.

29. Lidén, *Mariakirken,* pp. 23–66; Anker and Aron Andersson, *Art of Scandinavia,* 2:158–160; Lidén and Magerøy, *Norges kirker. Bergen,* 1:9–50; and Lidén, "Middelalderens steinarkitektur," pp. 40–41.

30. Gerhard Fischer, *Domkirken i Stavanger;* Anker and Aron Andersson, *Art of Scandinavia,* 2:153; and Lidén, "Middelalderens steinarkitektur," pp. 85–88.

31. Gerhard Fischer, *Domkirken i Trondheim,* 1:43–98; Gerhard Fischer, *Nidaros Domkirke;* Lysaker, *Domkirken i Trondheim;* and Lidén, "Middelalderens steinarkitektur," pp. 69–84.

32. Krins, *Frühen Steinkirchen Dänemarks,* pp. 73–84; Horskjaer, ed., *Danske kirker,* 14:324–327.

33. Lundberg, *Byggnadskonsten,* pp. 370–371; Cornell, *Svenska konstens historia,* 1:46–49; Swartling, "Cistercian Abbey Churches"; and Anker and Aron Andersson, *Art of Scandinavia,* 2:176–178.

34. Conant, *Carolingian and Romanesque Architecture,* pp. 126–134.

35. Hermansen and Nørlund, *Danmarks Kirker. Sorø Amt,* 1:107–137; Horskjaer, ed., *Danske kirker,* 4:14–24; and Bolvig, *Bykirker,* pp. 182–189.

36. Hermansen and Nørlund, *Danmarks Kirker. Sorø Amt,* 1:17–53; Horskjaer, ed., *Danske kirker,* 4:38–49; and Bolvig, *Bykirker,* pp. 219–227.

37. Frölén, *Nordens befästa rundkyrkor;* Anker and Aron Andersson, *Art of Scandinavia,* 2:142–149; Hugo Johannsen and Claus M. Smidt, *Danmarks Arkitektur. Kirkens huse,* pp. 53–55; and Johan Lange, *Vaern og våben,* pp. 103–115.

38. Norn, Schultz, and Skov, *Danmarks Kirker. Bornholm,* pp. 383–431; Horskjaer, ed., *Danske kirker,* 19:97–101; and Exner, *Landsbykirker,* p. 120. The other three are Nylars, Nykirke, and Ols, described in Norn, Schultz, and Skov, *Danmarks Kirker. Bornholm,* pp. 199–222, 244–274, and 335–362.

39. For Bjernede see Hermansen and Nørlund, *Danmarks Kirker. Sorø Amt,* 1:351–363; Horskjaer, ed., *Danske kirker,* 4:64–69, and Exner, *Landsbykirker,* p. 25. For Thorsager see Horskjaer, ed., *Danske kirker,* 13:226–229, and Exner, *Landsbykirker,* p. 99.

40. Carl M. Smidt, *Kalundborg;* Bencard, "Om Kalundborg kirke"; Horskjaer, ed., *Danske kirker,* 2:20–28; and Bolvig, *Bykirker,* pp. 70–72.

41. A painting of Kalundborg by Johan Thomas Lundbye, 1837, now in the State Museum of Art, Copenhagen, shows the cathedral without its central tower.

42. Moltke and Elna Møller, *Danmarks Kirker. Københavns Amt,* 3:1267–1332; Horskjaer, ed., *Danske kirker,* 3:29–37; and Bolvig, *Bykirker,* pp. 182–189.

43. Lorenzen, *Danske cistercienserklosters bygningshistorie,* pp. 1–18 and 62–95; Moltke and Møller, *Danmarks Kirker. Sønderjylland,* 2:1050–1095; Horskjaer, ed., *Danske kirker,* 18:37–46; and Exner, *Landsbykirker,* pp. 67–68.

44. See Johnny Roosval, *Baltiska nordens kyrkor.*

45. Horskjaer, ed., *Danske kirker,* 7:30–42, and Bolvig, *Bykirker,* pp. 150–154.

46. Horskjaer, ed., *Danske kirker,* 14:33–53; Vibeke Michelsen and Licht, *Danmarks Kirker. Århus Amt,* 1:125–383; and Bolvig, *Bykirker,* pp. 269–273.

47. Hermansen, Roussell, and Steenberg, *Danmarks Kirker. København,* 1:9–12, and Claus M. Smidt, *Vor Frue Kirke,* pp. 9–10.

48. Hermansen, Roussell, and Steenberg, *Danmarks Kirker. København,* 1:13–30, and Claus M. Smidt, *Vor Frue Kirke,* pp. 11–15.

49. Johnny Roosval, *Baltiska nordens kyrkor,* pp. 128–130.

50. Rinne, *Åbo Domkyrka,* pp. 12–26; Nils E. Wickberg, *Finnish Architecture,* pp. 24–27; Gardberg, "Åbo Domkyrka"; and Richards, *800 Years,* pp. 27–29.

51. Boëthius and Romdahl, *Uppsala Domkyrka;* Lundberg, *Byggnadskonsten,* 1:486–497; Andreas Lindblom, *Sveriges konsthistoria,* 1:173–179; and Cornell, *Svenska konstens historia,* 1:115–117.

52. Ibid., pp. 115–116; English translation in Bumpus, *Cathedrals,* p. 178.

53. Johnny Roosval, *S. Nikolai eller Storkyrkan* (*SK*), pp. 206–263.

54. Gunnar Svahnström, *Visby Domkyrka* (*SK*), pp. 113–195.

55. Gunnar Svahnström and Karin Svahnström, *Visby Domkyrka* (*SK*), pp. 140–148.

56. Lundmark, *Tingstäde kyrka* (*SK*).

57. Romdahl, *Linköpings domkyrka,* pp. 11–127, and Cnattingius et al., *Linköpings domkyrka* (*SK*), pp. 242–275.

58. Gerhard Fischer, *Domkirken i Trondheim,* 1:99–358.

59. Gerhard Fischer, *Domkirken i Stavanger,* pp. 49–81, and Lidén, "Middelalderens steinarkitektur," pp. 85–88.

60. Sverri Dahl, "Extracts from a Lecture on Kirkjubøur," and Jessen, "Magnus-Katedralen."

61. In this account of Scandinavian architecture no attempt is made to deal fully with the multitudinous problems of conservation. Here at Kirkjubøur out in the North Atlantic, at least, one might expect a minimum of difficulty, but this is not the case. The shell mortar is being attacked by acid rain from the Continent, causing the structure to become increasingly

unstable and raising questions about how to safeguard and use this much-beloved building.

62. Roussell, *Farms and Churches,* pp. 119–126, and Krogh, *Viking Greenland,* pp. 93–99.

63. Berthelson, *Studier i Birgittinerordens byggnadskick,* pp. 9–20, and Iwar Anderson, *Vadstena gård och kloster,* 1:136–148.

64. Horskjaer, ed., *Danske kirker,* 13:138–139, and Exner, *Landsbykirker,* p. 54.

65. Saxtorph, *Jeg ser på kalkmalerier.* Additional illustrations can be found in Broby-Johansen, *Det danske Billedbibel,* and Franceschi and Hjort, *Kalkmalerier fra danske landsbykirker.* The first of a projected iconographical study of the Danish paintings is Banning, ed., *Catalogue of Wall-Paintings.*

66. Erichs and Wilcke-Lindqvist, *Kyrkor i Närdinghundra härad (SK),* pp. 221–267. An account of the Swedish paintings, with extensive bibliography, is in Söderberg, *Svenska kyrkomålningar.*

67. A discussion of the baldachin paintings, with bibliography, is in Wichström, "Maleriet i høymiddelalderen," pp. 263–270.

68. Sárkány, "Finströms kyrka." See also the general discussion in Kronqvist, "Mittelalterliche Kirchenarchitektur."

69. For an extensive bibliography of the literature on medieval Scandinavian churches, 1950–1982, see "Kirkearkaeologisk litteratur i Norden."

70. The following articles that summarize these studies, with bibliography, are in Barley, ed., *European Towns*: Nyberg, "Denmark," pp. 65–81; Lidén, "Urban Archaeology in Norway," pp. 83–101; and Ambrosiani and Hans Andersson, "Urban Archaeology in Sweden," pp. 123–126.

71. Lebech, *Danske købstaeder,* 1:127–128, and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 13–15.

72. Ekhoff and Janse, *Visby stadsmur,* and Wåhlin, *Visby,* pp. 34–42.

73. Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:1–47, and Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 17–18. See also Hahr, *Nordiska Borgar,* pp. 27–132, and Tuulse, *Burgen des Abenlands,* pp. 197–204.

74. Ramsing, *Københavns historie,* 1:7–12.

75. Martin Olsson, ed., *Stockholms Slotts historia,* 1:31–60. For the early stone walls of Stockholm's Old City see Hansson, *Stockholms stadsmurar,* pp. 86–171. The painting *Vädersolstavlan* is the earliest known view of Stockholm.

76. The earlier defenses in Norway are discussed in Gerhard Fischer, *Norske kongeborger.* For a full account of King Håkon Håkonsson's building in Bergen, see Gerhard Fischer and Dorothea Fischer, *Norske Kongeborger. Bergenhus.* A summary is found in Lidén, "Middelalderens steinarkitektur," pp. 109–113.

77. King Håkon Håkonsson was a friend of King Henry III of England, whose master builder was Henry of Reynes, the architect of Westminster Abbey. There has been speculation that Henry of Reynes was the builder of Håkon's Hall (Simpson, *Castle of Bergen*).

78. Kronqvist, *Åbo slott,* and Gardberg, *Åbo slott.*

79. Nils E. Wickberg, *Finnish Architecture,* pp. 34–35, and Olof af Hällström, *Sveaborg.*

80. Rydbeck, *Glimmingehus,* pp. 3–30, and Kjellberg, *Skåne,* 3:61–81.

81. For a brief history of the development of European town halls from the twelfth to the fifteenth centuries see Pevsner, *History of Building Types,* pp. 53–62.

82. Tidemand-Dal, "Gildhuset i Naestved"; Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* pp. 21–22; and Aage Andersen, *Middelalderbyen Naestved,* pp. 85–86.

3 The Renaissance in Scandinavia

1. Derry, *History of Scandinavia,* pp. 86–95.

2. The Netherlandish works are discussed in Hitchcock, *Netherlandish Scrolled Gables,* pp. 33–47.

3. Roussell, ed., *Danske slotte,* 1:353–370. The sixteenth-century Danish manor houses are discussed in Hahr, *Nordiska Borgar,* pp. 151–174.

4. Eriksen, *Om vaelske gavle;* Norn, *Hesselagergaard;* and Roussell, ed., *Danske slotte,* 8:7–20.

5. Ibid., 8:128–155.

6. Hahr, "Torup"; Lundberg, "Torups Slott"; Kjellberg and Svensson, eds., *Slott och herresäten, Skåne,* 1:343–365; and Söderberg, *Manor Houses,* p. 38.

7. Norn, *Christian III's borge,* 1:82–91, and Söderberg, *Riksfästen,* pp. 177–200.

8. Strömbon, *Gripsholm,* pp. 18–62; Westlund, *Gripsholm under Vasatiden;* Wollin, "Gripsholmsföreningen och restaureringen"; Malmborg, ed., *Gripsholm;* and Malmborg, *Kungliga slotten* 2:9–84.

9. Andreas Lindblom, *Vadstena;* Unnerbäck, *Vadstena slott;* and Söderberg, *Riksfästen,* pp. 286–320.

10. Martin Olsson, *Kalmar slotts historia,* and Söderberg, *Riksfästen,* pp. 79–138.

11. Martin Olsson, *Kalmar slotts kyrkor,* pp. 34–48. See also Hahr, *Architektenfamilie Pahr,* pp. 56–92.

12. Hahr, *Uppsala slott,* and Söderberg, *Riksfästen,* pp. 232–265.

13. Andreas Lindblom, *Stockholms slott;* Malmborg, *Kungliga slotten,* 1:112–132; and Martin Olsson, ed., *Stockholms slotts historia,* 1:61–86.

14. Kloster and Gerhard Fischer, *Rosencrantz Tower,* and Lexow, "Arkitektur 1536–1814," pp. 13–15.

15. Ibid., p. 65.

16. Beckett, *Frederiksborg,* pp. 1–249; Weilbach, *Frederiksborg Slot;* Roussell, ed., *Danske slotte,* 1:83–86; and Honnens de Lichtenberg, "Frederik II's Frederiksborg."

17. Wanscher, *Kronborgs historie;* Christensen, *Kronborg;* Weilbach, *Kronborg Castle;* Norn, *Kronborg;* and Roussell, ed., *Danske slotte,* 1:11–52. The earliest stages of Kronborg and possible sources for the design of its walls in the late fourteenth century are discussed in Langberg, "Castle of Elsinore." A brief discussion of the work of individual builders and sculptors under Frederik II is in Skovgaard, *King's Architecture,* pp. 17–25. For eighteenth-century views and comments see Thurah, *Danske Vitruvius,* 2:67–75 and plates 28–30. For discussion of Thurah and of his great publication see below, chapter 4.

18. Beckett, *Uraniborg;* Martin Olsson, *Uraniborg,* pp. 3–23; and Jern, *Uraniborg.* Tycho Brahe set forth his idea of the site for astronomical observations as follows: "First of all, the place should be in a high locality from where there is a free view round the whole horizon, without woods or mountains or other buildings intervening. It is also preferable that it is a solitary place, free from the commotion of the common herd, where it is possible to enjoy philosophical tranquility," in Raeder, Strömgren, and Strömgren, trans. and eds., *Tycho Brahe's Description,* p. 121.

19. Allgulin, *Hans van Steenwinckel d.ä.,* pp. 39–60.

20. Kidd, ed., *Documents,* p. 199. For the Reformed liturgies and church furnishings see Hamberg, *Tempelbygge,* pp. 149–230, and Johannsen and Claus M. Smidt, *Danmarks Ariktektur. Kirkens huse,* pp. 110–135.

21. Moltke and Elna Møller, *Danmarks Kirker. Frederiksborg Amt,* 3:2023–2118; Exner, *Landsbykirker,* pp. 90–91; and Horskjaer, ed., *Danske kirker, 3:252–256.*

22. Christian A. Jensen and Hermansen, *Danmarks Kirker. Praestø Amt,* 1:294–300.

23. Skovgaard's *King's Architecture* is the most extensive account in English of the architectural activities of Christian IV. See also Wanscher, *Christian IV's bygninger,* Stein, "Christian IV," and Heiberg, ed., *Christian IV and Europe,* pp. 462–505.

24. Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:170.

25. Among the major publications on Frederiksborg are Thurah, *Danske Vitruvius,* 2:3–60 and plates 4–18; Wanscher, *Christian IV's bygninger,* pp. 41–62; Steenberg, *Christian IV's Frederiksborg;* and Roussell, ed., *Danske slotte,* 1:83–110. For gardens at Frederiksborg see Hakon Lund, *Kongelige lysthaver,* pp. 108–120. For the Chapel see Moltke and Elna Møller, *Danmarks Kirker. Frederiksborg Amt,* 3:1673–1778.

26. The original fountain was seized as booty by the Swedes in 1660 and is now at Drottningholm.

27. Skovgaard, *King's Architecture,* pp. 45–51.

28. Bligaard, "Privy Passage."

29. Molesworth, *Account of Denmark,* quoted in Skovgaard, *King's Architecture,* p. 67.

30. Thurah, *Danske Vitruvius,* 1:43–54 and plates 24–34; Wanscher, *Christian IV's bygninger,* pp. 64–72, 80–84, 89–98, and 150–154; and Heiberg, ed., *Christian IV and Europe,* pp. 471–473. For the gardens at Rosenborg see Lund, *Kongelige lysthaver,* pp. 15–40.

31. Thurah, *Danske Vitruvius,* 3:68–69 and plate 41.

32. Ibid., 1:61–63 and plates 53–55; Wanscher, *Christian IV's bygninger,* pp. 114–123; and Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* pp. 28–30.

33. Christian IV's desire to encourage trade with India led him to send the merchant Ove Giedde to Ceylon, near where the Danish trading post of Tranquebar was founded in 1620. This is the source of the name for the faience pattern designed for the Royal Copenhagen Porcelain Manufactory by Christian Joachim in 1914. The Danish buildings in Tranquebar are discussed in Pedersen, "Tranquebars danske huse."

34. Lorenzen, ed., *Christian IV's Byanlaege,* pp. 73–75, and Lebech, *Nyboder.*

35. Langberg, ed., *Hvem Byggede Hvad,* 1:24–25.

36. Lorenzen, *Jens Bangs Stenhus,* pp. 12–25.

37. Cederström, *Kristianstad;* Lorenzen, ed., *Christian IV's Byanlaege,* pp. 160–173; Sandblad, *Skånsk stadsplanekonst,* pp. 283–287; and Eimer, *Stadtplanung,* pp. 154–155.

38. Lorenzen, ed., *Christian IV's Byanlaege,* pp. 83–96; Lebech, *Christianshavn,* pp. 12–24; Eimer, *Stadtplanung,* pp. 157–158; and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 22–23.

39. Lorenzen, ed., *Christian IV's Byanlaege,* pp. 254–281, and Gerhard Fischer, *Oslo under Eiksberg,* pp. 31–48.

40. Sinding-Larsen, *Akershus,* 1:51–125 and 2:9–146; Arno Berg, *Akershus slott,* 2:20–80; Stenseng, *Akershus Castle;* and Mamen, *Akershus.*

41. Moltke and Elna Møller, *Danmarks Kirker. København Amt,* 3:1504–1526.

42. Lundborg, *Heliga Trefaldighetskyrkan,* pp. 25–82, and Wanscher, *Christian IV's bygninger,* pp. 105–113.

43. The suggestion has been made that Christian IV designed the chapel at Roskilde himself, on the grounds that Lorenz van Steenwinckel would have been unlikely to put a column so awkwardly in the center of the room (Skovgaard, *King's Architecture,* p. 79). The columns of the cross aisle at Holy Trinity Church in Kristianstad interrupt this central space in the same manner, however, and in neither building was the affected area likely to be used for processions.

44. Friis, *Orgelbygning i Danmark,* pp. 37–41. No satisfactory history of the organ cases built for the Renaissance and Baroque churches in the Scandinavian countries has been written. The organ works themselves have rarely survived, the casings now generally housing rebuilds or entirely new instruments.

45. Steenberg, *Danmarks Kirker. København,* 2:3–70; Horskjaer, ed., *Danske kirker,* 1:86–90; and Bolvig, *Bykirker,* pp. 93–100.

46. Steenberg, *Danmarks Kirker. København,* 2:225–250 and 265–288; Horskjaer, ed., *Danske kirker,* 1:172–177; and Bolvig, *Bykirker,* pp. 118–121.

47. Steenberg, *Danmarks Kirker. København,* 2:251–265; Steenberg, *Rundtaarn;* Stein, "Rundetaarns gaade"; and Svendsen, *Rundtårn opklaret.*

48. Johnson, *Swedish Settlements on the Delaware.*

49. Masson, *Queen Christina,* pp. 127–132. In September of 1649 Descartes was invited to Stockholm to instruct the queen in his new philosophy. Wherever his lodgings may have been, appearances in the drafty old castle at five o'clock in the morning led to his illness and death the following February.

50. Andreas Lindblom, *Sveriges konsthistoria,* 2:360–361.

51. Sirén, *Gamla Stockholmshus,* 1:11–13, and Andreas Lindblom, *Sveriges konsthistoria,* 1:359–360 and 399.

52. Söderberg, *Närke. Västmanland,* pp. 381–403.

53. Sirén, *Gamla Stockholmshus,* 1:28–34; Silfverstolpe, "Riddarhuspalatset," pp. 85–196; Karling, "Simon de La Vallée."

54. Lexow, "Arkitektur 1536–1814," pp. 55–58.

55. Lundmark, *Sankt Jakobs Kyrka (SK),* pp. 229–310.

56. Flodin, *Tyresö kyrka (SK),* pp. 25–51.

4 Scandinavian Baroque and Rococo

1. Krabbe, *Kastellet,* pp. 17–109.

2. Anderson, *Karlskrona,* pp. 13–36, and Eimer, *Stadtplanung,* pp. 483–509. Count Erik Dahlberg was a military engineer whose topographical drawings are a valuable source of information about Swedish and Finnish buildings in the late seventeenth century. The drawings were engraved and published in three volumes as *Suecia antiqua et hodierna,* 1693–1714. For his interest in city planning see Eimer, *Stadtplanung,* pp. 395–409 and 510–532.

3. Fett and Schnitler, eds., *Norsk Kunsthistorie,* 1:206, and Henry Berg, *Trondheim før Cicignon,* p. 17.

4. Engqvist, *Sønderjyske byen,* pp. 84–95.

5. Josephson, *Tessin,* 2:109–118, and Eimer, *Stadtplanung,* pp. 541–562.

6. Nordenstreng, *Fredrickshamn,* pp. 19–27.

7. Silfverstolpe and Stavenow, *Drottningholm;* Malmborg, *Drottningholm;* and Malmborg, *Kungliga slotten,* 2:183–241. For the gardens see Ahlberg, *Svenska trädgaardskonsten,* 1:77–85, and Karling, *Trädgårdkonstens historia i Sverige,* pp. 408–414.

8. Thurah's illustration is similar to a painting of Sophie Amalienborg at Ledreborg, both of which are dated long after the Copenhagen palace was destroyed. Both views probably had a common source, now lost. See comments by Lund in Thurah, *Danske Vitruvius,* 3:350–351, and Linvald, *Sophie Amalienborg,* pp. 8–10. For the gardens see Lund, *Kongelige lysthaver,* pp. 41–54.

9. Weilbach, *Charlottenborg,* pp. 3–55; Roussell, ed., *Danske slotte,* 2:253–270; and Thurah, *Danske Vitruvius,* 1:54–56. For the gardens see Lund, *Kongelige lysthaver,* pp. 257–260.

10. Josephson, *Tessin i Danmark,* pp. 25–84. For a shorter account see Josephson, *Tessin,* 1:80–85.

11. Ironically it was a small theater built close to the Sophie Amalienborg in 1689 that caught fire during its second performance and caused the burning of the palace as well. The episode is described in Overskou, *Danske Skueplads,* 1:117.

12. Lindblom, *Stockholms slott,* pp. 42–68; Josephson, *Tessin,* 2:70–98; Martin Olsson, ed., *Stockholms slotts historie;* and Setterwall, *The Royal Palace, Stockholm.* A more recent study that reexamines the project in detail and includes reproductions of Tessin's drawings and an analytical catalogue is Kommer, *Nicodemus Tessin der Jüngere und das Stockholmer Schloss.* For Rehn's work on the interiors see Wahlberg, *Jean Eric Rehn,* pp. 31–61.

13. Josephson, *Tessin,* 1:49–52. In 1687 as Royal Architect Tessin visited Versailles, where Le Nôtre himself showed him the gardens. In 1705 he offered a design for the rebuilding of the Louvre, but it was

not accepted (ibid., 1:72–73 and 97–106).

14. Weilbach, *Frederiksberg slot,* pp. 28–51; Nystrøm, *Frederiksbergs historie;* Roussell, ed., *Danske slotte,* 2:281–322; and Thurah, *Danske Vitruvius,* 2:110–114. For the park and gardens see Lund, *Kongelige lysthaver,* pp. 61–107.

15. Steenberg, *Danmarks Kirker. København,* 3:341–370; Horskjaer, ed., *Danske kirker,* 1:49–51; and Bolvig, *Bykirker,* pp. 82–84.

16. Barrow, *Excursions,* p. 192.

17. Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:81–84.

18. Ibid., 1:98–99. For the Castle Chapel see Birgitte-Boggild Johannsen, *Danmarks Kirker. København,* 5:22–35 and 67–81.

19. Thurah, *Danske Vitruvius,* 2:62–67; Steenberg, *Fredensborg;* Helsted, *Dronning Juliane Marie og Fredensborg slot;* Roussell, ed., *Danske slotte,* 1:131–164; and Steenberg, "Fredensborg Interiorer." See also Lund, *Kongelige lysthaver,* pp. 121–205.

20. Ehbisch also designed two pulpits for the Copenhagen Palace chapel, one of which was built (Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:157–161, figures 176 and 177). For the Fredensborg chapel see Moltke and Elna Møller, *Danmarks Kirker. Frederiksborg Amt,* 2:797–821, and Jørgen Høj Madsen, "Fredensborg slotskirke."

21. Hopstock and Tschudi-Madsen, *Rosendal,* and Lexow, "Arkitektur 1536–1814," pp. 58–60.

22. Andrén, *Skokloster.* For the gardens see Karling, *Trädgårdkonstens historia i Sverige,* pp. 468–478.

23. Langberg, *Clausholms bygningshistorie,* and Roussell, ed., *Danske slotte,* 14:77–98.

24. The organ in the chapel was probably originally built in the sixteenth century, by an unknown builder, and rebuilt in the seventeenth century. During restoration of the instrument in 1964 the bellows were found to have been lined with fragments of music, some of which turned out to be parts of a cycle of *Magnificat* settings by the German organist and composer Jacob Praetorius (1586–1651) (Friis, *Orgelbygning,* pp. 87–89).

25. Wrangel, *Tessinska Palatset,* pp. 5–25; Siren, "Tessinska palatset"; and Josephson, *Tessin,* 2:176–180.

26. Schiøtt, "Frederik III's Biblioteks og kunstkammerbygning."

27. Rosell and Bennett, *Kalmar Domkyrka (SK),* pp. 9–164.

28. Steenberg, *Danmarks Kirker. København,* 2:484–503; Thurah, *Danske Vitruvius,* 1:80–83; Horskjaer, ed., *Danske kirker,* 1:189–195; and Bolvig, *Bykirker,* pp. 122–125.

29. Josephson, *Tessin i Danmark,* pp. 121–135. The altar was based on Bernini's altar in SS. Domenico e Sisto in Rome, of which Tessin had made a sketch (ibid., figure 89).

30. Friis, *Orgelbygning,* pp. 84–87. During restoration in 1965 it was found that the organ was leaning away from the tower. Arnolt Schlick had warned against such dangers in his treatise on organ building of 1511 (quoted in Berry, "Arnolt Schlick's Spiegel," p. 80).

31. Steenberg, *Danmarks Kirker. København,* 3:24–67; Thurah, *Danske Vitruvius,* 1:84; Horskjaer, ed., *Danske kirker,* 1:227–231; and Bolvig, *Bykirker,* pp. 107–110.

32. For a brief discussion of Continental Protestant architecture before the seventeenth century see Donnelly, *New England Meeting Houses,* pp. 20–35.

33. Lexow, "Arkitektur 1536–1814," p. 43, and Muri, *Norske Kyrkjer,* p. 210.

34. Arno Berg, *Vor Frelsers Kirke,* and Muri, *Norske Kyrkjer,* pp. 43–44.

35. Thurah, *Danske Vitruvius,* 1:27–43 and plates 8–23, and Roussell, ed., *Danske slotte,* 2:26–40. A full account of the first Christiansborg project is given in

Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:181–258, with a summary in English, pp. 395–401.

36. Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 56–61.

37. Langberg, *Danmarks bygningskultur,* 1:276 and figure 256, and Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:167–198.

38. Thurah, *Danske Vitruvius,* 1:90, and plates 48–52.

39. Ibid., 1:41–42, and plates 17–21, and Birgitte-Boggild Johannsen, *Danmarks Kirker. København,* 5:99–175. The pulpit was designed by Louis-Augustus LeClerc. For the organ by Lambert Daniel Kastens see Friis, *Orgelbygning,* pp. 128–130. See also Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:292–297.

40. Donnelly, "Theaters in the Courts," pp. 328–340.

41. The text of the proclamation of March 31, 1738, is translated in Marker and Marker, *Scandinavian Theatre,* p. 69: ". . . no play actors, rope dancers, conjurers, or those who run so-called games of chance shall be found in Denmark or Norway, nor shall their plays and routines anywhere be performed or exercised."

42. Thurah, *Danske Vitruvius,* 1:64–68 and plates 49–64, and Hermansen, Roussell, and Steenberg, *Danmarks Kirker. København,* 1:113–136.

43. Thurah, *Danske Vitruvius,* 1:53–54 and plates 30–34, and Roussell, ed., *Danske slotte,* 2:57–66.

44. Overskou, *Danske Skueplads,* 2:27–47.

45. Thurah, *Danske Vitruvius,* 3:64 and plate 32.

46. Ibid., 1:57–59 and plates 44 and 47; 3:45 and plate 14.

47. Ibid., 1:53–54 and plates 21–25; Roussell, ed., *Danske Slotte,* 2:141–190; Viggo Sten Møller, *Amalienborg;* and Elling, *Amalienborg Interiors.*

48. Weilbach, *Architekten Lauritz Thura,* pp. 173–185. Baptized Laurids Thurah, he adopted the later version of his name after receiving letters of nobility in 1740. Weilbach's biography remains the principal source for Thurah's life and work. For an account of the preparation and publication of *Den Danske Vitruvius* and its place in Thurah's career, see the comments by the editor of the 1967 edition, Hakon Lund, appended to each volume, in Danish, French, and German. Lund also wrote on each of the buildings, clarifying Thurah's remarks and commenting on the later histories of the buildings.

49. Meldahl and Johansen, *Kongelige akademi,* pp. 8–69; Poulsen, Lassen, and Danielsen, eds., *Dansk Kunst Historie,* 3:11–21; and Pevsner, *Academies of Art,* pp. 155–156.

50. Meldahl and Johansen, *Kongelige akademi,* pp. 69–71.

51. Thurah, *Danske Vitruvius,* 1:85–87 and plates 90–95.

52. Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 1:197.

53. Thurah, *Danske Vitruvius,* 1:91 and plate 107, and Elling, "Arkitekten Philip de Lange."

54. Christian A. Jensen and Hermansen, *Danmarks Kirker. Præstø Amt,* 2:1008–1013; Exner, *Landsbykirker,* pp. 30–31; and Horskjaer, ed., *Danske kirker,* 6:269–270.

55. Donnelly, *New England Meeting Houses,* pp. 91–108.

56. Lindblom, *Sveriges konsthistoria,* 2:613.

57. Hirn, *Sveaborg,* and Hällström, *Sveaborg.*

58. Stavenow, *Hårleman,* pp. 149–157. For later proposals for further remodeling of Svartsjö by the Swedish-born English architect Sir William Chambers, see Harris, *Sir William Chambers,* pp. 87–88 and plates 127 and 128.

59. Roussell, ed., *Danske slotte,* 1:301–326.

60. Ibid., 1:53–66, and Hartmann and Villadsen, *Dan-*

marks Arkitektur. Byens huse. Byens plan, pp. 103–105. For the Marienlyst gardens see Lund, *Kongelige lysthaver,* pp. 243–252.

61. Weilbach, *Arkitekten C. F. Harsdorff,* pp. 153–163, and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 107–109. The attentive observer will note, however, that the Ionic capitals of these pilasters are presented with their rolls to the street, rather than with their volutes in the normal fashion.

62. Lexow, "Arkitektur 1536–1814," pp. 78–80.

63. Ibid., pp. 98–110.

64. Malmborg, *Kungliga slotten,* pp. 242–252. The first pavilion of 1753 was built as a birthday gift for Queen Lovisa Ulrica and, becoming unsound, was demolished in 1763 to make way for the present building. Much of the queen's collection of Chinese furnishings and objects of art remain there. An extensive account of both buildings, the collections, the landscaping, and the restorations is given in Setterwall, Fogelmarck, and Gyllensvärd, *Chinese Pavilion.* See also Wahlberg, *Jean Erik Rehn,* pp. 75–79, and Hardy, "Historic Houses: Fantasy at Kina Slott."

65. Karling, *Tyresö Slott,* and Söderberg, *Södermanland,* 2:255–271.

66. Roussell, ed., *Danske slotte,* 5:397–406, and Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 25–28. An extensive account of such gardens in Denmark is by Elling, *Romantiske Have.*

67. Muri, *Norske Kyrkjer,* pp. 69–71, and Lexow, "Arkitektur 1536–1814," pp. 48–49. Lexow calls attention to the work by the German mathematician Leonhard Christoph Sturm, *Architectonisches Bedenken,* which was known and used in Norway. See also Bugge and Alsvik, eds., *Norges Kirker. Kongsberg Kirke,* pp. 59–78.

68. Muri, *Norske Kyrkjer,* pp. 97–98, and Ødegaard, *Om Kjerke på Røros.*

69. Mannström, *Adolf Fredriks Kyrka (SK),* pp. 62–75, and Fogelmarck, *Carl Fredrik Adelcrantz,* pp. 147–160 and 389–392.

70. Meldahl, *Frederikskirken,* pp. 52–65.

71. Langberg, *Danmarks bygningskultur,* 1:5–8, and Lund and Millech, eds., *Danmarks bygningskunst,* pp. 277–291.

72. Weilbach, *Arkitekten C. F. Harsdorff,* pp. 58–71.

73. Hiort, "Andreas Kirkerup's Islandske kirke."

74. Beijer, *Court Theatres,* p. 7. The original architect is not known, but a member of the Bibiena family of designers has been suggested as a possibility (Donnelly, "Theaters in the Courts," pp. 333–334).

75. Fogelmarck, *Carl Fredrik Adelcrantz,* pp. 189–195 and 303–313; Malmborg, *Kungliga slotten,* 1:253–258; and Eklund and Stribolt, *Bollhuset och Dramaten,* pp. 8–15. Beijer's *Court Theatres* illustrates a large collection of drawings for the buildings and the sets, with commentary. On the staff of the Royal Library in Stockholm, in 1921 Beijer recognized the importance of the building and its contents, then stored in warehouse fashion, and led efforts for restoration.

76. Neiiendam, *Hofteatret,* pp. 8–12.

77. Stavenow, *Carl Hårleman,* pp. 197–199, and Alm, "Stockholms observatorium."

78. Setterwall, "Stockholms börsbyggnad," and Setterwall, *Erik Palmstedt,* pp. 52–89.

79. Fogelmarck, "Gustav III's Opera"; Fogelmarck, *Carl Fredrik Adelcrantz,* pp. 200–212 and 433–453; Hilleström, *The Royal Opera,* pp. 10–12; and Eklund and Stribolt, *Bollhuset och Dramaten,* pp. 16–19.

80. Dumont, *Parallèle,* and Pevsner, *History of Building Types,* pp. 76–77.

81. Høy, *Christiansfeld,* pp. 4–11, and Gorssen, *Christiansfeld.* This was of course not the only Herrnhutter colony founded in order to escape persecution in Germany. As early as 1731 Count Zinzendorf was in Copenhagen to arouse initial interest in such a settle-

ment, and in 1741 under his patronage the town of Bethlehem in Pennsylvania was founded. See Murtagh, *Moravian Architecture,* pp. 22–93.

82. Rácz, *Rokoko och klassicism,* p. 242 and plate 29, and Richards, *800 Years,* p. 60.

5 Scandinavian Neoclassicism

1. For comparable developments in England and America see Summerson, *Architecture in Britain,* pp. 247–291, and Whiffen and Koeper, *American Architecture,* pp. 100–124.

2. Cornell, *Svenska konstens historia,* 2:7–14, and Söderberg, *Manor Houses,* pp. 179–234.

3. Bain, *Gustavus III,* 1:269–270.

4. Setterwall, *Palmstedt,* pp. 165–180; Bjurström, "Gripsholmsteaterns salong"; and Beijer, "Les Théâtres," pp. 222–224.

5. For a discussion of Palmstedt's experience and probable resources see Donnelly, "Theaters in the Courts," pp. 339–340.

6. Beijer, "Les Théâtres," pp. 217–218. The dedication reads "alle maesta di Gustavo III, re di Svezia."

7. Ekberg, *Uppsala slott,* pp. 65–83.

8. Stavenow, *Hårleman,* pp. 216–217.

9. Wollin, *Desprez i Sverige,* pp. 84–89.

10. Ibid., pp. 59–82, and Malmborg, *Kungliga slotten,* 2:85–130.

11. Wollin, *Desprez i Sverige,* pp. 161–166.

12. Bucht, *Härnösands historia,* 1:384–390.

13. Jakstein, *Landbaumeister Christian Friedrich Hansen;* Langberg, *Omkring C. F. Hansen;* Wietek, *C. F. Hansen;* and Jørgensen, "Copenhagen School of Classicism," pp. 6–21.

14. Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 176–177.

15. Jakstein, *Landbaumeister Christian Friedrich Hansen,* pp. 23–24.

16. Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* p. 34.

17. Jakstein, "C. F. Hansens Rat-und-Arresthaus," and Jørgensen and Porphyrios, eds., "Neoclassical Architecture," pp. 46–51.

18. Weilbach, *C. F. Hansens Christiansborg.* For the full account of the second Christiansborg see Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 2:2–186.

19. Percier and Fontaine, *Recueil de décorations intérieures.*

20. Derry, *History of Scandinavia,* pp. 199–206.

21. Thurah, *Danske Vitruvius,* 2:77–97 and plates 36–53.

22. Horskjaer, ed., *Danske kirker,* 1:29–31; Bolvig, *Bykirker,* pp. 77–78; Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 2:27–32; and Birgitte-Boggild Johannsen, *Danmarks Kirker. København,* 2:177–202.

23. Hermansen, Roussell, and Steenberg, *Danmarks Kirker. København,* 1:151–184; Horskjaer, ed., *Danske kirker,* 1:195–201; and Bolvig, *Bykirker,* pp. 103–105. Attention has been drawn to some of the possible French sources for Hansen's ideas for rebuilding (Langberg, *Omkring C. F. Hansen,* pp. 30–34). See also Wohlert, "C. F. Hansen's Domkirke," and Jørgensen and Porphyrios, eds., "Neoclassical Architecture," pp. 38–41.

24. Wanscher, *Arkitekten G. Bindesbøll,* pp. 15–29; Millech and Fisker, *Danske arkitekturstrømninger,* pp. 26–30; Langberg, *Danmarks bygningskultur,* 2:106–109; Bramsen, *Gottlieb Bindesbøll,* pp. 49–97; Jørgensen, "Thorvaldsen's Museum"; and Jørgensen and Porphyrios, eds., "Neoclassical Architecture," pp. 42–45.

25. Derry, *History of Scandinavia,* pp. 206–209.

26. Meissner, *Carl Ludwig Engel,* pp. 39–41; Wickberg, "Engels stilhistoriska ställning"; Nils E. Wickberg, "Tillhundraårsminnet"; and Nils E. Wickberg, *Senaatintori,* pp. 121–123. The latter is the most extensive account in English of the history of the Senate Square and its buildings (the text is also in

Finnish, Swedish, and German), and includes color reproductions of a number of Engel's drawings for the entire project, published for the first time. See also Knapas, "Eastern and Western Neoclassicism," and Pöykkö, "Helsinki's Neo-Classical Center."

27. Nils E. Wickberg, *Senaatintori,* pp. 125–126.

28. Meissner, *Carl Ludwig Engel,* pp. 59–61; Nils E. Wickberg, *Finnish Architecture,* pp. 74–75; and Nils E. Wickberg, *Senaatintori,* pp. 127–130.

29. Lindberg, *Finlands kyrkor,* pp. 38–39.

30. Lindberg, *Finlands kyrkor,* p. 55; Meissner, *Carl Ludwig Engel,* p. 45; and Nils E. Wickberg, *Senaatintori,* p. 134.

31. Lindberg, *Finlands kyrkor,* pp. 55–56; Meissner, *Carl Ludwig Engel,* pp. 78–83; and Nils E. Wickberg, *Senaatintori,* pp. 132–134.

32. Meissner, *Carl Ludwig Engel,* pp. 64–66; Nils E. Wickberg, *Finnish Architecture,* pp. 76–77; and Nils E. Wickberg, *Senaatintori,* pp. 130–131.

33. Although the Library of the Academy of Sciences in St. Petersburg, built in 1718–1734, had burned in 1747, it had been recorded in an elaborate publication of 1741, *Palaty Sanktpeterburgskoi Imperatoskoi Academii.* The interior was a great hall with a two-story colonnade surrounding the walls, which had book shelves in two stories. Engel's colonnade is a giant order, but his inspiration for the reading room may well have come from his knowledge of the Russian example.

34. Derry, *History of Scandinavia,* pp. 210–218.

35. Fett et al., *Ulefos,* and Hamran, "Det nye Norge," pp. 15–17. Recent studies have changed the former attribution to Jørgen Henrik Rawert (ibid., pp. 123–124).

36. Kielland, *Paleet i Oslo;* Kavli, *The Royal Palace in Oslo;* Kavli and Hjelde, *Slottet i Oslo,* pp. 1–35; Hamran, "Det nye Norge," pp. 31–44; and Kavli and Hjelde, *Kongens Slott.*

37. Fett and Schnitler, eds., *Norsk kunsthistorie,* 2:235–238.

38. Anders Bugge, *Arkitekten Stadskonduktor Chr. H. Grosch,* pp. 31–44 and 75–80.

39. Ibid., pp. 91–94, and Hamran, "Det nye Norge," pp. 45–46.

40. Anders Bugge, *Arkitekten Stadskonduktor Chr. H. Grosch,* pp. 97–110; Muri, *Norske Kyrkjer,* p. 31; and Hamran, "Det nye Norge," pp. 46–48.

41. Fett and Schnitler, eds., *Norsk kunsthistorie,* 2:241–243; Anders Bugge, *Arkitekten Stadskonduktor Chr. H. Grosch,* pp. 131–153; and Hamran, "Det nye Norge," pp. 50–59.

42. Lindblom, *Sveriges konsthistoria,* 3:685–719.

43. Wollin, *Skeppsholmskyrkan (SK),* pp. 71–113.

6 Vernacular Architecture in Scandinavia

1. Uldall, "Open Air Museums"; Peter Michelsen, "The Outdoor Museum"; Arnö-Berg and Biörnstad, eds., *Skansens hus,* pp. 14–30; and Alexander, *Museum Masters,* pp. 240–275.

2. Peter Michelsen, "The Origin and Aim of the Open-Air Museum."

3. Peter Michelsen, *Frilandsmuseet,* pp. 17–59.

4. Uldall, "Open Air Museum," pp. 68–69.

5. Ailonen and Kinnunen, *Seurasaari Open Air Museum.*

6. Hermansson, "Árbaer Museum," and *The Árbaer Museum.*

7. There is a considerable literature on half-timber construction, including work done in England, Germany, and Holland. A useful discussion of the Scandinavian "bindingsvaerk" or "korsvirke" may be found in Lund and Millech, eds., *Danmarks bygningskunst,* pp. 54–59. See also Stoklund, *Bondegård og byggeskik,* pp. 28–37; Lundberg, *Trä gav form,* pp. 123–125; and Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 30–33.

8. Christian Axel Jensen, *Dansk bindingsvaerk;* Stoklund, *Bondegård,* pp. 40–44; Peter Michelsen, *Frilandsmuseet,* pp. 208–210; and Vensild, "Højremshuse i Nord-og-Nordvest-Jylland."

9. Lund and Millech, eds., *Danmarks bygningskunst,* pp. 50–52, and Stoklund, *Bondegård,* pp. 37–41.

10. Peter Michelsen, *Frilandsmuseet,* pp. 130–135.

11. For a study of chimneys and ovens see Peter Michelsen, *Ildsteder.*

12. For thatching see Erixson, "Halmtakstyper i Sverige"; Stoklund, *Bondegård,* pp. 50–54; and Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 33–35.

13. Berlin, "Ravlundsgården." The Ravlunda Farmstead unfortunately burned in 1970, and a farmstead from Hög in Skåne has been erected in its place.

14. For bibliography on the folk buildings of Skåne see Lundqvist, *Svensk konsthistorisk bibliografi,* pp. 154–155.

15. Arnö-Berg and Biörnstad, eds., *Skansens hus,* pp. 144–153.

16. For the bole-house techniques see Steensberg, "Bulhus"; Stoklund, *Bondegård,* pp. 44–46; Lundberg, *Trä gav form,* pp. 92–108; and Håkon Christie, *Middelalderen bygger,* pp. 41–54.

17. For the use of wall paintings and hangings in the Swedish farmhouses see Plath, *Decorative Arts of Sweden,* pp. 5–8 and 169–212.

18. Peter Michelsen, *Frilandsmuseet,* pp. 72–77.

19. A vivid account of how such roofs could be put to use other than for shelter also gives insight into early nineteenth-century conditions in Sweden: "We found a clean and excellent inn at Tännäs. A cooling and delicious delicacy presented itself to our parched palates upon our arrival here, and in a place where we should last have looked for it: this was nothing less than a whole crop of turnips growing upon the top of the house, and covering all the roof of the inn. Garden vegetables are hardly ever seen in Sweden; and with the exception of a few potatoes, we had been so long strangers to any thing of this kind, that pine-apples could not have been more grateful. We all ate of them greedily, both in their crude state and boiled; telling our host not to be anxious in procuring for us any other provisions" (Clarke, *Travels,* 10:156).

20. No attempt will be made here to include all possible bibliographical sources. A general survey is given in Valonen, "Knuttimring." For Sweden see Erixon, *Svensk byggnads kultur;* Hallerdt, *Timmerhus;* and Lundberg, *Trä gav form,* pp. 18–31. For Norway see Kavli, *Norwegian Architecture,* pp. 22–29; Gunnar Bugge and Norberg-Schulz, *Stav og laft,* pp. 29–80; Håkon Christie, *Middelalderen bygger,* pp. 33–40; and Gjaerder, "Om stavverk og lafteverk."

21. Erixon, "North European Technique" and Erixon, "Är den Nordamerikanska timringstekniken överförd fran Sverige?"

22. Arnö-Berg and Biörnstad, eds., *Skansens hus,* pp. 343–366.

23. Boëthius, *Anders Zorn.*

24. Stigum, "Loft," and Reimers and Anker, "Trearkitektur, pp. 400–410. For a discussion of changing elements in Norwegian houses as related to historical factors see Lloyd, "The Norwegian Laftehus."

25. Stigum and Arne Berg, "Stove," and Reimers and Anker, "Trearkitektur," pp. 386–400.

26. For a discussion of the Norwegian painters of these interiors see Hauglid, *Native Art of Norway,* pp. 63–106.

27. Reimers and Anker, "Trearkitektur," pp. 386–390, and Visted and Stigum, *Vår gamle bondekultur,* 1:46–153.

28. Arne Berg, "The Joining of Individual Houses," and Myhre, "Development of the Farm House."

29. For the early history of sawmills see Bishop, *History of American Manufactures,* 1:93–94.

30. The illustration is from Reginald Outhier, *Journal d'un voyage au nord.* Outhier had accompanied the French astronomer Pierre Louis Moreau de Maupertuis on an expedition to Lapland in 1736–1737, sent by Louis XV to measure the length of a degree of the meridian. The work was undertaken at the observatory at Kittilä.

31. Nikander, "Byar och gårdar," pp. 117–146, and Valonen, *Zur Geschichte der finnischen Wohnstuber.*

32. Vilkuna, "Den karelska gården," and Nils E. Wickberg, *Finnish Architecture,* pp. 56–57.

33. Heikel, *Karuna Kyrka,* and Lindberg, *Finlands kyrkor,* p. 97.

34. Ullén, *Granhults och Nottebäcks kyrkor (SK),* pp. 277–296, and Ullén, *Medeltida träkyrkor I (SK),* pp. 19–30.

35. Ibid., pp. 112–113.

36. Wallin, *Seglora Kyrka,* pp. 9–17 and 35–77, and Arnö-Berg and Biörnstad, eds., *Skansens hus,* pp. 510–534. The Seglora church has two features in common with churches built by the Swedish settlers in the New World. In 1647 John Printz, Governor of New Sweden, wrote in a report to the Swedish West India Company, "Again, I have caused a church to be built in New Gothenburg, decorating it according to our Swedish fashion, so far as our resources and means would allow," in Myers, ed., *Narratives of Early Pennsylvania,* p. 122. This would suggest paintings similar to those in the Seglora church. Then in 1698 the Swedish community in Philadelphia built Gloria Dei Church, which also has a polygonal apse. See Morrison, *Early American Architecture,* pp. 508–510.

37. Petterson, *Petäjäveden vanhau kirkon puolesta,* pp. 56–57.

38. Manker, *Lapsk kultur,* pp. 106–155, and Erixon, *Svensk byggnads kultur,* pp. 48–59. The use of curved poles for the frame is thought to have preceded the familiar "cruck" construction in English building. See Innocent, *Development of English Building Construction,* pp. 10–14; Crossley, *Timber Building in England,* pp. 109–112; and Clifton-Taylor, *Pattern of English Building,* p. 35.

39. Michelsen, *Frilandsmuseet,* pp. 199–201. In this group the hut in the foreground is original, brought to the Open Air Museum in 1910, and distinctive in being the first building acquired from Danish territory proper.

40. Stoklund, "Røgstue og glasstue"; Thorsteinsson, "Faroese House Constructions"; Stoklund, "Røykstova and Glasstova"; and Stoklund, "Houses and Culture."

41. The splashmill illustrated here is another Faroese example, from Sandur, moved to the Open Air Museum in 1961–1965. A dwelling similar to the one at Saksun, a kiln, and a storehouse complete the group there. An especially hazardous part of the enterprise was to lower the stones of the dwelling from Múla on Borthoy down a 60-foot cliff to the ship below. (Peter Michelsen, *Frilandsmuseet,* pp. 229–234.)

42. Sigurdsson, "The Turf Farm"; Ágústsson, "Inner Construction"; and Ágústsson, "Building through the Centuries," pp. 97–101.

43. Nilsson, "Den sentida bebyggelsen"; Eldjárn, "Two Medieval Farm Sites"; and Ágústsson, "Development of the Icelandic Farm."

44. Gestsson, "The Use of Stone and Turf in the Icelandic Houses."

45. Roussell, *Farms and Churches,* pp. 24–27 and 138.

46. Ágústsson, "Inner Construction," pp. 181–183.

47. Fenton, "The Longhouse in Northern Scotland."

48. Hiort, "Andreas Kirkerup's Islandske kirke," pp. 126–167.

49. Quoted in *The American Magazine,* 3, no. 12 (September 1837): 461.

50. Jökulsson, "Árbaer Museum and Church."

51. Jespersen, *Kommandørgården,* and Ester Ander-

sen and K. Roland Hansen, "Kommandørgården på Rømø."

52. Stoklund, "Frilandsmuseets gård fra Lønnestak."

53. Klein, *Landbrugets bygninger;* Langberg, *Danmarks bygningskultur,* 2:44–53; and Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 58–67.

54. Langberg, *Danmarks bygningskultur,* 1:115, and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse,* p. 55.

55. Langberg, *Danmarks bygningskultur,* 1:185.

56. Tunander, *Falun.*

57. Clarke, *Travels,* 10:556–557.

58. Lexow, "Arkitektur 1536–1814," pp. 101–102, and Ødegaard, *Røros.*

59. Sahlberg, *Handicraft Museum.*

60. Richards, *800 Years,* pp. 94–96.

61. Tschudi-Madsen, "Veien hjem," pp. 92–94.

62. Ágústsson, "Building through the Centuries," pp. 102–103, and Árnason, "New Lease on Life."

7 Eclectic and Early Modern Scandinavian Building

1. An extensive account of this period in European architecture is given in Hitchcock, *Architecture: Nineteenth and Twentieth Centuries,* pp. 93–151; the work of Scandinavian builders is discussed on pp. 40–42. See also Paulsson, *Scandinavian Architecture,* pp. 177–184; Andreas Lindblom, *Sveriges konsthistoria,* 3:800–828; Langberg, *Danmarks bygningskultur,* 2:103–142; Faber, *History of Danish Architecture,* pp. 112–126; Lund and Millech, eds., *Danmarks Bygningskunst,* pp. 333–378; and Hamran, "Det nye Norge," pp. 99–122.

2. Werlauff, *Udsigt over Kiøbenhavns Universitets-Bygnings,* and Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 116–119.

3. Wanscher, "Constantin Hansen."

4. Anders Bugge, *Arkitekten Stadskonduktor Chr. H. Grosch,* pp. 172–177, and Hamran, "Det nye Norge," pp. 71–72.

5. Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 38–63, and Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 178–182.

6. Roussell, ed., *Danske slotte,* 8:319–322, and Brogaard, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Landbrugets huse,* pp. 178–179. The illustration is from Richardt and Secher, *Prospecter af danske herregaarde,* n.p.

7. Hjelde, *Oscarshall,* pp. 11–34, and Hamran, "Det nye Norge," pp. 72–75.

8. Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 48–84.

9. Guenther Lange, *Alexis de Chateauneauf,* pp. 49–51, and Hamran, "Det nye Norge," pp. 94–95.

10. Guenther Lange, *Alexis de Chateauneuf,* pp. 51–53; Muri, *Norske Kyrkjer,* pp. 45–46; and Hamran, "Det nye Norge," pp. 96–97.

11. Millech and Fisker, *Danske arkitekturstrømninger,* pp. 103–109, and Millech, *J. D. Herholdt.*

12. Meeks, *The Railroad Station,* pp. 26–55, and Pevsner, *History of Building Types,* pp. 225–230.

13. Derry, *History of Scandinavia,* pp. 228 and 264. For discussion of the early Danish railway stations see Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* pp. 81–83 and 116–123.

14. Paulsson, *Scandinavian Architecture,* pp. 172–194. Hahr expressed dissatisfaction with the station as remodeled, calling the façade a "very inexpressive mantle" (*Architecture in Sweden,* p. 75).

15. Tschudi-Madsen, "Veien hjem," pp. 61–67.

16. Haffner, *Stortingets Hus,* pp. 74–128, and Hamran, "Det nye Norge," pp. 80–90.

17. Muri, *Norske Kyrkjer,* pp. 247–248.

18. Tschudi-Madsen, "Veien hjem," pp. 30–31.

19. Hugo Johannsen and Claus M. Smidt, *Danmarks Arkitektur. Kirkens huse,* pp. 171–175.

20. Millech and Fisker, *Danske arkitekturstrømninger,* pp. 222–224, and Horskjaer, ed., *Danske kirker,* 1:134–135.

21. Fritsch, *Kirchenbau des Protestantismus,* p. 208. Fritsch found this plan in A. W. N. Pugin's *Present State of Ecclesiastical Architecture,* where it appeared as the first of four ideal plans for not Protestant but Roman Catholic churches, Pugin by this time having become a Catholic. Although Borch could have known Pugin's book, it is more likely that he saw the plan published by Fritsch. In the German author's book there is a substantial section on "evangelical" churches in Denmark, Norway, and Sweden, which must have been appealing to Scandinavian readers (pp. 409–450).

22. Grut, "Engelbrektskyrkan," and Wahlman, *Engelbrektskyrkan.*

23. For discussion of the immediately preceding French and German museums see Pevsner, *History of Building Types,* pp. 120–129, and also for theaters, pp. 82–84.

24. Plageman, *Das Deutsche Kunstmuseum,* pp. 117–126.

25. Ibid., pp. 145–149.

26. Ringbom, *Stone, Style and Truth,* pp. 72–74.

27. Millech and Fisker, *Danske arkitekturstrømninger,* pp. 109–111.

28. Langberg, *Danmarks bygningskultur,* 2:146–148; Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 162–163; and Skriver, "Royal Theatre."

29. Engberg, *Pantomimeteatret,* pp. 9–16; Lund and Millech, eds., *Danmarks Bygningskunst,* p. 379; and Jørgensen, Lund, and Nørregård-Neilsen, *Danmarks Arkitektur. Magtens bolig,* p. 162.

30. For discussions of Meldahl and his contemporaries see Stemann, *F. Meldahl og hans venner,* and Millech and Fisker, *Danske arkitekturstrømninger,* pp. 165–206. See also Horskjaer, ed., *Danske kirker,* 1:44–47, and Bolvig, *Bykirker,* pp. 84–85.

31. Willoch, *Nasjonal galleriet,* pp. 25–35 and 88–94, and Ringbom, *Stone, Style and Truth,* p. 74.

32. Sachs, *Modern Opera Houses,* 1:53–54; Eklund and Stribolt, *Bollhuset och Dramaten,* pp. 36–43; and Stribolt, *Stockholms 1800-talsteatrar,* pp. 287–357.

33. Sachs, *Modern Opera Houses,* 1:51–52; Tschudi-Madsen, *Henrik Bull,* pp. 45–53; and Skriver, "National Theatre in Oslo."

34. This matter is discussed at some length in Ringbom, *Stone, Style and Truth.*

35. Hitchcock, *Architecture: Nineteenth and Twentieth Centuries,* pp. 281–306.

36. In Denmark the architectural expression of the Art Nouveau was limited (Faber, *History of Danish Architecture,* pp. 142–145), but the impact of this style in the decorative arts was strong. See Viggo Sten Møller, *Dansk kunstindustrie,* 2:11–24. For the Norwegian architectural Art Nouveau see Tschudi-Madsen, "Veien hjem," pp. 81–94. For the Swedish see Andreas Lindblom, *Sveriges konsthistoria,* 3:922–124. For the Finnish see Moorhouse, Carpetian, and Ahtola-Moorhouse, *Helsinki Jugendstil Architecture,* and John Boulton Smith, *Golden Age of Finnish Art,* pp. 117–199.

37. Lindegren, "Kungliga Dramatiske teatern," and Eklund and Stribolt, *Bollhuset och Dramaten,* pp. 44–68.

38. Tschudi-Madsen, "Veien hjem," pp. 80–90.

39. Richards, *800 Years,* p. 133.

40. Hamran, "Det nye Norge," pp. 105–106.

41. Addison, *Romanticism and the Gothic Revival,* pp. 117–126, and Hamran, "Det nye Norge," pp. 102–104.

42. Ibid., pp. 98–102. For the Finnish wooden churches see Petterson, *Suomalainen piukirkko.*

43. Tschudi-Madsen, "Veien hjem," pp. 68–69.

44. Pevsner, *History of Building Types,* pp. 169–192.

45. Tschudi-Madsen, "Veien hjem," pp. 56–60.

46. Curman, "Nordiska museets byggnad"; Edestrand and Lundberg, *Isak Gustaf Clason,* pp. 32–43; and Ringbom, *Stone, Style and Truth,* pp. 130–132.

47. Giedion, *Space, Time and Architecture,* pp. 211–218.

48. Ibid., pp. 181–196.

49. Hamran, "Det nye Norge," pp. 117–120.

50. Anders Bugge, *Arkitekten Stadskonduktor Chr. H. Grosch,* p. 184. For industrial buildings in Denmark from 1807 to 1914 see Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* for an interesting and well-illustrated account.

51. Ibid., pp. 77–78.

52. Millech and Fisker, *Danske arkitekturstrømninger,* p. 114; Lund and Millech, eds., *Danmarks Bygningskunst,* pp. 377–381; and Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* pp. 83–84.

53. Ibid., p. 73.

54. Knud Jensen, *Fra Halmtorvet till Rådhusplads,* and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse,* pp. 35–38.

55. Fisker, "Omkring Herholdt."

56. Cervin, "The City Hall at Copenhagen"; Beckett, *Københavns raadhus;* Stein Eiler Rasmussen, *Nordische Baukunst,* pp. 7–16; Millech and Fisker, *Danske arkitekturstrømninger,* pp. 207–252; Funder, *Arkitekten Martin Nyrop,* pp. 34–52; and Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 78–81.

57. The future architect of the Stockholm Town Hall, Ragnar Östberg, saw the Copenhagen building in 1896 and later wrote of his impression: "The town hall in Denmark, for example, seemed to typify the exuberant vitality of the Danish people. The equipoise and repose of the structure amid the lively play of the lines, the rich lustre of the red brick,—this was at once Scandinavian and characteristically Danish, symbolizing as it were, the sturdy self-reliance of the one who, after much toil and trouble, builds a cosy home on his own soil" (Östberg, *The Stockholm Town Hall,* p. 15).

58. Holger Rasmussen, ed., *Dansk Folkemuseum,* pp. 8–11.

59. The history of projects and quarrels, political as well as architectural, that finally resulted in the third Christiansborg is set forth in Hvidt, Ellehøj, and Norn, eds., *Christiansborg,* 2:187–327, with English summary, pp. 362–371.

60. Stein Eiler Rasmussen, *Nordische Baukunst,* pp. 17–29. From the considerable literature on the Town Hall in Stockholm the most important account in English is by the architect himself: *The Stockholm Town Hall.* See also Strömbon, "The new townhall of Stockholm," David Dahl, "Stockholms stadshus," and Easton, "The Stadshus at Stockholm."

61. Östberg, *The Stockholm Town Hall,* pp. 31–32.

62. Ibid., p. 38.

63. Ibid., pp. 28–30.

64. Saarikivi, Niilonen, and Ekelund, *Art in Finland,* pp. 118–120; Ulf Hård af Segerstad, *Modern Finnish Design,* pp. 7–71; Salokorpi, *Modern Architecture in Finland,* pp. 5–14; Mikkola, *Architecture in Finland,* pp. 5–16; and Hausen, Mikkola, and Amberg, *Saarinen in Finland.*

65. Pallasmaa, ed., *Hvitträsk.*

66. Kopisto, *Suomen Kansallismuseo,* and Nikula, *Armas Lindgren,* pp. 153–154.

67. Christ-Janer, *Eliel Saarinen,* pp. 30–34, and Hausen, Mikkola, and Amberg, *Saarinen in Finland,* pp. 42–48 and 71–76.

68. Saarikivi, Niilonen, and Ekelund, *Art in Finland,* p. 120, and Salokorpi, *Modern Architecture in Finland,* pp. 9–11.

69. Ringbom, *Stone, Style and Truth,* pp. 148–152. For a discussion of Richardsonian influence in the Scandinavian countries see Eaton, *American Architecture Comes of Age,* pp. 143–207.

70. Treib, "Lars Sonck," and Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 7–11.

71. Ibid., pp. 35–45.

72. Nils E. Wickberg, *Finnish Architecture,* pp. 104–106; Kivinen, *Tampereen tuomiokirkko,* pp. 61–90; Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 45–62; and Ringbom, *Stone, Style and Truth,* pp. 226–227.

73. Fritsch, *Kirchenbau des Protestantismus,* pp. 513–530. Fritsch made a distinction between Anglican churches in England and America and those of other Protestant denominations. His plan of St. James Congregational Church in Newcastle-upon-Tyne, by T. Lewis Banks, 1884, is thought to be the inspiration for Sonck's plan of St. John's (figure 1007, p. 521). This plan had appeared in *Building News* of 1885, but Sonck would have been more likely to have used Fritsch's book.

74. Treib, "Lars Sonck," pp. 234–236, and Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 81–85.

75. Ibid., pp. 63–67, and Ringbom, *Stone, Style and Truth,* pp. 179–180.

76. Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* p. 75, and Ringbom, *Stone, Style and Truth,* pp. 240–241.

77. Nils E. Wickberg, *Finnish Architecture,* pp. 117–118, and Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 75–81.

8 Scandinavian Architecture since World War I

1. For the Scandinavian countries in World War I see Derry, *History of Scandinavia,* pp. 303–304.

2. Marstrand, *Grundtvigs Mindekirke,* pp. 28–29; Fisker, "Den Klintske skole," pp. 48–53; Millech, "På Bjerget, Grundtvigs Kirke"; Bolvig, *Bykirker,* pp. 87–89; and Jelsbak, ed., *Grundtvigs Kirke,* pp. 7–26.

3. Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 108–111.

4. Sonck, "Mikael Agricola Kyrkan i Helsingfors," and Kivinen, Korvenmaa, and Salokorpi, *Lars Sonck,* pp. 113–117.

5. The spire, carrying a gold cross, rises 103 meters above sea level. Special equipment built into the tower made it possible to lower it considerably during World War II.

6. Millech and Fisker, *Danske arkitekturstrømninger,* pp. 300–301; Faber, *New Danish Architecture,* pp. 76–77; and Stephenson, *Arkitekten Thorkild Henningsen,* pp. 52–59. See also Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 64–78, for workers' housing in Denmark. The work of Heinrich Tessenow in Germany, and particularly his publication *Hausbau und dergleichen* (1916), is discussed by Kenneth Frampton in "The Classical Tradition," pp. 167–168.

7. In 1980 the Museum of Finnish Architecture began organizing an exhibition, "Nordic Classicism," for which it collaborated with the other Nordic architectural museums. The catalogue (Paavilainen, ed., *Nordic Classicism*) contains essays by leading scholars of Scandinavian architecture and is a significant contribution to the study of this development. In 1982 the catalogue was published as the exhibition was on view in Copenhagen, Helsinki, Oslo, and Stockholm. In the same year another major study of classicism appeared: Porphyrios, ed., *Classicism Is Not a Style.* See also Elling, *Klassiske København;* Millech and Fisker, *Danske arkitekturstrømninger,* pp. 283–306; Langberg, *Danmarks bygningskultur,* 2:177–208; Faber, *History of Danish Architecture,* pp. 150–164; and Lund

and Millech, eds., *Danmarks Bygningskunst,* pp. 383–406.

8. Swane, *Faaborg Museum;* Hiort, "Museet i Faaborg"; Stephenson, *Arkitekten Carl Petersen,* pp. 34–63; Paavilainen, ed., *Nordic Classicism,* pp. 67 and 70–71; and Langkilde, *Nyklassicismen.*

9. From "Contrasts," published in *Architekten,* 1920, quoted in Paavilainen, ed., *Nordic Classicism,* pp. 45–48.

10. Porphyrios, ed., *Classicism,* pp. 23–35.

11. Fisker, "Den Klintske skole," pp. 60–61; and Millech, "Nordvestsjaellands Elektricitetsvaerk."

12. Kampmann, "Politigaarden"; Wanscher, "Politigaarden"; Bröchner, "Copenhagen's New Scotland Yard"; Rafn, "The Police Headquarters in Copenhagen"; Rasmussen, *Nordische Baukunst,* pp. 103–113; and Langkilde, "Politigaarden." Kampmann is quoted as saying, "I love putting up pillars . . . but they have got to be decent pillars and not like Palladio's who made them all imitations, plastered boardings" (Rafn, "Police Headquarters," p. 199, and Jørgensen, "Hack Kampmann").

13. Caldenby and Hultin, eds., *Asplund,* pp. 41–46; Ahlin, *Sigurd Lewerentz,* pp. 38–49 and 116–118; Cruickshank, ed., *Erik Gunnar Asplund,* pp. 97–113; and Treib, "Woodland Cemetery."

14. Holmdahl, Lind, and Ödeen, eds., *Gunnar Asplund Architect,* pp. 41–42 and 94–97; Maré, *Gunnar Asplund,* pp. 20–21; and Caldenby and Hultin, *Asplund,* pp. 23, 44, and 68–71.

15. Holmdahl, Lind, and Ödeen, eds., *Gunnar Asplund Architect,* pp. 76–81; Wrede, *Architecture of Gunnar Asplund,* pp. 45–46 and 120–129; and Cruickshank, ed., *Erik Gunnar Asplund,* pp. 97–113.

16. Tynell, "Stockholms stadsbibliotek"; Holmdahl, Lind, and Ödeen, eds., *Gunnar Asplund Architect,* pp. 42–43; Maré, *Gunnar Asplund,* pp. 21–24; Wrede, *Architecture of Gunnar Asplund,* pp. 100–124; and Caldenby and Hultin, *Asplund,* pp. 28–29 and 92–101. The Tomb of Hadrian is illustrated in Fischer von Erlach's *Entwurff einer historischen Architectur,* Book 2, plate VIII. The building in the background of Book 4, no. 11 is also a cylindrical structure rising from a rectilinear base, set on a hill much as is the Stockholm library.

17. Blakstad and Munthe-Kaas, "Haugesund rådhus," Norberg-Schulz, "Fra nasjonalromantikk," pp. 38–42, Norberg-Schulz, *Modern Norwegian Architecture,* pp. 41–43, and Pontvik, "Haugesund rådhus."

18. Berner, "Torvalmenningen," and Paavilainen, ed., *Nordic Classicism,* p. 115.

19. Veijola, "Riksdagshuset"; Sirén, "Finland's New House of Parliament"; Nils E. Wickberg, *Finnish Architecture,* pp. 126–129; and Paavilainen, ed., *Nordic Classicism,* pp. 83–85.

20. Lindberg, *Finlands kyrkor,* p. 184; Pearson, *Alvar Aalto,* pp. 50–53; Quantrill, *Alvar Aalto,* pp. 37–50; and Schildt, *Alvar Aalto,* pp. 44–45 and 283.

21. Lundahl, ed., *Nordisk Funktionalism,* is a collection of essays on this aspect of architecture in the Scandinavian countries, similar to the volume on *Nordic Classicism.*

22. Lars Backer in *Byggekunst* 7 (1925), quoted in Norberg-Schulz, "Fra nasjonalromantikk," p. 46.

23. Alvar Aalto, "Sanatorium i Penmar"; Nils E. Wickberg, *Finnish Architecture,* pp. 132–134; Pearson, *Alvar Aalto,* pp. 84–93; and Quantrill, *Alvar Aalto,* pp. 51–55. See also Salokorpi, "Currents and Undercurrents."

24. See Pevsner, *History of Building Types,* pp. 153–158, for discussion of nineteenth- and early twentieth-century hospitals.

25. Norberg-Schulz, "Fra nasjonalromantikk," pp. 66–68.

26. *Housing Question in Sweden,* p. 49.

27. Faber, *History of Danish Architecture,* pp. 156–158, and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 161–166.

28. Shand, "Stockholm, 1930"; Holmdahl, Lind, and Ödeen, eds., *Gunnar Asplund Architect,* pp. 54–58; Maré, *Gunnar Asplund,* pp. 27–31; Rasmussen, *Nordische Baukunst,* pp. 122–128; Caldenby and Hultin, *Asplund,* pp. 29–31 and 35–39; and Fant, "Gunnar Asplund."

29. Paulsson, *Scandinavian Architecture,* pp. 192–202. See also Silk, *Sweden Plans for Better Housing;* Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 167–178; Norberg-Schulz, "Fra nasjonalromantikk," pp. 94–103; and Norberg-Schulz, *Modern Norwegian Architecture,* pp. 73–85.

30. Paulsson, *Scandinavian Architecture,* pp. 220–224. See also Hitchcock, *Architecture: Nineteenth and Twentieth Centuries,* pp. 374–375, for the Siemenstadt Estate by Walter Gropius in 1930, a prototype for such housing blocks all over Europe.

31. "Københavnske etagehus," *Arkitekten* 40, no. 4 (1939):51–72; Rasmussen, *Nordische Baukunst,* pp. 158–163; and Millech and Fisker, *Danske arkitekturstrømninger,* pp. 332–334.

32. Pearson, *Alvar Aalto,* pp. 138–140; Richards, *800 Years,* pp. 148–149; and Quantrill, *Alvar Aalto,* pp. 70–72.

33. Faber, *History of Danish Architecture,* p. 172, and Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 140–141.

34. Blakstad and Munthe-Kaas, *Arkitekt Ove Bang;* Norberg-Schulz, "Fra nasjonalromantikk," pp. 75–79; and Norberg-Schulz, *Modern Norwegian Architecture,* pp. 61–65.

35. Koppel, "Villa Mairea"; Giedion, *Space, Time and Architecture,* pp. 645–649; Pearson, *Alvar Aalto,* pp. 168–175; and Quantrill, *Alvar Aalto,* pp. 83–91.

36. Aino Alto and Alvar Aalto, "Mairea."

37. Langkilde, *Arkitekten Kay Fisker,* pp. 53–59; Faber, *History of Danish Architecture,* pp. 186–189; and Møller, *Aarhus Universitets Bygninger.*

38. Arneberg and Poulsson, *Oslo rådhus;* "Oslo rådhus," *Byggekunst* 9–10 (1950):145–174; Norberg-Schulz, "Fra nasjonalromantikk," pp. 29–35, especially for the proposals and competitions; and Norberg-Schulz, *Modern Norwegian Architecture,* pp. 34–37.

39. "Sunila sulfatcellulosafabrik," *Arkitekten Finland* (1938, no. 10), 145–160; Nils E. Wickberg, *Finnish Architecture,* pp. 139–141; and Giedion, *Space, Time and Architecture,* pp. 640–645.

40. Lauritzen, "Bygningerne ved Københavns Lufthavn."

41. For the consequences of Scandinavian involvement in World War II, see Derry, *History of Scandinavia,* pp. 328–355.

42. Kavli, *Norwegian Architecture,* pp. 120–122; Norberg-Schulz, "Fra gjenreisning," pp. 13–14; and Norberg-Schulz, *Modern Norwegian Architecture,* pp. 92–93.

43. Knutsen, "Menneskit i sentrum," p. 129.

44. *Architectural Digest* 30, no. 9 (September 1960):347–348; Faber, *History of Danish Architecture,* pp. 218–219; and Jørgensen, *Danmarks Arkitektur. Enfamiliehuset,* pp. 156 and 161.

45. *Architectural Design* 47, nos. 11–12 (1977):783–790, and Erskine, "Architecture in a Cold Climate."

46. Paulsson, *Scandinavian Architecture,* pp. 234–238; Langkilde, "Bellahøj"; and Hartmann and Villadsen, *Danmarks Arkitektur. Byens huse. Byens plan,* pp. 180–188.

47. Nils E. Wickberg, *Finnish Architecture,* pp. 226–233; Ervi, "Bybyggerne bag Tapiola"; Ålander, *Viljo Revell,* pp. 40–51; Tempel, *New Finnish Architecture,* pp. 60–98; and Hertzen and Spreiregen, *Building a New Town.*

48. Howard, *Garden Cities.*

49. Mumford, *Stadskultur.*

50. Smith, *Sweden Builds,* pp. 94–113; Paulsson, *Scandinavian Architecture,* pp. 234–236; and Åström, *City Planning in Sweden,* pp. 67–74.

51. For a discussion of "garden cities" and "new towns" see Hitchcock, *Architecture: Nineteenth and Twentieth Centuries,* pp. 405 and 420–421, and Giedion, *Space, Time and Architecture,* pp. 782–785.

52. Nils E. Wickberg, *Finnish Architecture,* pp. 146–147; Pearson, *Alvar Aalto,* p. 219; and Quantrill, *Alvar Aalto,* pp. 128–136.

53. Pearson, *Alvar Aalto,* pp. 203–217.

54. Skriver, "Den tekniske højskoles hovedbygning"; Borràs, *Arquitectura Finlandisa;* Pearson, *Alvar Aalto,* pp. 216–217; and Quantrill, *Alvar Aalto,* pp. 121–127.

55. Olsen and Crumlin-Pedersen, "The Skuldelev Ships"; Faber, *New Danish Architecture,* pp. 146–147; and Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 178–179.

56. *Arkitekten* 45, no. 13 (1963):245–249.

57. *Byggekunst* (1977):22–26, and Herteig, *Handbook,* pp. 11–13.

58. Yates, "A Monument to Faith."

59. Tempel, *New Finnish Architecture,* pp. 182–183, and Bruun and Popovits, eds., *Keija and Heikki Siren,* pp. 20–43.

60. Lund, "Skt. Clemens Kirke"; Horskjaer, ed., *Danske kirker,* 13:31–32; Faber, *New Danish Architecture,* pp. 213–215; Bolvig, *Bykirker,* p. 62; and Johanssen and Smidt, *Danmarks Arkitektur. Kirkens huse,* pp. 186–189. St. Clement's Church is also mentioned in a series of essays on church architecture, furnishings, and liturgy edited by one of the architects, Johannes Exner, and Tage Christiansen, *Kirkebygning og teologi,* p. 260.

61. Jor, *Kirker i en ny tid,* pp. 43–48.

62. Ibid., pp. 65–67; Muri, *Norske Kyrkjer,* pp. 256–257; and Norberg-Schulz, "Fra gjenreisning," p. 39.

63. I have seen icebergs in the fjords of southern Greenland of nearly identical shape. Were such natural formations Hovig's inspiration for the Tromsdalen church?

64. Brochmann, "Kaleva Kirken," and Connah, *Writing Architecture,* pp. 174–180.

65. Skriver, "SAS Air Terminal"; Skriver, "Royal-Hotel-Copenhagen"; and Faber, *New Danish Architecture,* pp. 158–161. For Arne Jacobsen see Pedersen, *Arkitekten Arne Jacobsen;* Faber, *Arne Jacobsen;* Kastholm, *Arne Jacobsen;* and Dyssegaard, *Arne Jacobsen: A Danish Architect.*

66. A detailed study of architects as decorative designers would be an enormous but fascinating undertaking. They have been represented in several exhibitions of Scandinavian design, including a recent one at the Cooper-Hewitt Museum in New York City. For critical essays by Scandinavian experts and a good bibliography, see the exhibition catalog edited by David R. McFadden, *Scandinavian Modern Design 1880–1890.*

67. Skriver, "Arne Jacobsens Nationalbank," and Jørgensen, Lund, and Nørregård-Nielsen, *Danmarks Arkitektur. Magtens bolig,* pp. 113–115.

68. Woldbye, "Kim Naver's Wall Hangings."

69. Larsson, ed., *New Architecture in Sweden,* p. 312.

70. Kristensen, "Udvidelse af tappehall."

71. Erik Berg, "Udvidelse af Kastrup," and Sestoft, *Danmarks Arkitektur. Arbejdets bygninger,* pp. 176–177.

72. Salokorpi, "Currents and Undercurrents."

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