Bathing facilities
in relation to Town Planning

Thesis presented
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by

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Introduction

Recreation in general has maintained its place of importance through the rapid changes that have taken place since the turn of the century. Random growth of cities has deprived city-dwellers of many natural recreational facilities. Highly accelerated living conditions as well as monotony of work due to specialization and mechanization and the more leisure which people in all walks of life enjoy in our "Electronic, Atomic and Chemical" age, all these call for recreational facilities as an integral part of life within the framework of a modern urban society.

Bathing and swimming are regenerative activities which appeal to people of all ages and of every country. They draw people together regardless of their economic status, social position, race, creed or education. Bathing and swimming are the best known means of developing and maintaining healthy organs. They contribute to the physical and mental well-being of the individual. Their importance has been reflected in the increasing popularity of bathing-grounds as well as their more extensive development over the last few years as an essential part of a planned community center.

These considerations have led to the conclusion that a new era of planning for bathing facilities is beginning, an era which will see many factors heretofore not taken into account. These developments have prompted the present work "Bathing facilities in relations to town planning". The aim is to study and shed light on the main guiding lines and principles for the planning of bathing grounds regarding the purpose, scope and general character of the modern public bathing and swimming systems as well as the guiding standards that serve as measures of the quality or adequacy of bathing grounds. These guiding principles and standards are together the tools required for planning and design of public bathing and swimming systems within a town-plan along with other recreational areas and community services.

The thesis is presented in six parts:

Part 1. "History of Public Bathing" includes an analytical study of bathing patterns and types through the ages to the 20th century. The historical development of public bathing is fundamentally bound up with the spirit of each age. Bathing has always been an integral part of regenerative activities and it has played a social role within each culture.

Part 2. "Scope of Modern Bathing Systems" includes the different types of bathing and places where they occur and is divided into five chapters as follows:

Chapter 1 "Domestic Bathroom": In this chapter the historical development of this cell which serves the needs of personal hygiene, is investigated, especially the late stages of development until it has attained its present form. New trends show that the bathroom, after its late development, has become a focal point in the house and is no longer thought of as strictly utilitarian, but also as a place of luxury and relaxation.

Chapter 2 "Curative Baths" is devoted to hydrotherapy, the scientific application of water to diseased conditions. A historical background shows that the
healing power of water played a great role in the medical practice of former cultures. The advantages of water as a curative agent, different functions of curative baths and the key to hydrotherapy are briefly outlined.

Chapter 3 deals with recreational bathing facilities and their significance in modern life. These are classified as follows:

Paddling and wading facilities for small children: In this section the different types and forms of paddling facilities are discussed and illustrated. It also includes an analytical study of paddling facilities as an element in children's playgrounds.

General bathing and swimming facilities for adults. In this section the importance of swimming pools for the public is discussed along with the main characteristics. A section is devoted to the natural bodies of water (Bathing beaches) showing sources of pollution, hygienic and safety demands and precautions as well as other planning requirements.

Chapter 4 "Instructional Pools": In this chapter the main guiding principles and standards for planning these pools are provided. It also includes an analytical study of instructional pools in schools which are classified according to their location in the school complex.

Chapter 5 deals with the main characteristics and planning requirements for those pools planned and designed in accordance with Olympic requirements and devoted primarily to sports activities.

Part 3. deals with the importance of town planning for bathing facilities, i.e. the study of bathing requirements in terms of comprehensive urban planning. The different types of bathing centers are classified on a town planning basis. In this part the need for and establishment of planning standards is discussed. A review of various standards is presented: Some of them established by bath-planners or swimming associations as minimum standard requirements in different countries and others as actually practiced in specific towns. The proposed or actual planning standards mentioned encompass space requirements, the proper ratio of each type of bath to population, the reasonable and desirable bathing capacity and the effective service radius. This gives a comparative review of planning standards in different localities.

The end of this part is devoted to the different factors which affect planning and require local space standards and combined facilities.

Part 4. "Planning and Design of Open-Air Swimming Pools" is devoted to the importance of open-air bathing grounds (bathing parks) in our modern urban areas. It stresses that the usefulness of bathing grounds is also dependent on the way in which they are designed, developed, equipped and maintained. It reviews quantitative planning for spatial distribution between the different components of the bathing grounds; as well as between the different types of dressing facilities. It also includes further a review of the different types of filtration plants and new trends in filtration processes.
Part 5. deals with the analysis and criticism of some existing open-air as well as indoor baths. These examples have been chosen to represent various localities in different countries and special characteristics. At the end we offer a table with comparative data.

Part 6. serves as a conclusion and deals with the problem of bathing and swimming facilities in Egypt, Cairo being taken as an example. In the first chapter, geographical situation, population of Cairo, and climatic conditions are outlined in a brief introduction. A pioneer attempt has been made by the author to provide a scientific survey of the available facilities. Analysis and criticism have been made of the present existing facilities which are located on the town-plan and technical data has been provided to give a clear picture of the problem.

The second chapter deals with the obstacles which confront the planning and design of bathing facilities in Cairo as seen by the author.

The last chapter states the recommendations proposed for the planning and design of the different types of bathing and swimming facilities in Cairo and indicates some imperatives and standards for Egyptian social, economical and climatic conditions.
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1. History of Public Bathing

Early Stages of Development

Pre-Classical Period: Ancient Egyptian and Indus Culture

Classical Period: Greek and Roman Culture

Islamic Culture

Middle Ages

Russian Vapor bath and Sauna

Renaissance Period

Nineteenth Century

Japanese Bathing Culture

Modern Times
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Water as a Cultural Element in the Early Stages of Civilization

The history of bathing begins with the first settlements of Man. He settled beside rivers and lakes, where he could bathe and bring water to his fire. As people later came together into their early communities, it became necessary to control that lifegiving element, "Water," its significance in the realm of personal hygiene having been perceived. The fact that all the three early civilizations—Egyptian of the Nile, Sumerian of the Tigris-Euphrates, and the Indus civilization—developed beside rivers, gives clear evidence that at this time of human development "Man+Water=Civilization".

Pre-classical period

Ancient Egyptian Culture

Significance of floods

Around 4000 B.C., in the Nile Valley, primitive agricultural communities began to emerge out of the Neolithic culture. They settled on higher ground beyond the reach of flood-waters. Then several communities would cooperate to control the flood of water. Finally, this activity became the chief factor that united the whole country in about 3360 B.C. Consequently, the ancient Egyptians hallowed the river Nile, believing that life would somehow continue after death in the same way as the renewal of its annual flood.

Spirit of the times

The spirit of ancient Egypt is expressed in the countless wall reliefs covering the walls of temples and tombs. They show, besides many achievements in public life, a large variety of recreational activities. The amount of time devoted to bodily regeneration depended on the position of the individual in ancient Egyptian society. Swimming, which was popular at that time, was practiced out of doors because of the warm climate, in the Red Sea as well as in the River Nile. Some of the swimming styles and strokes, as well as diving, were known to Egypt 5000 years ago. Swimming instruction was given to upper-class youngsters as one of the basic elements in their physical training.

Bathing pattern

Although the numerous reliefs of Ancient Egypt never actually depicted a public bathing scene, it must be accepted that there was at that time some sort of hot-bathing pattern serving the masses. It was written on one of the old Papyrus documents, that two girl bathers complained to Pharaoh that they might be scalded by the too-hot water in a public bath, because of the carelessness of bath attendants. This document suggests an early system of hot bathing.

1 Society of ancient Egypt consisted of: (1) The lower economic group, which had no leisure time as they were subjected to hard work. (2) the Middle-class group, which had limited leisure-time. (3) The upper classes, which enjoyed an unlimited amount of leisure.
In view of Egypt’s warm climate, which demands no massive buildings, the patterns of bathing practiced by Egyptians in ancient times were perhaps so simple that no traces were left behind except that written document. As indicated by Vitriinius, the temple of So-Bu-Ra pyramid at Abusir possessed washing and bathing-facilities in 2500 B.C., which might have served for religious functions.

**Indus Civilization**

Traces of the oldest bathing-establishment in the world were discovered at the lower courses of “Indus River” in Mohenjo-daro. That unique and prosperous city, which was built in about 2300 B.C., possessed an indoor public bath 30x60 m attached to a great sports-ground, fig.1. The brick-walled public bath, which had a swimming pool 12.00x7.20 m and 2.40 m deep, with dressing rooms on three sides, might have served for religious functions similar to Hindu practices of today.
Classical period

Spirit of the times

The pattern of Greek life was full of leisure. The cult of "Play hard so that you may work hard" was much in evidence. This organic attitude gave ample opportunities for regenerative activities. Every life in Greek society was worthy of care as well as effort. The Greeks, in their creative life, laid great emphasis on naturalism and humanism in addition to a love of beauty. Education, and indeed the entire daily life of the people, which was of a high standard, was oriented towards the ideal of the balanced personality.

Gymnasium activities embraced everything in the daily life serving both physical and intellectual culture. In that Greek institution (the educational centre of the Hellenes), physical and intellectual activities were inseparable. They appreciated the concept of "A sound mind in a sound body."

The Greek bath was an integral part of the Gymnasium, forming a link in its chain of activities. It was a bridge between the energetic gymnasiun exercises in the palaestra (school of gymnastics) and the philosophical discussions in the exedra, fig. 2.
**Bathing pattern**

3 The City of Priene: Priene was a city of only some 4000 people, for which the Gymnasium and Stadium had served.

A Agora
B Temple of Athene Polias
C Theater
D Stadium and Gymnasium

The Greek bath of the Hellenes in view of climate, consisted mainly of cold showers and ablutions. It was simply performed, having no large basins, in keeping with the scarcity of water in Greece. The shower-baths where cold water flowed down from a reservoir two meters high, sometimes a small cold plunge as in Delphi, marble troughs with running water and simple hollows for foot-baths (as found in the Hellenistic Gymnasium of Priene 4th century B.C.), all these washing facilities reveal how simple was the process of bathing in the Greek culture.

**Social significance**

2 Vase painting: Women's bath

3 The Hellenic period (700-146 B.C.) has only been mentioned here as it is of interest in the realm of public bathing. The two former periods—Minoan age (1800-1450 B.C.), and the Mycenean period (1250 B.C.) were before the advent of the Greek gymnasium which gave the bath its meaning.

4 A report from Plutarch

The Greek culture, more than any other, organically fused the act of bathing with other human regenerative activities. Bathing was an integral part of the people's lives. It is said that the people would not bath in the same water with those who were prone to the accusation of Socrates.

Public bathing-establishments were on hand at every sports-ground as well as gymnasia. Every town was proud of and praised its baths.

Concerning the social role of the baths in the Greek culture, we cannot neglect the private hot baths in individual houses. They also played an important role, in addition to the public baths: The guest was, first of all, conducted to the bath-room, washed with hot water (helped by the mistress of the house, a daughter or a slave), massaged and finally wrapped in a fresh robe.
**Roman Culture**

Rome is the first large-scale city in history with the majority of the population dependant on state support. Society was responsible for guarding health and promoting well-being for the individual. Besides the establishments which were erected for the glory of the Empire, Emperors also designed thermae as the “people’s palaces”. These monumental baths were erected for a practical, arrogant nation which controlled the material wealth of the world at that time. Romans venerated, in the same spirit as the Greeks, the cult of “Play hard so that you may work hard”. Roman Society, which regarded human regeneration as a basic social responsibility, provided these baths as public services and not sources of revenue.

In view of this Roman spirit, public bathing establishments attained a supremacy achieved neither before nor since.

The Roman thermae included almost the same elements as the Greek Gymnasia, but endowed with enormous dimensions. In the first century B.C., instead of the simple cold bath, water and heat were combined to create a new conception of bathing (the conception of the hot-air bath). As indicated before, the conception of hot-air bathing was already known to the Greeks, and developed on Egyptian soil. Now with the Roman culture, it developed to another level and took on a sovereign significance in the new society.

Within the walls of those new Roman baths, the best in Roman technical, architectural and sociological thought were united.

**Components of the Roman Thermae:**
The individual parts of the Greek gymnasium were retained, but the bath proper became superior to all the others, fig. 4. With the advent of the hot-air bath, the function of the bath changed conclusively.

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The hot-air bath and its variously heated rooms, fig. 5:

Tepidarium: The "Lukewarm hall," it was the largest and the most spatially luxurious hall in the Roman Thermae, fig. 6

Caldarium: The hot room.

Laconicum: The hottest chamber in the Roman bath.

The new floor and wall heating system, which distributed the heat throughout these rooms with great evenness, was a notable achievement of Roman culture. This combined heating system which emerged in the first century B.C., was utilized on the large Roman scale in halls of dimensions hitherto unknown. The floor stood on low brick pillars (Hypocausts) beneath which the fire-gases passed, fig. 7. A system of square earthenware pipes (Tubulae) carried the heat through the hollow walls. The technical scheme of the thermae was entirely based upon that combined heating system. Water, the second element linked with heat in that new bathing concept, was transferred via Aqueducts to reser-
Swimming-pools, heated to various temperatures and then piped to the various bathing apartments.

Apodyterium: Situated beside the entrances it merely functioned in the Roman Thermae as a dressing room, fig. 8.

Swimming-pools: The small cold plunge and cold washing at the Greek Gymnasium, developed into another form, "Frigidariums" in the Roman Thermae were enormous swimming-pools, fig. 9. With their lavish consumption of water, they were a novel feature in civilization.

Sports-ground: The Greek palaestra for physical exercises was kept, but expanded enormously. In the Roman Thermae, like that of Caracalla, the open space for gymnastic sports could have held more than one gymnasium of the Greeks.

Roman Library: The Greek exedra also reappeared in the Roman Thermae as a place for repose and social intercourse. The actual function of the exedra was, in the Roman culture, transferred to the outer zone of the thermae where discussion could take place in quiet surroundings. This included an assembly-room and the Roman library.

Swimming-pools, hot-air baths with lofty interiors adorned by mosaics and murals, sports-ground, places for resting, dressing-rooms, as well as library—all these spatial aspects gave the thermae their architectural originality. Their social significance was a natural outgrowth of their primary function in the service of human regeneration.

Bathing process: The Roman Thermae were intended for daily use. They were opened at noon so that they could be visited at the close of the workday. Physical exercises in the palaestra stimulated blood-circulation before bathing. The main function of the tepidarium, the most splendid and spacious of all the rooms, was natural relaxation. A rest of half an hour was taken in its luke-warm atmosphere. The second step was the hotter calidarium, followed by a brief stay in the very hot dry atmosphere of the laconicum, which reached a temperature of 70° C.

Soaping and massage were performed after the sweat-bath in the laconicum. A plunge into the refreshing cold swimming-pool of the Frigidarium usually ended the bathing process—a process which aimed at bodily regeneration within the 24-hour daily cycle.

The staff of attendants, including anointers, manicurists, barbers, shampooers, and hundreds of slaves, made the process of bathing a luxurious relaxation.

**Social significance**

Enjoyment of bathing was a part of everyday life. It was bound up with the Roman working day, which began at dawn and usually ended at noon. The morning's labor was followed by a free afternoon, when the baths were open to anyone wishing to use them.

Entrance fees were nominal, quite out of proportion to the expense and the upkeep of the establishment.

Later the thermae were opened free to the populace by emperors in search of popularity. A great number of Roman citizens of every social class met and spent a great part of their leisure in the thermae.
They served the same function as modern clubs. As they encouraged social intercourse, they naturally became the focus of communal life.

Under the roof of the Roman Thermae, every pastime and recreation was to be found: bathing, swimming, sports, walks under covered porticos, bars and restaurants in the annexes, libraries and even art museums. One could also be shaved, have a haircut or a manicure.

The thermae helped to develop Roman physical culture. Boys, when old enough, were trained in swimming, which was one of their favorite leisure activities. Viewed as a sociological innovation, it might be said that the Romans took an institution designed for bodily regeneration, and made of it a social center for the masses. Besides the social role that Roman Thermae played within the urban areas, there were also those at military camps, devoted to the regeneration of the legions. The Roman generals knew that physically unstimulated soldiers fight badly.

The Roman Thermae may be attacked from the point of view that they were havens of erotic abuse, but that does not lessen the significant social role they played within Roman society.

Concerning town planning

Thermae emerged wherever the Romans settled: on farms, on estates, in cities large or small, and in military camps. They occupied a prominent place within the urban areas, often surpassing all other buildings in scope, figs. 10, 11.
<table>
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<tr>
<th>Year of construction</th>
<th>Water Surface m²</th>
<th>Total Area m²</th>
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<tr>
<td>Agrippa 20 B.C.</td>
<td>1'000</td>
<td>12'000</td>
</tr>
<tr>
<td>Nero 60 A.D.</td>
<td>1'200</td>
<td>20'000</td>
</tr>
<tr>
<td>Titus 80 A.D.</td>
<td>1'100</td>
<td>10'000</td>
</tr>
<tr>
<td>Trajan 110 A.D.</td>
<td>2'000</td>
<td>80'000</td>
</tr>
<tr>
<td>Caracalla 210 A.D.</td>
<td>2'000</td>
<td>140'000</td>
</tr>
<tr>
<td>Decian 250 A.D.</td>
<td>1'000</td>
<td>12'000</td>
</tr>
<tr>
<td>Diocletian 305 A.D.</td>
<td>5'000</td>
<td>120'000</td>
</tr>
<tr>
<td>Constantin 315 A.D.</td>
<td>1'200</td>
<td>16'000</td>
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14'500 410'000

11 Thermae of Rome in the 4th century A.D., scale: 1:37'000

12 Hot-air baths of private houses "Balneum" (Villa of Diomedes)

The Caracalla Thermae (210 B.C.) occupied an area of about 140,000 m² with accommodation for 1600 bathers, with which no indoor public bath of modern times can compete. It is said that the thermae of Diocletian could serve about 3000 bathers. Rome was the greatest bathing-center of the ancient world. In 330 A.D. when Constantine moved the capital to Byzantium, Rome possessed besides its thermae, about 856 public baths at the free disposal of the common people.

The population of Rome in the 2nd century A.D. was estimated at about one million. At that time, the total water-surface of the Roman Thermae, from Agrippa to Constantine, was about 14,500 m²—i.e., water-surface per head was about 0.015 m², not counting the other public baths existing at that time.

These public baths, "Balneum," were very usual in Roman palaces and houses; they were simpler in character than the later thermae of the Empire, fig. 12.
Islamic Culture

The cult of "Cleanliness is next to Godliness" deeply penetrated Islamic life. Islam made human revivification, either through the rite of cold Ablution and Prayer or public bathing, a religious matter: The Rite of Ablution (the partial purification of some organs of the body) is part of a wider concept of bodily invigoration. It is performed five times daily, before the rite of Prayer: first at dawn or "sunrise," second at noon, third in the afternoon, fourth at the hour of sunset, finally in the evening. The rite of Prayer itself is not only considered a religious ceremony but a sort of simple physical exercise performed five times a day for the refreshment of the human body.

The Hammam used to be regarded as complementary to the mosque, where the great ablution should be performed (as a religious rite), particularly after sexual intercourse, and before the performance of any religious ceremony. The Islamic religion saw in the bath a symbol of purification from sin. Thus, the art of bathing has been closely interwoven with everyday life in Islamic culture.

Public baths, viewed as public services, were for centuries financed either by the public treasury (Beit-el-Mal), or by endowments from well-to-do persons, which was regarded as an act of piety. At the same time, Islamic society encouraged the bathing institutions by making the bath attendants tax-exempt. These public institutions were open to the poor, free or for a nominal charge. Payment or gratuity given to the bath attendants, considered as a religious deed, was left to the bather's discretion and ability.

Public bathing, with its associated customs, was commonly practiced until the end of the 19th century, and in some popular districts in Cairo, for example, until the first decades of the 20th century. Besides the baths of Islam, every mosque should include washing facilities (Meda) for the performance of the rite of ablution.

When Moslems began to build their first baths in about the 8th century A.D., they adopted the Roman pattern they had found in Syria, fig. 13, and reshaped it according to their new needs. The Islamic bath began as a hot-air bath and, according to the oriental preference for steam-bathing, a series of steam chambers at staggered temperatures was added. The bath building became smaller in comparison with those of the Romans, being composed of only two wings: cold and warm, figs. 14, 15. Consequently the Islamic heating system became a simplification of the Roman one. The architectural structure, because of the warm climate, required only small openings to afford seclusion from the outside world.
Components of the Islamic Bath, compared to the Roman:
The Roman palaestra for gymnastic exercises disappeared in the Islamic bath. The same was true of the swimming-pool in the frigidarium; as Islam considered it unappetizing that one bathe in one's own dirt, it fell into disuse. Religious and general instruction now took place in the center of intellectual culture, the mosque, and the Greek exedra became nothing but a place for relaxation, with beds. The hot-air rooms, which had been the nucleus of the Roman bath, were modified according to Islam's climatic conditions.

Maslak: The apodyterium, which had merely functioned in the Roman Thermae as a dressing room, was utilized as a rest hall with galleries and delicate murals. The "Maslak" chamber, the cold wing, came to be the focus of the Islamic bath, fig. 16.

Beit-El-Harara: The warm wing in the Islamic bath, in which only hot-air pipes run under the floor, attained more significance than the calidarium in the Roman. It usually had small chambers radiating crosswise from it, which acted
as private bathing-places “Khelwa”. Instead of the Roman marble troughs of hot and cold water in the calidarium, the Beit-El-Harara possessed a polygonal couch in the center for massage and limbering. In consequence of the decline of the tepidarium, the domed Beit-El-Harara became the dominant architectural feature of the Islamic bath, fig. 17.

Tepidarium: The “Lukewarm hall,” the largest and the most conspicuously luxurious hall in the Roman Thermae, dwindled in the “Hammam” to a mere passageway, in keeping with warmer climate and the disappearance of the palaestra.

Maghtas “Laconicum”: The hottest dry-air chamber in the Roman bath became a steam bath in the Hammam, with a deep pool in the center, fig. 18. Sometimes several pools, steamed to different temperatures, occupied those chambers radiating from the Beit-El-Harara.

The regenerative cycle within the Islamic bath: The Islamic bath, as mentioned before, consists mainly of two wings: The cold one “Maslak” for relaxation, and the warm one “Beit-El-Harara”, both linked by the tepid passage chamber. The bather goes to the “Maslak,” both at the beginning and at the end of the bathing cycle, for rest and relaxation. In the Beit-El-Harara, the bather yields to the hands of the bath attendants “Mekaisaty,” who pinch and pull every limb and joint, perform shampoo-massage, rubbing the skin with a special glove which skims the dirt from the body. This process of limbering, cracking the joints and shampoo-massage, expertly performed, took the place of palaestra exercises.

After the dirt of one’s body has been skimmed off, and removed by washing, the bather goes to the “Maghtas,” to soak for awhile in winter or be doused with cool water in summer.

18 Vapor room, in a Persian bath 16th cent. (Maghtas)
19 The “Maslak” as seen by an Englishman in a “Moorish Bath” during the 19th cent.
The bath was complementary to the mosque; the mosque served as a center of religious ceremony and intellectual culture, the bath for human regeneration and the focus of communal life. The bath attained its social significance through the "Maslak". This chamber, for all its modesty of size, became the "social hall" of Islamic society.

As an institution, the Islamic bath became a place of social intercourse; a place where one might eat food, listen to music played in the galleries of the maslak, smoke "Hubble-Bubble," a place to transact business and make deals, fig. 19. It was the place where the barber-surgeon would cut hair and shave beards, also a place for medical practice, where cupping, blood-letting and minor operations like circumcision might be performed. To women, it provided the opportunity to visit outside the home, a center where they might gossip, offer gifts and view dancing performances, fig. 20. The Islamic bath also served as a beauty parlour, where the bath-women "Ballana" practiced their art of beautification, as well as a place where mothers might choose sweet brides for their sons. It was the spot from which the "nuptial procession" began after a great ablution had been made preparatory to the bride's first intercourse.

The Hammam attained its full maturity as a social institution under the Ottoman Empire. At the end of the 19th century, in consequence of western influence and as the public baths lost their wealthy patrons who possessed private facilities at home, they began to decline, although they continued to attract the poorer classes who used them until the first decades of the 20th century.

The earliest builders of Islamic baths in the 8th century were still half-bedouin people, not yet accustomed to urban life. Their baths stood isolated beyond the urban areas, like rest-houses or oases in the desert wastes. Later, when new cities were built, the baths became the focus of communal life. Hammams developed in all cities and villages, as well as on highways—wherever Islam influence reached. They emerged in Africa, from the Euphrates to the Atlantic ocean, in Spain, in Persia, Asia minor and the Balkans. Cordoba, was said to have 900 baths at the peak of its development at the end of the 10th century. In the first three decades of the 20th century, Pauty could account for more than 50 public baths of the 12–15th centuries in Cairo. After the disappearance of sports-grounds, they occupied small areas, resembling normal houses but with more elaborate entrances, fig. 21. The situation of these baths made it possible for every bath to serve a small neighborhood within a short walking distance, fig. 22.

The two sexes were separated by different times of admission. Sometimes there was a bath for each sex within one neighborhood.

In keeping with the warm climate in countries where Hammams developed, this distribution of local baths within the urban area was logical. It was a more convenient arrangement than the gigantic Roman Thermae, which served a wider area and involved a longer walking distance.
Middle Ages

Spirit of the times

Special attitudes towards life grew up out of misery and terror, strongly affecting the development of all social institutions. Security was not to be found except in groups. Everyone had to belong to something for protection: a guild, a household, a manor, a monastery. Moreover, the amount of leisure time depended on the social position of the individual. The idea of total regeneration for the human body did not find any encouragement after the decay of the Roman Thermae. Even the Islamic concept of bodily joy was rejected, as people were indisposed to accept the Arab's way of bathing. But bathing and swimming in the open during the summer time were practiced.

Later, in the Middle Ages, the steam bath, that ageold type of bathing practiced in Russia, began to penetrate to the West. It attained its popularity with the advent of the 12th century, and became fully developed in the late Middle Ages. These bathing-establishments (sweat-houses) were sometimes run by private individuals, but more usually by municipalities. They were widespread everywhere, even in country districts, and bathing was practiced at least every fort-night as a family pleasure.

Bathing pattern

The late gothic sweat-house was identical to the Russian Vapor bath. The conception was bathing in steam-saturated air.
The late gothic sweat-house, as portrayed in Dürer's Women's bath comprised within the low wainscoted bath-chamber: a fire-place built up to ceiling height, a pile of heated stones, hot water vessels, and various levels, fig. 23. Sometimes the abundant steam generated by ordinary baking was utilized for this purpose. Having introduced a tube into the oven, the workers could have a vapor-bath.

**Social significance**

In the late medieval period, when the public bathing-establishments came in to serve again the human regeneration, a common trend linked it with both the ancient and Islamic bath. It was a place of social intercourse, resorted to for news and gossip and sometimes for medicinal purposes. But sometimes, the stress fell on its erotic aspects. A portrait from the 15th century shows the naked guests gathered around a table in an enormous wooden tub, fig. 24.
With the wane of medieval culture, these houses became the resorts of loose women and lewd men, both looking for sensual satisfaction, as a result of the deterioration of family life. They were viewed as brothels, and the habit of regarding the bath as a social institution began to die out.

Later in the Middle Ages, the sweat-houses, humble in appearance, were characteristic institutions in every town. They could be found in every quarter. It was a familiar sight to see children running naked through the streets to these neighborhood bathing houses.

By the end of the Middle Ages, e.g., Ulm possessed 11 such sweat-houses, Nürnberg 12, Frankfurt-am-Main 15 (with 29 bath-house keepers as early as 1387), Augsburg 17 and Vienna 29. These sweat-houses not only played their role in the urban areas, but also spread into rural districts. Some places possessed a medieval sweating-house as late as the mid-1800’s, like the Isle of Rathlin on the Irish coast, which maintained one till 1856, and in Switzerland, in the Zürcher Oberland, communal vapor baths remained in use even later.

25 itinerary of the Regenerative Types of Baths: In this map the path of the different types of regeneration has tentatively traced by “M. Ecochard and S. Giedion”: “From Central Asia the archetype—vapor or hot-air bath—Spread in ancient times to Russia, Syria, the Greek world. This type was probably first elaborated technically in the Nile Delta during the Ptolemic Period. In the first century B.C. the Roman Thermae, a crossing of archetype with the Greek Gymnasium, spread with the expanding Empire. It was in Syria, in the third century A.D., that the Roman Thermae—marching east—met the archetype and were transformed into what later became the Islamic bath, a type that persisted until the influx of mechanization.”
The Russian vapor bath

The Russian bath, a pattern of bathing in steamsaturated air as practiced by the Russians, goes back to pre-historic times in central Asia. It existed in the classical world, from the time of Herodotus, as it has remained intact to this day in every Russian village. That age-old type of bathing has kept its pristine form: A log-hut with an open hearth, a pile of red-hot stones and simple containers of water. The Russian vapor bath has always been a simple rural institution, having attained its common form in peasant surroundings and wooded regions. Instead of the variously heated rooms of the urban Roman bath, a few benches at various levels provide the desirable variety of heat within the one space, figs. 26, 27. The abnormal moist heat, which stimulates the skin and the glands, cleanses the body from within as well as without. The skin is also rubbed with a bundle of twigs, a special massage designed to provoke intensive perspiration in that atmosphere. The bather goes directly into the outside atmosphere to have a roll in the snow in winter, a plunge in a nearby river or lake in summer, or a dousing of cold water. Such bathing is performed at least twice weekly in Russia as well as Finland.

The Russian vapor bath and the Sauna have long been regarded as social institutions, like the Roman and Islamic baths, but of earlier origins which were

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5 As mentioned in the earliest chronicles of the Russians.
6 It was described by a Frenchman in the 18th century; when he tried that type of bathing on his journey to Tobolisk in Siberia.
7 The Finnish bath or "Sauna" differs from the Russian only in that the latter is a mere vapor-bath, while the Sauna combines both Russian and Roman baths. One perspires in dry, hot air, and the humidity is temporarily increased from time to time by sprinkling water on the red-hot stones. This change from dry to moist air gives the Finnish bath its unique and congenial power of revivification.
not dependent on slave labor. Middle-class houses, as well as those of the well-to-do, possess a bath which the family members use communally or individually.

Public baths are open to the lower classes throughout Russia. They are often used by the public "promiscuously"—that is, even in cases where the two sexes are separated by plank partitions, the bathers meet again after the bath, completely naked, to gossip about the most varied topics. The Russian bath and the Sauna is the only type which could have maintained itself virtually unchanged through the ages.

**Renaissance period (15–18th century)**

Although the Renaissance spirit resulted from a rebirth of interest in, and knowledge of, earlier classic forms, and from a revolt against medieval forms and habits, it failed to reintroduce the classic habit of bathing for the purpose of human regeneration. It also rejected the Islamic culture of bathing when it came into contact with it (the Arabs were driven from Spain in 1500). Even those sweat-houses, within a century or more of their advent, began to fall out of use for the following reasons:

1. Immorality, which led to objections from the church, especially under the influence of the Reformation and Counter-Reformation movement of the 16th century which regarded nakedness as a sin.
2. The source of wood for heating water was pushed further away from the neighborhood of towns.
3. The spread of plague and other infections frightened the bathers away.

The 17th century, which contributed towards the refinement of standards of living, stopped short at caring for the human body; it even neglected the most elementary aspect of cleanliness. The bath served only as a means of rejuvenating the body after a debauch.

Attitudes began to change with the coming of the 18th century. The idea of bathing developed in two directions: Therapeutic effects; Natural education.

At the beginning of the 18th century, voices in England as well as Germany and Holland were heard advocating the bath and shower for medical purposes. Some decades later, attention was also turned, especially in England, to the curative effect of sea-bathing. As time went on, "Return to Nature" movements\(^8\) began to penetrate European life, striving to eliminate the fear of contact with nature and the human body. Care of the body through water, and other outdoor physical exercises, were incorporated in the new attitudes towards education. These attitudes appeared first in the military sphere. The earliest practical effort in the civil field was carried on by J.B. Basedow (1728–1790) at Anhalt-Dessau during the last decades of the 18th century, fig. 28. Soon after, bolder steps were taken by the next generation\(^9\), aiming at more natural living and total vivification of the human body.

\(^8\) Rousseau's Return to Nature (1712–1778), was the first to penetrate this sphere, in the guise of cold washing, cool sleeping, early rising in summer... more natural living.

\(^9\) Pestalozzi (1746–1827), Zurich: "The power of nature more vital and alive."
The 19th century

The 19th century, which looked so much to former cultures for its ideas, was the beginning of breakdown of the traditional attitude towards human regeneration. The social structure changed; formerly, only the well-to-do had had time for play, but now a percentage of the public had some leisure. In the second half of the century, as working hours grew shorter in relation to those of the early industrial period, opportunities for leisure activity grew and the concept of physical regeneration returned. At the same time, the growth of cities and the need to take steps against physical deterioration in the new industrial era, stimulated the introduction of regenerative facilities. Hence attempts were made to reintroduce integrated public bathing systems to serve the working masses. The cult of cleanliness, which was scarcely popular even in aristocratic circles in the 17th and 18th centuries, became a universally recognized necessity.

Even before new attempts at total regeneration were made, the vapor-bath had never quite been forgotten. It had many advocates, from the third decade down to the end of the century, but remained no more than a private matter recommended for medical purposes.

Priessnitz' approach, 1830:

V. Priessnitz (1799–1851) attained world-wide fame at Graefenberg through his efforts to unite “therapy” and the “return to nature”. Only one decade later, cold-water cure establishments based on this concept spread from Russia to America. Although his method was still a matter of medical practice, he was among the first to advocate involving the whole human organism.

Priessnitz’ approach—hardening of the body and living in close contact with nature—soon passed from the realm of therapy into that of regeneration, when it was taken over by healthy people to balance the physical ill-effects notably felt in urban life. The military services also contributed towards the development of the ideas of total regeneration as well as the cult of cleanliness, in all European countries. Swimming-instruction, designed to harden the recruit’s body, became compulsory in the last three decades of the 19th century.

Islamic-bath movement:

At the time when all regenerative types of bathing had disappeared from the Western culture, the Islamic bath, that high tradition of bathing which was fully developed after the experience of more than a millenium, still played its role, total in scope, in the Islamic world from the Euphrates to Morocco.

An English diplomat around mid-century, having reviewed the barbaric condition in which Europe had lived for centuries, advocated the reviving of regenerative facilities in a total form.

Two decades earlier (1830), when he was wounded in the war of Greek Liberation, he had observed that the Turkish bath began to recede from the Mediterranean region as the Ottomans were pushed back. He wished to save this culture of bathing, which awakens man’s joy in living, for the regeneration of the working masses in the smoke-blackened towns of industrial England.
He estimated that London, which in 1850 had over two million inhabitants, would need about 1000 public baths, in comparison with Istanbul (with a half-million population) which still possessed over 300 operative baths. Urquhart began with a simple Turkish bath in his home in London. He continued to propagandize the introduction of this type of bathing. In the year 1856, he had the opportunity of carrying out his ideas on a broader basis in Ireland. Dr. R. Barter, the owner of St. Ann's Hill water-cure establishment, placed land, workmen and material at his disposal to establish a Turkish bath which was used in connection with Priessnitz' procedure, fig. 30.

Later in 1862, the first Turkish bath in London, in Jermyn Street, was built under his supervision, and became the prototype of all the Turkish baths both in Europe and America. Although this type of bathing played no small role in Western culture during the last three decades of the 19th century, it was still a luxury institution serving only the wealthy.

Return to the Roman attitude:
When the Turkish bath was introduced into Western life, it awakened the "Roman spirit". During the last three decades of the 19th century, a series of bath-clubs were formed, reintroducing the Roman attitude toward bathing. They possessed, in addition to the club-rooms, a gymnasium, hot-air baths and a swimming-pool, fig. 31.

The shower-bath:
As cleanliness came to be regarded as a universal necessity for the working masses, and the size of the populace grew out of all proportion to the number of public baths, the shower-bath emerged during the eighties as the "thermae of the 19th century". Shower baths had been advocated from mid-century, not only because they require less water, less space and time, and fewer repairs, but also because they are more hygienic. Inquiries in the eighties showed that Germany for instance, possessed only 2918 baths, a proportion of one bath per 29,000 inhabitants.
Shower-baths were first established at the Berlin Hygiene Exhibition (1883) by Dr. Lassar, who called them "Cleansing-Station" or "People's Baths". The people's bath was a corrugated-iron shelter with ten shower-stalls, five for each sex, fig. 32. One could enjoy a hot-water shower for 10 pfennigs, including soap and towel. These showers were to be situated at the end of a street to encourage the people to use them.

The 19th century vacillated between the different styles of bathing. It was still uncertain which type of bath would prevail, but as the century came to its end the bathtub emerged victorious, since this was a period which understood the bath merely as an external ablution with warm water.

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**Japanese Culture**

"If Cleanliness is next to Godliness," said an American visitor to Japan during the 19th century, "then the Japanese are a godly race". "The cleanliness of the Japanese is one of his most commendable qualities." As a nation fond of bathing, they have for centuries been accustomed to human nakedness, without its provoking among them the slightest attention. Public bathing has always been a characteristic feature of their daily life, as well as sea-bathing which has been widely practiced for 700 years. The Japanese regard the bath not only as a means to cleanliness, but also as a method of physical regeneration.

In the Japanese bath, the bather first soaks for a while in very hot water (like the "Maghtas" in the Islamic bath), which increases the glands' activities promoting the elimination of waste products. There are many forms of bathing-tubs, to which heat is applied directly in various ways. After having literally parboiled himself in the abnormally hot water, which could not be endured by

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12 When nakedness has long been regarded as "sinful" in Western culture.
most foreigners, he scrubs and washes himself with an extra bucket on a neighboring platform. Members of the Japanese working classes often practice this type of bathing two or three times a day. Like the Islamic bath, the Japanese bathing establishments encourage social intercourse. The guests, especially of the lower classes who bathe communally in the public baths, chat together during the bathing process without any false modesty. This pattern of bathing, practiced for centuries, in which every bather serves himself, is wide-spread in urban areas as well as in country districts. Usually, the Japanese public bath adjoins a tea-room and restaurant. Every house among the higher and middle classes possesses the most ample arrangements for hot bathing.

20th century

Our age, having technical potential which no period has had before, in addition to an accurate knowledge of the nature of the elements, has the ability to create almost limitless facilities for the human organism. At the same time, developments in automation have provided the worker with longer week-ends, shorter working-hours, and longer vacations during the year. It is an era whose spirit strives for more “human” living conditions, partially by affording the people more leisure time. The steady growth of our cities since the 19th century has necessitated the expansion of regenerative facilities, particularly for the city dweller, to compensate for the wear and tear which the new pattern of life entails. Bathing facilities, among these, are needed for all age-groups. They are not only required for sports purposes, but also for regeneration and human refreshment. Bathing has today developed along two main lines: On the one hand, bathing in the private sphere: The domestic bathroom, whether it is a tub or shower-bath, which serves the purpose of personal cleanliness. On the other hand, the various forms of public baths, culminating in bathing within recreational centers, which serve the regeneration and refreshment of the masses. Today, bathing is encouraged by the availability of indoor-pools, open-air baths and bathing-beaches, as well as instructional-pools for school-youngsters and competition-pools for sports activities. In addition, there are the medicinal, mineral and hot baths for medical purposes, and public baths for cleansing.

13 As Morse witnessed them during the 19th century.
2. **Scope of Modern Bathing Systems**

Classification of baths with respect to their functions:

- **Cleanliness**
  - Domestic bathroom.

- **Water cure**
  - Medicinal baths,
  - Spas,
  - Vapor and hot-air baths.

- **Recreation**
  - Recreational bathing facilities:
    - Wading and paddling pools for small children,
    - General bathing and swimming pools for adults,
    - Bathing beaches.

- **Swimming instruction**
  - Instructional pools.

- **Competitive activities**
  - Sports pools.
Leer - Vide - Empty
2.1. Domestic Bathroom

The bathroom in general is that cell in the dwelling, hotel, hospital, factory, etc., which serves the needs of personal hygiene and cleanliness. It has become, in the last few decades, the most valuable place in the dwelling. However, the domestic bathroom is no substitute for public regenerative bathing facilities, as it offers only a rather superficial means of cleansing. This pattern of private bathing, which has the bathtub as its symbol, has passed through various stages of development before attaining its present form.

The Ancient Egyptian bathroom dates from about 4000 years ago. It was provided with a limestone slab, and occasionally walled off from the bedroom by a stone screen or through a small ante-chamber. The pattern of bathing was only a simple shower bath, as the water, cold or hot, was poured over the bather, fig.34. Besides this, upper-class houses possessed swimming pools. In Minoan Crete, the first known bath before the Greek Gymnasium was almost identical to today's form. The bathroom, which adjoined the bedroom through a short passage, had a terra-cotta bathtub, fig.35. Domestic baths of the Greeks were of minor importance. However, there was a surprising number of homes with private baths, made possible by improvements of drainage techniques.

The Roman private baths had no great meaning, being subordinated to the highly developed public baths “Thermae” which were the focus of communal life. But private houses of wealthy people possessed hot air baths “Balneum,” fig.12, which were simpler in character than the Thermae. The Islamic culture never accepted the domestic bathtub. It was objected to on the ground that a man merely soaks in his own dirty water. But washing facilities were found at home. Washing as well as bathing has always had special ritual significance in Islamic religion.

In the Middle Ages, wooden bath-tubs were widely used, where all the family would take a hot bath together. Some royal bathrooms had built-in tubs properly cased in tiled floors, and were provided with hot and cold water. The bath of the eighteenth century was portable; it could be placed at one's bedside. The chaise-longue bath was made to open up, having a shallow metal tub within. The separate bathroom was a luxury found only in palaces.

"The bathroom with running water and its standard fixtures—tub, wash-basin and toilet—are the outcome of long wavering. Which type was to prevail in our period, hung in the balance through the nineteenth century as late as the nineties." 14

The “cult of cleanliness” developed strongly during the nineteenth century as an automatic reaction against the unsanitary conditions in which the industrial townsman lived. It also received reinforcement from medical authorities in the second half of that century. People began to appreciate the physiological effect of water on the human organism, and the habit of bathing and washing spread to become a universal practice. Whereas a domestic bathroom was not provided in even the finest houses early in the nineteenth century, by the end

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**Historical background**

34 Ancient Egyptian bath

35 The Queen's bathroom at Knossos

14 S. Giedion “Mechanization takes command”.

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of the century the standard of a separate bath for every family had become a minimum ideal. The bath and wash-basin remained portable, not requiring a room of their own.

Running water—first piped into only the basement, then the different stories, and finally to each apartment—with which cities everywhere were supplied during the second half of the nineteenth century, was the first prerequisite before the bath could achieve a stable position. The bath of the forties was merely a recess in the bedroom with only a cold water supply; no waste and no overflow, fig.36.

When the bath first found a place in a proper bathroom with running water, sheet-metal fixtures were considered most practical and simple. Further development brought the bathtub, around 1890, to be artfully concealed in a piece of wooden furniture, fig.37.

36 The domestic “Bathroom” of the 1846
37 Bath-tub around 1890
38 The English bathroom at the turn of the 20th century
At the turn of the twentieth century, the upper-class English viewed the bath as a relatively spacious affair with expensive fixtures, fig. 38. This was, of course, a matter of conspicuous luxury: "The doubleshelled porcelain tub of the English luxurious bathroom—of 1900—was individually built, like a Rolls Royce."  

The Americans, who took over the lead in the twentieth century, viewed the bathroom as a cell large enough to hold the fixtures, an adjunct to the bedroom. The American type developed outside the home—in the hotel. The prototype of the compact bathroom appeared in 1908. The bathroom became smaller, with all the fittings and plumbing on one wall, fig. 39. Finally, when Western civilization made up its mind as to what form of bath it really wanted (around 1915 to 1920), the built-in tub enameled on the inside only became a standard in determining the breadth of the bath-cell. However, the bathroom with an enameled bathtub, coupled with running hot and cold water which gave the tub its meaning, was not taken for granted until the 'forties. It then became an actuality in every rational housing program: for every dwelling, even the smallest, a bathroom.

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15 England at first surpassed other countries in sanitary articles (1880–1910).

16 The development required close to half a century, as the first cast-iron enameled tub made its appearance in America around 1870.

17 The outside surface was painted over or tiled in—as is still the European practice—or concealed by a separate one-piece enameled apron.
New trend

The bathroom, after its late development, has been getting more focus and attention as an important room in the dwelling. The house owner or the tenant in past days, was easily satisfied if he found the expected wash basin, toilet and tub or shower with minimum requirements. Floor space was usually at a minimum and little thought was given to lighting, space organization and layout. But now times have changed. Since the second World War the trend towards relaxation and leisure has grown. The general average income is higher and families have more money to invest in comfort for themselves. As a result the bathroom has become a more luxuriously-furnished room, especially in one-family houses, figs. 40–43. The number of baths in new homes has dramatically increased. The number of dwellings being built with more than one bath is steadily growing.

The modern bathroom is viewed utilitarian as well as a relaxing and attractive place. Good lighting for shaving and make-up, flat surfaces for setting down bottles and brushes, quiet fixtures, good ventilation, air conditioning, moisture-proof and water-proof surfaces, are all part of the design. Color, beautiful coverings and furnishings, elegant materials and lighting fixtures, have found their way into the modern bathroom to give it the "new look".

Classification

The bathroom can be classified with regard to the type of dwelling it serves, as follows:

In small blocks of flats, the bathroom and the kitchen are practically combined in one unit, with no regard to the location of the bedroom. The internal bathroom, using artificial light and ventilation, makes possible a more economical use of space.
In high-rise buildings, the bathroom may be adjacent to the sleeping wing and the kitchen to the living quarters, fig. 44. A separate lavatory near the entrance is recommended in large flats, fig. 45. In one-family houses of more than one floor, the living floor should be provided with a separate lavatory, fig. 46.

In large villas, especially luxurious ones, separate bath units are adjacent to every bedroom, and sometimes two bathrooms for one bedroom, figs. 47, 48. In many cases, such bathrooms are equipped with pool-type tubs.

Bathrooms usually contain a tub, wash basin, toilet and in large flats, a bidet. Separation of these facilities is useful, making possible their simultaneous use and improving sanitary conditions. If this separation is not possible, the toilet

Space organization
47. Habitation près de Paris, by A. Aalto: A separate bath-unit adjacent to every bedroom.

Glass-wall separates the toilet area, giving privacy but at the same time keeping an open feeling.

A bedroom-bathroom combination in the American style: suspended closets act as room dividers, by E. Jablow.

The different lengths of the rectangular bath-tub

is at least to be separated from bathing and washing accommodation, fig. 49. A dressing compartment adjacent to the bathroom and fitted out with adequate storage space, has great value.

Accessibility

The bathroom—from the American point of view—even if walled, is a unit with the bedroom. It is accessible directly from the bedroom, or through a dressing room, fig. 50.

On the other hand, the bathroom in European ground plans is often separated by a passage from the bedroom. If the toilet is separated, the entry would be from the bathing-space if not directly from the corridor.

Arrangement of fixtures

Bathtub: It should be installed on an internal wall. An external wall, especially directly under the window, is unsatisfactory. It may be perpendicular to the external wall. In internal bathrooms this problem does not exist. The bathtub may be in rectangular or square shape—diagonal or angle tub. The built-in tub has become a standard during the last few decades, fig. 51, because of its sanitary qualities, and practical maintenance.

Shower-bath: Its arrangement is the same as the bathtub with respect to the external wall. It is best for it to be arranged within a niche of three partitions,
provided with built-in shower-tub with the discharge of water in a corner to facilitate bathing. Today the combined shower and bathtub is common, while only separate shower enclosures are often provided in large flats.

**Wash-basin:** Every bathroom possesses a basin of 50–70 cm wide. Today, the long counter with two basins has become popular.

**Bidet:** The erection of a bidet with running cold and hot water, has also become popular in one-family houses as well as in flats.

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### 2.2. **Water Cure: “Hydrotherapy”**

Hydrotherapy is the scientific application of water to diseased conditions. The water-cure on a physiological basis, elevated water from its purely empirical uses—Hydropathy—into a scientific one.

The healing power of water played a great role in the medical practices of former cultures, as water is the only one of all remedial agents which has proved enduring since the dawn of medicine. Water as a curative agent had been utilized for a long time—over two thousand years—before its true action was scientifically studied:

The Ancient Egyptians appreciated the effects of water in their medicinal practices.

The Greek doctor viewed the patient in his total environment, taking the effect of water into account in any diagnosis. “The best is the water, as the true medium of healthy living” says the Greek poet Pindar.

The Roman, Islamic and Late Medieval baths had prophylactic as well as therapeutic effects, and the bath in these cultures was the center of medical practice. Even in the seventeenth century, when standards of hygiene were very low, watering places—spas—where people went for reasons of health, continued to be frequented.

At the beginning of the eighteenth century, voices began to advocate the therapeutic effects of water. The bath in those days was used for any but medical purposes. England is the birthplace of scientific hydrotherapy. In France, Doctor Poitevin established in the year 1761 the first bathing ship on the Seine for water cure. In that century, the old bathing resorts—spas—took on new life as people began to flock to them not only on the pretext of seeking health, but also for fashionable social intercourse. They became places for both health and pleasure, and accordingly a specialized type of town emerged, like Bath of England and others in Germany and France.

Early in the nineteenth century, the vapor baths came back in the form of private steam cubicles for medical purposes. Also shower baths—rain baths—were advocated for the same purpose, fig. 52.
The founder of the true water-cure was V. Priessnitz (1799–1851). Hydrotherapy was given a further push, when Doctor S. Kneipp (1821–1897), after years of experience, came to establish his health service at Wörishofen in 1860. He appreciated the healing force of nature, and water was the leitmotif of his treatment. Moreover Kneipp venerated the theory that "Prevention is better than cure" through the general—unspecific—effects of water. After 1860, hydro-pathic establishments multiplied and flourished, especially at spas and seaside resorts. Parallel to the water-cure was the atmospheric cure of Rikli (1860), based on the curative effects of solar irradiation.

Since that period, people have appreciated both the prophylactic and therapeutic effects of water. Moreover, numerous institutions came into existence at universities for practical hydrotherapeutic research, and the water-cure is no longer separated from Materia Medica.

Water as a curative agent

No other remedial agent has merited the confidence of physicians as much as water. It meets all therapeutic demands. Water is not only readily accessible, but also may be used in the liquid, solid and vaporized form, each of which has its own therapeutic value. The modifications to which water may be subjected, renders it a most flexible agent.

Physical characteristics of water:
1. The temperature of water may be readily changed and adapted to varying conditions. Moreover, water absorbs and gives off heat and cold quickly. In hydrotherapy, it acts as a medium for conveying temperatures—high and low—to the skin, thereby producing excitation of the peripheral sensory terminals, which are abundant in all parts of the skin.

   The excitation of the cutaneous nerves by the water is conveyed to the central nervous system and quickly reflected upon the organs.

2. Mechanical impact: this peculiarity of water is its capacity for being projected upon the body with more or less force. The mechanical impact of water delivered under pressure upon the skin produces an excitation of sensory terminals. This is demonstrated by the recognized superiority of the refreshing action of a shower over a tub bath.

Classification with respect to application

Hydrotherapy consists mainly of two forms:
1. External application of water in the form of baths, fig. 53.
2. Internal application through a drinking cure.

These two forms of hydrotherapy may be employed separately or together, and are often combined with atmospheric therapy, which is complementary to the water cure.

Curative baths

Water and the skin are the chief elements of this therapy. It has a specific curative effect on certain diseases, which comes through the general effect of water. Curative baths first cause a general change in reactivity of the body, before their specific component is able to take effect.
Different functions of curative baths:

**As a stimulant:** The stimulating effect of cold water—below skin temperature—is well known in the treatment of a fainting person, in case of typhoid fever and similar ailments.

**As a sedative:** Water is used in the calming of patients, through the soothing effect of continuous baths at body temperature—neutral baths, 34–37° C.

**As a diaphoretic:** The hot bath, in which the heat stimulates the skin and sweat glands, promoting the elimination of waste products, is well known even to the layman.

Massage is closely connected with bathing-therapy. It has its meaning in the treatment of physical exhaustion. The art of massage was well appreciated in nearly all the former great cultures.

The same applies when waters are taken internally. There is a difference only in the mode of action on the body. While the curative baths act primarily on the skin, the drinking cure influences primarily the water balance of the body, which then leads to a general effect at first and a specific one later. Drinking cure may act as a diuretic, an emetic or a purgative.

Therapeutic application of water, whether in the form of ablution, bath, shower, vapor or wet-dressing, represents an "irritation" therapy which is mainly based on physiological law. Since the application area is the skin, it is necessary to outline briefly here its structure and physiology:

- **The protective epidermis:** Although not supplied with blood-vessels and nerves, it is able to convey sensory impressions to the underlying part, the true structure of the skin, which contains elastic and muscular fibers.
The elastic fibers form a network, which by its structure admits the bloodvessels and nerves which endow the skin with the most important function connected with hydrotherapy.

"The cutaneous nerve endings are constantly exposed to irritation by heat and cold, which they convey to the vasomotor, respiratory and cardiac centers, and the muscles, in order to arouse in them, by reflex action, such a degree of innervation as may be required to ward off any damaging influence that may approach from without."

54 Autonomic Nervous System: Through sympathetic and parasympathetic systems, nervous system has a thorough connection with all the organs of the organism.
This is the actual physiological basis of hydrotherapy, which adapts its attacks by cold and heat according to each individual case. Water below the temperature of the skin, is in practice preferable for therapeutic purposes. Cold water, in spite of its first depressing action, quickly stimulates—active action, while water considerably above the temperature of the skin has the opposite effect—passive action. Moreover hot water cannot be safely used above certain temperatures.

The effects of this irritation-therapy are thermal, mechanical and chemical. It has an effect, through the physical process, on the chemical one; i.e., through thermal and mechanical application on the nerve endings, which by means of the autonomic nervous system, affect the functions of all internal organs—the whole complex of the biological process, fig.54. The vasomotor—the physiological contact between the nervous system and muscles—plays a great role here, causing the constriction and dilatation of the blood-vessels. The reaction is mainly a positive change in blood circulation under the applied therapy.

The temperature, duration and mechanical action of each procedure determine its therapeutic action, because these elements determine the extent of the excitation of cutaneous nerves. Reaction is modified by the patient's physical and mental condition, as well as the nature and stage of the malady.

Mineral waters

Effect of the mineral elements of watering places "Spas":
Mineralized waters could be regarded as outside the scope of work on hydrotherapy. Their action when externally applied—curative baths—is due only to the temperature conveyed to the skin and the mechanical impact, unless the mineral elements of spring water are absorbed through the skin or promote the therapeutic effect of the water. For example, the presence of the saline in Carbon Dioxide mineral baths for cardiac diseases, further the absorption of carbon dioxide into the blood, which acts as a stimulant to the respiratory center increasing the volume of respiration. In general, the addition of some herbs or salines intensifies the effect of the curative bath. This reabsorbed matter through the pores of the skin, gets to particular organs through the blood and lymph.

Partial baths

The partial baths known as "Kneipp Treatment," have a localized effect. In the case of cold local application of water, the muscular and elastic fibers of the skin constrict, which results in pressing the blood out of the cutaneous vessels. When the cold is removed, the constricted fibers relax slowly, being warmed by the blood flowing—through the action of vasomotors—into the affected part from all sides. The blood will flow more freely than in the previous normal state. The result is a tonic effect—Hyperemia—of longer or shorter duration through the stimulating effect of applied cold. Reciprocal action—from short cold application to penetrating heat action—is more effective and, as described by Kneipp: "These baths are effective for the abdomen, they stimulate weak digestion, movement of the bowels and regulate blood circulation."

Hydrotherapeutic application, in general, is effective for nearly all organic diseases: Heart, digestive organs, kidneys, blood vessels and feverish infections, as well as for paralysis. Through water applications, the circulation...
and internal secretions can be enhanced or retarded and the blood distribution affected as well. A general increase or decrease in the body temperature is produced through the effect of a hot or cold bath on the heat-regulating center. Excretions are enhanced in diseased conditions through the skin and kidneys, which both act to excrete many harmful elements. However, specific treatment for diseases comes through the general effect of water application, as well as its local effect. In Japan, for example, with its high frequency of hot-water bathing, maladies of heart and rheumatism are rare.

**As prophylactic**

Hydrotherapy in the treatment of autonomic disturbances: Water applications not only serve the function of restoring the ill to health, they have other possibilities far beyond this. The application of water has a quite general effect on the body for those who have specific diseases and also for those who are perfectly healthy or perhaps in need of a rest.

In modern life, particularly in big cities, the autonomic nervous system tends to become heavily overstrained, overstimulated and weakened. The efficiency of the whole organism depends largely on the efficiency of this system, as it controls, through the sympathetic and parasympathetic system, the function of all the organs and affects internal secretions. In case of any autonomic disturbances—nervousness, exhaustion or debility—the efficiency of the organism is reduced, resulting in such diseases as heart, digestive disturbances, cold hands and feet and similar organic symptoms. Through the unspecific effect of water application, which modifies this system and changes its reaction, lies its significance as a prophylactic agent.

General treatment by water attempts to restore to the incorrectly functioning organism a healthy reactivity to external stimuli and to secure balanced action between individual organs. The harmony thus acquired makes it impossible for the disease to continue or to gain a foothold.

Thus, hydrotherapeutic applications are not only significant for the sick; for persons who are no longer quite well and whose organisms have already been thrown off balance; but also for entirely healthy people.

The preceding therapeutic or prophylactic applications of water may be administered at home, medicinal baths, spas, and vapor baths.

In general, nearly all types of water applications are practiced at recognized watering places, which have for centuries been in use for hydrotherapy. A visit to a spa today means treatment and a relaxing vacation in a natural atmosphere.

Vapor baths and Sauna, with their therapeutic and prophylactic effects, stand today at the disposal of the sick as well as of the healthy.

Medicinal baths are equipped with the various bathing accommodations which are necessary for executing the different hydrotherapeutic procedures.

Here we should not neglect to mention the physiological effects, of cold water application through normal bathing and swimming.

Hence, hydrotherapeutics today could not be separated or isolated from the entire scope of the bathing and swimming system. The bath, in whatever form and pattern, acts to safeguard and promote one's health.
2.3. Recreational Bathing Facilities

Significance of recreation in modern life: Recreation, defined as "all types of leisure-time activities which contribute to human happiness," is a fundamental need. Recreation has maintained its place of importance through the rapid changes that have taken place since the turn of the century. These changes have stimulated the growth of recreational facilities.

Growth of cities

The random growth of our cities deprived people of many natural facilities for recreation. This growth also resulted in the pollution of streams, lakes and coastal areas. Moreover, the changes in home-life, resulting from the rapid increase of multiple-family houses has necessitated the provision of outdoor recreational facilities. The city-dweller must be provided with space for his leisure-time activities within the framework of modern urban living.

Speed of life and monotony of work

Man today not only lives in often unsuitable urban surroundings, but the highly accelerated speed of living as well as monotony of work due to specialization and mechanization, results in a level of nervous tension and pressure to which he is not accustomed. Overstrained modern man needs a chance to relax, to counteract the effects of the conditions under which he lives and works. This need to relieve tension calls for recreational facilities as an integral part of modern life.

More leisure

On the other hand, people have been provided with more and more time for leisure.

55 Recreational needs of different age groups, made by the Dutch group of C.I.A.M. for the city of Rotterdam: of which aquatic activities have the lion's share
Water is the "magic element" for the child; it provides many chances for adventure and the exercise of imagination and affords an outlet for his growing physical strength: It gives him e.g., a chance to know what fishing is, to sail his model boat. Water can be watched pouring, trickling, flowing—water seeping into sand—and the wet sand that can be molded.

Thanks to labor-saving devices at home, the housewife has gained more time to spend on leisure activities. Developments in automation have created more leisure time and shorter working hours: Shorter working hours per day, the five-day week and more vacations with pay a year in this "Electronic, Atomic and Chemical" Age contrast sharply with the lack of leisure which the worker had during the "simple machine age".

Earlier retirement and longer life because of medical progress have created new social problems, insofar as a great number of people have nothing but
leisure. Sufficient recreational facilities must be provided to accommodate them. The more leisure we gain, the more human we shall become.

Aquatic activities: The interest in bathing and swimming activities has grown in the last few decades. This is attributable to the value and satisfactions which these regenerative activities bring to people of all ages: children, adolescents, adults, and the “old folks”.

57 In some water activities, such as sailing and water-ski, the adventurous desire of the participant is fulfilled and mental activity may be stimulated as well.
Water activities have value for all people of every country. They provide active participation on the one hand and quiet relaxation on the other. Through them, one attains the enjoyment of one's physical power as well as relaxation. There are passive as well as active forms of recreation.

Although we stand today in a new era of development in public bathing, the number of public baths in relation to the population density of our cities still appears deficient, especially if we think of the size and number of the Roman thermae by way of comparison.

For the child

Water games for the child are important requisites for mental and physical growth. To him, water is the "magic element" which provides many chances for adventure and the exercise of imagination, fig. 56. A children's playground does not have to have too many elements, as long as one of them is water. Water as a base for physical activities is an outlet for the child's growing physical strength. Through the physiological effects of water, these activities are "growth-giving". They help the child to enjoy a healthy and happy life.

For the adult

In the case of the adult, water activities are required for the restoration of his physical and mental energies. On the one hand, they afford satisfying outlets for physical energy in the form of training and exercise of the muscles. On the other, they provide rest and relaxation after work. In both cases they function to balance life in relation to work.

In some water activities, the adventurous desire of the participant is fulfilled and mental activity may be stimulated as well. An excellent example is sailing, in which the participant has to study and observe the wind, waves, etc., fig. 57.

Old age is closely associated with recreation or amusement, which represents a social problem. Today many types of aquatic programs rather than swimming, may be provided that will broaden the lives of oldsters and to offer them an opportunity of an active life. They may share the activity of racing their miniature sailboats on a large lake set aside for this purpose, an activity which has become popular in recent years.
For older adults

"Old age = retirement = leisure." Care and protection of health is the prime need in the life of older individuals. An elderly person can continue a normal active life much longer if he perseveres in water activities, as they prevent physiological decay. Bathing and swimming help keep the organism in tune and the participant young and fresh in appearance despite his age. Moreover bathing loosens and relaxes the body, and is thus conducive to healthy rest. It induces pleasure and cheerfulness.

Bathing and health

Without water, we cannot lead a healthy life. Bathing and swimming contribute to the physical and mental well-being of the individual. Through their physiological effects on the body in general, bathing and swimming activities are the best known means of developing and maintaining healthy organs.

Physiological effects of bathing and swimming:
1. Cleansing effect.
2. Increased circulation, greater respiration and better elimination of waste matters, stimulation of the heart.
3. Swimming has a tonic action and induces an appetite. (The extra food is needed to counteract the loss of body-heat.) Digestion is also improved. Thus, the significance of bathing activities in public health is evident. "The bath should be a fountain of youth."

Bathing and sociability

Bathing and swimming activities favor social intercourse. They furnish outlets for the desire for social relationships. In this way they contribute to character development of the individual as a member of the community.

Bathing and equality

Bathing and swimming draw people together from various walks of life, regardless of their economic status, social position, race, creed, nationality, or education. They contribute to the democratic principles of equality between individuals, as they share the same pool for their activities. The swimming pool may be a crucible in which people of different ages and distinct groups are fused together in common humanity.

2.3.1. Paddling Facilities

Water games, as has been mentioned before, are important during childhood. Wading facilities are the most common means of providing water games at any children's playground and at bathing centers as well. Wading facilities vary in size, form and depth according to the varying conditions, number and age of children for which they are intended.
Classification of paddling facilities

Spray and shower facilities are the simplest means of meeting the demand for water games. These facilities—in the form of spray nozzles or jets—bring pleasure to the children, through the mechanical effects of water, and offer opportunities for imaginative games. They are economical to erect and maintain. They are also flexible, as they can be modified according to the age-group for which they are intended, fig. 59.

Spray facilities are usually provided with one enlarged basin called a spray pool, where a few centimeters of water can be retained to approximate wading conditions. These basins are of varying sizes and provided with suitable outlet-drains.

As the name indicates, the enlarged basin of any fountain may be used for wading and paddling, fig. 60. In Switzerland, the paddling fountain has become popular during the last few years, especially in children’s playgrounds where it is not practical to provide a large wading pool.

The typical Swiss paddling fountain consists of a number of basins of about 2 m in diameter at varying heights, fig. 61. The water flows from the central fountain into the highest basin, then to the next, finally to the lowest one. The water level in every drum is about 10 cm. The advantages of such wading structure are: Due to the constant flow of water, the wading fountain does not get soiled as quickly as other pools do. Small children can play without danger in the various basins which correspond to their sizes.
61 Paddling fountain at Heiligfeld playground, Zurich

62 Paddling pool affords the children the opportunity of sailing their model-boats
Wading pool

The wading or paddling pool is the most popular of these facilities. It is usually found in bathing and swimming centers. It provides a place where the young child may lose his fear and shyness of water, and make his first attempts at swimming.

This type of pool also affords the children the opportunity of sailing model boats, fig. 62. Usually two pools are provided, one for wading and one for sailing, or an enlarged lagoon for both.

In case one of the preceding forms cannot be provided for children in one of their playgrounds, a simple fountain should be erected for drinking, from which the children can also bring water to their sandpile so that it can be molded, fig. 63. This simple drinking fountain is no substitute for any of the wading facilities; only if the latter are not desired or not practical, should it be provided.

Different forms of paddling pool

The paddling pool can be classified with regard to its form, into the following main types:

1. **The normal wading pool**: This artificial pool which is built of concrete and filled from the city's water supply, is of the same depth throughout, having a slight slope towards the center or to the outlet drain, fig. 64. It may have a rectangular, circular or informal shape. The water depth varies between 20–40 cm, and pools with a depth of more than 40 cm are outside the scope of wading facilities. The size of the wading pool is determined by the number of children for which it is intended.
2. The wading beach: This form is designed to simulate the atmosphere of the seaside, fig.65. It provides the child with both water and sand to play with. Water seeps into sand so that wet sand may be molded.

3. Wading stream: Since the child loves beauty and natural elements, the flowing stream-like pool, fig.66, of pure water is an ideal solution. It meets the adventurous spirit of the child. But this idea is difficult to realize in urban areas and the water tends to be quickly polluted. Sometimes in suburban areas the wading pool adjoins a natural body of water, fig.67.
Besides measures which should be taken for the safety and convenience of the child in the design of a wading pool, the facility should also be attractive. One of the most attractive features at a wading pool can be the water-chute, as well as an abstract play sculpture, fig.68. Special attention should be given to the materials used in construction.

A well-designed and constructed pool with regard to drainage, water supply, outlet controls, and the surrounding area, will minimize the problem of operation and maintenance. However, special considerations to meet varying local conditions should be noted on one hand with regard to the operation of the pool, and on the other to the health and safety of the children.

A combination of spray pool or paddling fountain with a paddling pool may be attempted, figs.69, 70. This combination, with running water, has the advantage of being more hygienic. While the water of the normal wading pool should be
treated daily under normal conditions, in this case cleansing may take place once a week (depending mainly on the amount of use). Moreover, such combined pool offers the possibility for the young child to wade and paddle safely in the fountain, while the older child of elementary-school age may use the pool without any clash between them. Also, in cold weather the fountain may be kept in operation and the pool empty.

**Paddling Facilities as an Element in Children's Playgrounds:**

For the small child

Since water has a great fascination for children, facilities for water-games should never be omitted from their playgrounds. The paddling pool which is complementary to the sandpit, is intended to serve small children up to 7 years. It may be located in the interior of a large town block, or near the center of several multiple-family housing units. At any recreation center, an area is usually set aside as a small children's playground with a small pool for paddling. It should not be necessary for a small child to cross busy streets in order to reach the pool. The pool should be located within a clear view of all dwellings it serves, so that the children can remain under the supervision of their mothers. It usually serves from 100 to 150 tots within an effective service radius of about 200 m. This assumes a resident population of 1000–2000. The pool should be near a shelter and rest area in which benches for mothers are provided.

For the older child

According to the growing interest in and importance of water-games for children, the phenomenon of the completely aquatic playground is a new trend which has appeared during the last few years. This type of playground provides
opportunities for children of all ages to take part in a variety of water activities. In this case, a small pool should be set aside for the use of the pre-school age children to keep them safe from the older children's activities. An area of about 400–900 m² for water games, usually adjoins or interconnects with the neighborhood playground. It may also adjoin the elementary school playing area, in which it could be used during and after school hours, and part of the school building can serve the purpose of a shelter house. Playgrounds may be designed with water as their main element, or they may be completely designed as aquatic playgrounds.

Practical applications: We shall review some examples in different localities, giving data with regard to population served, water area and type of paddling facilities provided in each playground.

71 Paddling pool on the open roof terrace of “Unité d’habitation” at Marseille
   a View of the paddling pool
   b Plan of the playground: 8 the paddling pool

72 “Heiligfeld” housing estate, Zurich
Roof playgrounds

Small children's playgrounds

"Unité d'habitation" at Marseille, by Le Corbusier:
The rectangular paddling pool, which measures 5 by 10 m, forms part of a small children's playground, fig.71. It is sited on the open roof terrace of Unité d'habitation, Marseille, which comprises 337 flats.

73 a

Children's playground at "Heiligfeld" housing estate, Zurich
a A view of the paddling fountain together with the sandpit where wet sand can be molded
b A view of the fountain from the western side
c Plan of the playground: 2 sandpit, 3 paddling fountain
Playground for small children at the "Heiligfeld" housing estate: This playground, which covers an area of about 1500 m², possesses a small paddling fountain with water surface of 25 m², fig. 73. It serves a group of housing units comprising about 330 flats within a radius of 150 m. The paddling fountain consists of brightly colored concrete drums 2 m in diameter, in different heights. The water runs from the central fountain into the highest basin, and then down from one basin to another. The water is retained in each drum to a level of about 10 cm. Due to the constant flow of water, the pool does not get soiled as quickly as other pools do. Such shallow, small basins are particularly suitable for the young child who can paddle without danger. A sandpit adjoins the fountain providing a simultaneous opportunity for mucking about.

Playground in the Pedregulho housing estate, in Rio de Janeiro, Brazil: The playground is intended to serve the children of a housing estate which comprises about 500 flats. It possesses a paddling pool which has an informal shape and covers an area of about 100 m². The pool is placed close to the sandpit, fig. 74.

Design for a playground at a housing estate, in London: This playground is planned to serve children between the ages of 2 and 12 years. The wading "beach" is its characteristic feature, in which the paddling area is combined with the sandpit and approximates the atmosphere of the seaside, fig. 75. The water area of the pool is more than 200 m², and nearby there are seats for mothers. The pool has a gradual slope, in which the deep section of the pool can be used by older children.
Playgrounds for all age groups

Although the following examples, are playgrounds for all age groups, an area in each is devoted to small children, with paddling facilities.

Robinson playground at Wipkingen, Zurich:
The whole area, which covers about one hectare, comprises a number of zones for different activities, fig. 76. There is a playground 'V' for small children.
with a sandpit and a combined paddling fountain and pool. The fountain consists of five concrete drums of 2 m diameter, in which water flows continuously from one basin to the other down to the large pool which measures 10 by 10 m. The continuous flow of water reduces the danger of pollution.

Design for a playground at Wildermethmatte near Biel, Switzerland: An area at the eastern edge is planned to serve small children, having a paddling pool, and a sandpit connected to each other by means of a bridge, fig. 77. The pool is large enough, so that it can be used for paddling and sailing model-boats as well. The water area is about 120 m². On this playground, and near the pool, there is a shelter house—Pavilion covered with canvas—and pergola with seats in the shade.

Small children's playground in the Mitchell recreation park, at Palo Alto, USA: A circular area is devoted entirely to small children and surrounded by a wooden fence, fig. 78. The paddling pool and sandpit are the two characteristic features of this playground, which have free shapes. The pool covers an area of about 100 m² and is used for paddling and model-boat sailing.
79a Plan of the playground: 5 the boggy pond, 8 the stream
Playgrounds with water as their main element

Robinson playground at the federal horticultural exhibition 1959, Dortmund: The chief attraction of this playground is its stream and boggy pond. The playground covers an area of about 4 acres, of which 4% is water, fig. 79. In the large pond, children can navigate in round small boats and wade as well in the shallow water. Wading facilities in that form represent a new trend, providing for the child's the first attempts at boating, and leading him on to more imaginative activity.

Red indian playground at Mannheim, Germany:
This playground forms part of a Youth Center and serves children of all ages, fig. 80. As the name indicates, the playground has a wild character, with water as its main element. The water covers an area of about 500 m² and comprises a small pond and stream on a higher level, fig. 66, and a large shallow pond of informal shape below. On one side of the larger pond, there is a water fall about 4 m high.

These water elements help to create the required wild and romantic atmosphere which stimulates the adventurous spirit of children. They also offer sufficient opportunities for water games of all kinds. The large pond, which is surrounded by two stepped rows of stone seats, could be used as a skating rink in the winter as well.
Design for a playground at the Spa of Grenchen, Switzerland:
This playground which was designed—1956—with water as its main element, forms part of an open air swimming pool, fig. 81.
The characteristic feature in this as yet unrealized design, is the stream, in which children can navigate in small boats. The boats will be manually propelled, and moored at a primitive village which consists of open huts on poles. The village adjoins the widest section of the stream, which is called: “the ocean”.
In this ocean—with shallow water—a larger boat will be at anchor. The children can climb this boat by means of rope ladders or through a series of stepping poles in the shallow water of the ocean.
The child in his round trip in the stream, passes by a harbor, a lighthouse, and under arches bridging the stream and tunnels made of curved concrete castings. The playground also has a sandpit which lies beside an artificial hill away from the water activities. On the other side and near the bend of the stream, a paddling pool for small children is situated and connected with the island with a bridge.

**Water playgrounds at Düsseldorf, Germany**

This is one of the water playgrounds which have been installed during the last few years in Düsseldorf. They have been established on the premise that paddling pools generally get dirty quickly and can only be built and maintained at comparatively high cost.

Paddling areas, paved on a slight incline, have climbing and hopping equipment which also discharges water by means of jets and revolving sprays, fig.82. Made of galvanised or painted steel tubes, it is assembled in different combinations 'a, b, c, d' which can be modified according to the age group for which it is intended.

'a' Large climbing structure of tubular steel with jets, fig.83.

'b' Curved horizontal bar with water jets, fig.84.

'c' Automatic splashing device. Water pouring into the bowl, turns it over and returns it back to its former position, fig.85.

'd' Circular pipes with jets directed to the outside and inside alternately, fig.59.

The area is also equipped with movable sprays, fig.86, at the outer edge at several points, with the help of which the slab is kept clean by children playing with the pipes. The water is drained through a channel at the lowest point of the paving.
On the other side of the shelter house, which contains an attendant's room, storeroom and lavatories, a small pool is provided for young children to paddle in safely far from the older children.

82 Plan of one of the water playgrounds at Düsseldorf: 1 spray paddling equipment, 2 open channel, 3 movable sprays, 4 paddling pool for small children, 5 shelter house, 6 small children's playground, 7 open green area

83 Climbing structure of tubular steel with jets at the top
2.3.2. General Bathing and Swimming Pools

General bathing and swimming pools, for adults, form today an integral part of the community’s recreational facilities. They are usually more fully realized out of doors, than at indoor grounds. The latter are less common because of:

1. Higher costs of construction for the indoor bath.
2. Limits in size of covered pools and in number of bathers able to be accommodated, in comparison with the open ones.
3. Atmospheric and sun-bathing being complementary features to the recreational swimming facilities.

The aim is to provide for the general public recreational facilities in water, air, sun in the most natural form. Such bathing facilities are usually adjacent to, or form part of, a recreation center.

During the last few decades, efforts have been made to encourage participation in swimming activities by the general public rather than by a few highly skilled participants. Besides informal bathing, swimming and other water games, diving has become one of the most popular activities because it satisfies the human interest in physical performance.

Areas for diving and areas for swimming should be separated in order that persons can swim without worrying that they will come into dangerous contact with someone hurtling down from the diving board. At the same time, since such a pool is meant for all people, and in order to protect the non-swimmers from the danger of drowning, separate areas for swimmers and non-swimmers should be maintained.
This ideal is most easily fulfilled in the case of the open-air bath, where every section can have its necessary surroundings and characteristics.

The shape of the general swimming pools usually follows no hard or fast lines. In general, the metric distance-markings, racing lanes and starting blocks are not requisites as in the competition pool.

The actual dimensions of the water areas provided for these activities, depends on the number of visitors with respect to the community population.

The most important provisions, besides those normal ones necessary for any bathing ground (filtration and heating), are the changing and lavatory accommodations. They should be adequate in relation to the size of population for which they are intended.

The most economical solution to the problem of changing-facilities, is for each bather to change in a cubicle and then deposit his or her clothes in a numbered container which is handed to an attendant.

At such types of pools, water chutes are an attractive feature to both swimmers and non-swimmers.

Moreover, artificial waves may be produced to approximate the effect of sea-atmosphere. This will give added enjoyment to the bathers.

2.3.3. Bathing Beaches

This term includes all natural bodies of water such as streams, lakes and seashores, which can be used for bathing and swimming. Nearly all countries have natural bathing facilities.

At the turn of the century, a great percentage of towns having water-fronts, wasted their natural bathing resources. Water-fronts have, since the second half of the 19th century, been occupied by industrial structures, private establishments, etc., to a great extent.

This situation steadily increased until the first few decades of the 20th century, resulting in destruction and disappearance of many bathing beaches whose natural advantages could have been utilized for recreation. For example, a report by the United States Department of Agriculture showed that in 1939 only 1% of the entire coastline of the country was open to the public. Fig.88 also points up the rapid rate of disappearance of bathing beaches of the B-W-A area shoreland: From 265 miles of public beaches for a population of 1'000'000 in 1910, they dwindled to a mere 48 miles for a population of 1'700'000 in 1935. Hygienic requirements were also overlooked.

Natural bodies of water, being polluted, have become a source of many diseases and other inconveniences to bathers. In Europe, polio and typhoid infections are a danger, and in Egypt, for example, bathing in the Nile is responsible for the spreading of Ancylostoma in the country.

However, bathing infections are rare in relation to the vast numbers of bathers. This is due to the fact that the majority of those who indulge in this activity are fairly healthy people who have a degree of resistance to diseases; and the Pathogenic Bacteria is only dangerous when taken internally (drinking the bathing water).
Sources of pollution

Pollution is usually caused by sewage from private establishments or the public sewage system, refuse dumping, industrial and special chemical wastes and the bathers themselves.

Sea beaches: The hazard of pollution in tidal waters is less than that in streams and lakes. Sea water has a chemical and biological self-cleansing power which lessens its danger and dilutes it to a considerable degree. The Pathogenic Bacteria perish through contact with sea-water because of the high percentage of salines and the action of plankton.

The bacteria may also be carried away from the shores and bathing places by the tides.

Accordingly, tidal bathing beaches are the most highly recommended hygienically as well-suited to serve the general public—unless they are close to the delta of a great river where pollution is more concentrated.
Classification of beaches according to location

These beaches may be within the boundaries of an urban area or on the immediate outskirts. They can be utilized daily by the masses in the adjacent sector or district of the town. Their importance lies in the fact that they serve a tremendous number of people, who are thus enabled to enjoy the water, sunlight, fresh air, and open space, within the limits of their towns. The availability of such bathing places affects the planning of open-air baths in a town—such as in Stockholm and Zurich, for example, fig. 89.

Bathing resorts on a regional scale outside of town limits:
These beaches exist in nearly every country, and provide bathing and recreational facilities of a larger scope for more than one town, sometimes for an entire metropolitan region. They are often outside the corporate boundaries of the towns which they serve, and serve as week-end and vacation summer bathing resorts. Modern transportation, parkways, and the rapid increase in the number of automobiles in recent decades, have contributed to make bathing beaches outside the town limits more accessible, thereby attracting an increasing number of visitors.

This type of beach serves two purposes:
1. They preserve a portion of the natural waterfront, thus providing city-dwellers with a relief from urban surroundings.
2. They supplement the bathing facilities available within an urban area.

Need for planning

Those cities with water-fronts suitable for bathing which have been acquired in time and developed for such use are fortunate indeed. Consequently cities have taken steps to correct the situations which have led to the disappearance of their beaches.

Outstanding examples of such action, during the first half of this century, were the reclaiming and rehabilitation of lake-front property in Chicago, fig. 90, which was a pioneer effort of its kind; and the remarkable progress which New York City has made toward restoring its waterfront for bathing and other recreational purposes, fig. 91.

Since then, this movement has become steadily more widespread and there has been a growing tendency for cities to acquire and preserve their water-fronts, and rehabilitate them for recreational use.

The aim of planning should be two-fold:
1. To re-design, enlarge the existing beaches which no longer meet existing requirements, and to eliminate all sources of pollution. Water-fronts which have been occupied by industrial and obsolete structures should be cleared, reclaimed and rehabilitated for recreational use.
2. To provide new, larger bathing beaches for the growing masses. Waterfronts acquired for these purposes, which have retained their original and natural beauty, should be protected by legislation against damage and water pollution.

The next step is the improvement of public transportation facilities, in order that city-dwellers may have easy access to the beaches. Beach sites should have the necessary space set aside for the parking of cars and bicycles, the space allotment depending on the expected number of motorist visitors. This differs from one locality to another according to the ratio of automobiles to inhabitants.

Highways should neither traverse nor border the beach site. Access from the highway should be through a secondary short approach leading to the parking ground near the beach. Public transportation stations—such as trains and bus lines—should be near the beach site and provided with large spaces which allow for the mass movement necessary, with a minimum of congestion.
Basic principles for planning of bathing beaches

Size

Bathing beaches may occupy only a relatively small tract of land, or may extend several miles along natural bodies of water. Which size is preferable and provides the most suitable and comfortable facilities? Although the latter is very common, the endless stream of crowds of people lend an impersonal atmosphere. A rather limited beach is more intimate and provides the most comfortable facilities.

Hygienic demands

Water should be clean, odourless, and transparent. The depth of vision should reach at least one meter\(^9\).

Moreover, bathing places should be free from alluvium which shelters many pathogenic germs, vegetation and algae which hinder bathing as well as give water a bad taste, smell and appearance.

The chemical composition of water should be as neutral as possible, because a high alkaline content attacks the acidic coat of the skin, with the result that the skin loses its resistance to external irritations. The recommended value of pH for public bathing may vary between 7.0 and 8.2. The maximum permissible figure may be increased to 8.5–8.6, after which the water will be irritable.

Faecal (organic) pollution, which represents the main problem, calls for great attention. Sewage water of towns and villages should pass through a purification plant\(^20\) before it is admitted to a natural body of water. This will reduce the hazard of faecal pollution.

By means of chemical analysis, the percentage of Ammonia according to the decomposition of organic matters should not exceed 0.5 mg/liter. A higher ratio indicates strong pollution.

\(^9\) According to the hygienic demands of European Federation for protection of water: "Informationsblatt 1962".

\(^20\) This system of "Kläranlage" for sewage-water has been recently developed in many towns, such as Zurich.
Coli-test: The permissible standard strength of pollution is from 1.0+ to 0.1+.
The standard of 0.01+ may be taken as the maximum limit of pollution, after
which bathing must be prohibited.

Although the preceding chemical and bacteriological analysis may determine
the percentage of pollution in time, they do not give a general sanitary judgment
of the water intended for bathing, for which biological examination is required.
The latter, wider in scope, takes into consideration the entire local conditions,
self-cleansing property of the water and sources of pollution.
For example, the disappearance of pathogenic bacteria does not mean that the
water is entirely safe. Sometimes there may be foreign matter present which
cause these germs to perish, but at the same time is itself dangerous to bathers.

A bathing place should be at a considerable distance from sources of pollution
(at least 1 km), because the hazard from a relatively small amount of sewage
in close proximity to a bathing area, for example, is far greater than that created
by a large amount from a great distance.
Bathing in small bodies of water, or in stagnant water, especially by a great
number of people, is not recommended unless disinfection is provided to
counteract the pollution introduced from the bathers themselves.

Safety demands and equipment

A bathing beach is usually frequented by a relatively small number of children
in comparison with the number of those visiting open-air swimming pools.
That is due to the fact that there exists a danger of drowning for the beginners
at a beach. For this reason, safety measures are a prime factor in planning and
building up a bathing beach, and equipment must be provided from the very
beginning. A beach must not represent threats to bathers in the form of danger¬
ous fish, waves, etc.; and its site must be naturally protected against excessive
wind. Improvements in local beach conditions are required for the safety and
convenience of bathers.

Fences should be erected at beaches to facilitate control and restrict bathing to
supervised and safe areas only. A portion of the water surface should be marked
off for non-swimmers. This area may be enclosed on three sides by rope lines
supported by floats secured in place at various points and at the corners.
These marking lines extend outwards in the case of salt-water bathing beaches,
as far into the surf as bathing is ordinarily safe and free from danger of drown¬
ing for persons not expert in swimming. A floating pool may also be provided to
attain the maximum security for non-swimmers.

Areas to be used by swimmers should also be plainly shown, and in general
the limits of safe bathing should be indicated. Such limits may be marked by
buoys, poles or other markers which should be located not over 30 m apart
and of a type visible to bathers from a distance of at least 30 m.
Diving boards or platforms, sometimes floating, should be placed at a sufficient
water depth corresponding to their heights.
Towers for lifeguards on the beach, lifeboats, ring buoys (lifebelts), ropes, first-aid supplies and grappling irons which comprise the equipment essential to adequate protection of bathers should be provided at a beach. The number of these implements varies with the size of the beach and the number of people served.

An important factor is weather conditions. Bathers must be warned by various means (e.g., loudspeakers, flags, etc.) against bad weather, excessive wind and waves, and other threatening weather factors.

The ideal bathing beach should combine deep water for the experienced swimmer and shallow water for the non-swimmer, as well as the wading area for the child. It should have a gradual slope free from obstructions, such as rocks, stones and sharp matter; and a sand surface extending into the water beyond the wading area, fig.94.

Beaches, especially at high tide, should be built up in order to prevent the sand being washed away.

Other recreational facilities, such as playing and sports grounds and boating activities, add greatly to the popularity of the beach. These facilities may be located so as not to interfere with bathers.

Care should be taken that beaches, especially those within urban areas, do not present obstacles to promenaders. This may be achieved by means of an external walk-way outside the beach site.

Dressing facilities vary from simply beach huts (cabins) to beach-houses supplying, beside the necessary changing and lavatory accommodations, other refreshment and office facilities. The beach-house—a necessary feature—is especially needed at an extensive beach attracting large numbers of people from a considerable distance.
Bellerive beach at Lausanne, Switzerland. It is one of the early examples, 1937, on the lake of Geneva as a part of the rehabilitation of its fronts. The dressing-room building is over 200 m long curved around the shore. A sunbathing terrace tops the structure and a restaurant occupies the upper floor of the circular building.

a) The sun-bathing terrace looking towards south.
b) Cross section.
c) The two-storey dressing-room building looking towards the circular building which houses a restaurant and other refreshment and office facilities.

The building itself should not extend too far onto the sand beach, however ready access to the water is desirable. The number of changing and dressing facilities depends on the number of visitors of both sexes which the beach is intended to receive. Adequate shower-bath facilities with hot and cold water should be provided for both sexes, to permit all bathers to rinse off sand and dirt before entering the dressing rooms. Adequate and proper toilet facilities should also be provided. Foot troughs with running water are desirable at entrances to dressing facilities.

**Operation**

Bathing in general is an activity which appeals to people of all ages and sexes. It also affords an excellent means of social activity.
Water sports at beaches are one of the most popular forms of recreation during summer months. Hence, the operation of beaches is a major phase of the municipal recreation service during bathing season. Safety and convenience of the bathers require great attention.

Staff: To assure health, safety and enjoyment of all persons using the beach, there should be a well-trained staff present whenever the beach is open for public use. There should be a beach manager who is responsible and has the full authority for all beach activities. One or more lifeguards should be on duty during all bathing hours, the number required depending on the size of the beach and number of people served. Attendants at dressing and shower rooms as well as caretaker, are also required. The entire staff at a beach should be capable swimmers and competent in lifesaving methods.

Sanitary Control: The beach should always be maintained at a high standard of cleanliness. The sanitary condition of the water should be assured by continuous supervision. Disinfection is desirable, especially for small bodies of water, to counteract pollution introduced by bathers. In addition, care should be taken to assure the sanitary condition of dressing-room buildings, lavatory accommodations, and recreational grounds. Provisions should be made to collect refuse at the end of the day.

Safety: There should be safety rules and regulations posted at the beach indicating the water areas which may be used, the conditions of use, and the practices which are not permitted, and they must be strictly enforced. Lifesaving and first-aid equipment must be constantly available and in good condition. Lifeguards should not be in the water except in the line of duty. They should be stationed at convenient intervals along the beach.

Financial aspects: Fees for entrance and services, such as cabins, lockers, suits, towels, beach chairs and umbrellas may be collected, but there should be no attempt to profit from these services. They should be nominal, to permit the maximum number of people to enjoy the facilities.

2.4. Instructional Pools

Swimming instruction is an essential part of physical education for elementary-school children (7–14 years). This is an old concept inherited from Greek culture when the child, from the age of seven, received swimming instruction. No other aspect of physical education has been so universally accepted, and that because of the effects of swimming on the body.
From the revaluation of swimming emerged the demand that the pupil should not be allowed to leave his (or her) school unless he proves his swimming ability. The pupil should not only be taught the way, but also the worth of swimming. In this manner, youngsters are afforded an effective means of counteracting the unhealthy conditions of modern life. A swimming-proficiency certificate for the child is an insurance policy against many diseases, particularly nervous disorders.

Swimming instruction not only contributes to the physical well-being of the participant—through the hardening and proper development of the vital organs, but is a means of reducing the hazard of death by drowning. Moreover, a person cannot secure the fullest enjoyment from bathing unless he is familiar with the water and knows how to swim well.

Swimming instruction is usually carried on in two stages:
1. Elementary instruction: for the non-swimming child.

The first stage involves teaching the basic strokes. The child has to condition itself to the new element, and learn to control its movements. At this stage the child may be aided by artificial supports. Thus, the beginner's instructional pool requires neither large space nor deep water.

The second stage is to teach advanced swimmers, who are already accustomed to water, to attain greater proficiency in swimming, diving and life-saving. For this level of instruction, a larger instructional pool is required. A single such pool may be provided for a group of elementary schools.

At this stage, the pupil must not only be able to swim but should be able to give help to others. Life-saving should be an integral part of swimming instruction.

**Instructional Pools in Schools**

In some localities, instructional pools form part of open-air bathing grounds, in which case the swimming program is affected by climatic conditions. In some others, the pools are part of indoor baths which have a relatively large service radius. Instructional pools are intended to serve mainly schoolage children. Accordingly, they are best situated on the school premises rather than combined with public baths. In this case, the effective service radius is smaller, confined to each neighborhood. Instructional pools in schools are a new trend, in which the pool is combined with the gymnasium or auditorium, or located beneath the class-rooms. A self-contained school bath building is rare in practice.

Combined arrangements with Gymnasia may be useful, since changing and lavatory accommodations, as well as the heating installation, can be jointly utilized.

1. This combination may take place on the same groundfloor level, which will give the pool better daylight and ventilation.

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22 As in Zurich.
23 In Hannover, where studies have shown the advantages of indoor public baths.
2. A pool situated underneath the gymnasium is more economical, because it needs no additional space within the school ground. But at least one-third of the total height of the hall should be above the ground to provide natural lighting\(^\text{24}\).

Planning standards

One pool is required for every school which contains more than 12 classrooms, unless the school lies within the effective service radius of an indoor bath having an instructional pool\(^\text{25}\). Several schools, as long as they can be reached on foot within 15 minutes, may share a pool. The maximum number of classrooms which should share one pool is about sixty—or approximately 1500 pupils—so as to permit one swimming hour per week.

Use of instructional pools could be made by clubs in the evening for training, and this would be an advantage. In this case, a large multi-purpose pool may be provided, from which a small section is set aside and marked off for swimming instruction; or two separate pools, a small shallow one for instruction and another larger pool for advanced swimming. This type of arrangement is called a small indoor bath. It has been advocated in recent years because it can also serve the public within a small service radius. It is preferred particularly for small communities which cannot afford large indoor baths.

Architectural layout

Pool: The swimming pool measures 6.0–8.0 by 12.50–16.66 m, having a water depth\(^\text{26}\) of 0.80–1.25 m with gradual slope. The longer side is preferred to be a divisor of the standard hundred meter distance. Too great pool-depths should be avoided because of the accident risk. A few steps with handrails on one side of the pool, help the non-swimming pupil to step into and out of the water\(^\text{27}\). They should be provided on the longer side for the following reasons:

1. The child will be within easy reach of the shorter side, having a feeling of confidence as a beginner.
2. The longer side could be available for advanced swimming without obstacles.
3. A greater number of pupils can enter the water at one time.
4. On the other hand, the steps being erected on the shorter side would give additional length to the pool, and consequently a bad proportion to the hall.

Surrounding Area: The pool should have adequate passage space all around: 3 m at the entering side, 1 m at the opposite side, 2 m at both other sides.
Sunken lanes for teachers, which enable the instructor to be in close contact with the learner, are recommended. They are generally provided in Sweden, and are going to spread in other countries.

Built-up area: The size of the built-up area depends on the dimensions of the pool. An average of 26–30 m\(^3\) built-up space per m\(^2\) of water surface is required for a learner’s bath with a small pool, and 18–22 m\(^3\) for a bath with a relatively large pool\(^\text{28}\). The following table shows the required clear dimensions of the swimming hall relative to the pool size (with the steps being erected on the longer side):

\(^{24}\) The pool enclosure may also be a basement at one side, and a ground floor at the other.
\(^{25}\) According to recommendations of the German Swimming Association.
\(^{26}\) The depth of the pool (1.10–1.15)—(1.55–1.60).
\(^{27}\) In Germany, 6 steps are provided with total width of 1.86 m beyond the width of the pool, and total height of 1.10–1.15 m. Wider steps are recommended in Switzerland.
\(^{28}\) German standards, D.Fabian "Bäder".
Dimensions of the pool | Clear dimensions of the hall
---|---
6.00 by 12.50 | 11.86 by 16.50
8.00 by 12.50 | 13.86 by 16.50
6.00 by 16.66 | 11.86 by 20.67
8.00 by 16.66 | 13.86 by 20.67

The clear height of the hall should be at least 3.20 m. The dimensions of the gymnasium, under which the pool would be sited, as well as the number of pupils which would use the pool at one time, determine its size. In general, the most suitable pool length is 16.66 m. Benches should be provided on the wider side for pupils who wait their turn outside the water.

**Hygienic standards**

A learner's pool, which has a relatively small body of water, is heavily frequented. An average number of 40 pupils visits the pool during one hour. Accordingly, the hygienic level is of prime importance. The water of the pool should be changed once every two hours. A proper cleansing bath should be taken by each pupil before entering the pool.

**Changing rooms**

For pools which are devoted entirely to instruction, dressing facilities are usually communal rooms with benches and hooks. An area of 0.8 m² per pupil-visitor is sufficient, and two rooms, one for boys and one for girls, are preferred. The height of the rooms is about 2.80 m. Changing rooms, being situated on the way to shower rooms, should separate the "dry" and "wet" corridors. That may be achieved through cross-over benches. The pupil arrives on the dry side, takes off his shoes and crosses over to the wet side where he undresses. The wet side must have a non-slip floor which has to slope about 5% to the gullies.

If the pool is intended to serve other purposes after school hours, additional dressing facilities in the form of individual cubicles and lockers may be provided.

**Shower facilities**

Adequate shower facilities should be provided in direct contact with the pool enclosure. A room with about 12-15 showers is usually sufficient for each sex, in which the showers can be installed beside each other without separation. The shower room should be 2.80 m high and well ventilated without draughts. A proper cleansing bath should be taken before entering the pool²⁸. Foot-baths or showers should also be provided³⁰.

**Toilet facilities**

²⁸ A shower with warm water and soap is generally recommended.

³⁰ Foot-baths are sometimes provided covering the total width of the passage-way to the pool, with running water to a depth of 15-20 cm.

Toilet facilities should be adjacent to the dressing room and located for convenient use before the pupil enters the shower room (3 W.C.'s for girls and 1 W.C., 2 urinals for boys). In some localities, pupils are instructed to use the toilet, particularly to empty the bladder, before taking the cleansing bath and entering the pool. The pupil who leaves the pool to use the toilet is also required to take a second cleansing bath before returning.
In addition to the required distinction between dry and wet areas, pupils should have a way of returning directly to the dressing room. This creates uninterrupted circulation, enabling the next class to be already undressed and using the shower room.

A small room for the instructor should be provided in a position which permits him to supervise the dressing and shower accommodations, as well as the pool enclosure. The apparatus and storage space should be placed on the same level as the pool and directly connected with it.

Mechanical equipment: "Filtration, disinfection, water-heating" should be located in space surrounding the pool near the deep end, so that piping is kept to a minimum.

In the following examples, we shall review the different arrangements possible within school precincts:

**Pools beneath the gymnasium**

Bürgerschool Hupfeldstrasse at Kassel, Germany: 1954
Pool: 7.50 by 12.66 by 0.80-1.20 m, fig.96.
The pool, which is located under a gymnasium of 13 by 26 m, has steps on the longer side. There are two dressing rooms of about 36 m² each, as well as two shower rooms. An average of 37'000 pupils visit the pool in the year.
96 b Longitudinal and cross-section and ground-plan: 1 entrance, 2 instructor, 3 storage, 4 W.C., 5 girls' changing room, 6 boys' changing room, 7 shower room, 8 instructional pool, 9 footbath, 10 filtration, 11 water-heating, 11 gymnasium

Pools beside the gymnasium

Soläng school at Gävle\textsuperscript{31}, Sweden: 1956
Pool: 6.00 by 12.50 by 0.70–1.20 m, fig.97.
This is an instructional pool in a school ground combined with two gymnasia and a sauna on the same floor. The pool is constructed in reinforced concrete and lined with white tiles. It has a sunken lane on one of the long sides, for the instructor to be in direct contact with the learners, fig.97b. This is a characteristic feature at nearly all the Swedish pools.

\textsuperscript{31} This town possesses at the same time one of the oldests instructional pools in Europe since 50 years ago "6 by 6 m" and is still in operation.
The instructor on duty in the sunken lane

Plan of the ground floor: 1 entrance, 2 changing room, 3 shower room, 4 W.C., 5 instructor, 6 swimming hall, 7 sunken lane, 8 sauna, 9 storage space, 10 gymnasium

The three walls of the swimming hall rather than that for fenestration, are of unplastered brick work. There are separate dressing and shower rooms for each of the pool and both of the two 10 by 20 m gymnasia. Within the service radius of this pool, there are five schools with about 1500 pupils.

Pools beneath the auditorium

Lessing Oberschule at Bochum, Germany: 1962
Pool: 8.00 by 12.50 by 0.90–1.35 m, fig. 98.
A deep lane is provided on one side with stepped seats. Corridors on both sides are used as dressing and shower rooms which represent an economical solution, fig. 99.
Pools beneath the classrooms

Volksschule Brantroper Strasse at Bochum, Germany 1961
Pool: 4.50 by 12.50 by 0.90–1.25 m, fig. 100.
This pool is intended to serve 5 schools having about 1800 children. The turn over of the water is completed once in two hours. Only one dressing and one shower room are provided. The pool is constructed in reinforced concrete and lined with blue ceramic-tiles.

98 b  Plan and sections: 1 garden, 2 instructional pool, 3 sunken lane, 4 seats for pupils, 5 W.C., 6 shower room, 7 changing room, 8 instructor room, 9 auditorium
99  Changing corridor
100 a  An example of a pool underneath the classrooms
a The swimming hall
Self-contained school bath building

Abendroth school in Cuxhaven: 1960
Pool: 10.00 by 16.66 by 0.8–1.25 m, fig. 103.
Some steps are erected on one of the longer sides. It serves 13 schools having 43 classrooms "about 1500 pupils" and 7 swimming clubs.

100 b Section and ground-plan: 12 Instructional pool, 13 shower room, 14 toilets, 15 instructor, 16 filter-space, 17 classrooms, 18 Heating plant, 7 changing room
101 Changing room
102 Shower room
103 An example of a self-contained school bath building
a The swimming hall
Competitive swimming

Competitive activities in general satisfy the desire for progress and achievement. Although swimming and other aquatic activities are primarily recreational, they should also be conducted on a competitive basis. An activity may die when it no longer affords opportunity for further progress to the participant. Competitive swimming is but a continuation of those organized meets held in Olympia over 2,000 years ago. Moreover, competitive swimming and diving provide an incentive to the learners for improving their proficiency. Competitive aquatic activities not only satisfy the special interests of the participants, but also provide spectator participation for a larger segment of the population.

Competitive meets may be held either in natural bodies of water, especially for long racing championships, or at artificial pools—indoor or open-air—established especially for this purpose. A competition pool usually forms a part of training or sports centers. Sometimes it may be an aquatic stadium needed for national or international meets. Because of the function such a pool fulfills, it differs fundamentally from those used for general bathing and swimming.

Areas for diving and swimming should be separated. It may be complete, partial or slight separation. The latter is compact and more suitable for the arrangement of spectators’ stand in indoor as well as open-air baths.
Racing Pool "or Section": The rectangular section is marked off for such a pool. Its length should be a divisor of the hundred-meter distance: 25 m, 33.33 m, or 50 m. Since the pool has to have a water surface large enough for a water-polo field—whose maximum dimensions are 20 m by 30 m—the length of the pool should not be less than 33.33 m. But the 50-m length is preferable, since the terminal point is the same as the starting point, so that the contest judges can remain in one place. Racing pools must be fitted with starting boxes "blocks," racing lanes with the essential marker-lines, underwater viewing windows and spots for lighting and other fittings essential for competitive swimming.

The width of the racing lane varies from 2 m to 2.50 m in indoor and open-air pools respectively. The total width of the pool depends on the number of lanes, of which the two end-lanes should be 0.50 m wider. The 20–21 m width is preferable and allows 8–9 swimmers to compete at one time.

The depth of the racing pool need not be more than 2.20 m; the minimum depth, especially within the water-polo field, should be at least 1.80 m.

Diving Pool "or Section": It must be fitted with diving facilities, spring and fixed boards, up to 10 m high. Pool and diving platform dimensions must be in accordance with Olympic requirements.32

Orientation: Open-air diving boards must be oriented so that the sun is not in the diver's eyes. The ideal orientation is to the north. For indoor pools, the position is not significant.

Stands: The number of seating accommodations should be related to the importance of the competition pool. Seating accommodations may be classified in the two following groups:
1. Seating accommodations are integrated with the pool to form an aquatic stadium.
2. They are independent from the pool as a separate grandstand.

In both cases, these accommodations may be entirely or partially roofed. Championship pools, capable of displaying the Olympic Games, or similar international contests, should provide accommodation for no fewer than 4'000 spectators.33 They should be arranged so that the maximum amount of spectators have a good side view of the divers.

In addition to the changing rooms, shower and toilet facilities for swimmers, additional ward-robe and toilets should be provided for spectators.

32 For Olympic requirements, see architectural record November 1960.

33 This figure may be reduced in the case of indoor pools to about 2'000 spectators.
3. Town Planning for Public Bathing
Leer - Vide - Empty
3.1. Baths as an Element of Town Planning

Prior to the last few decades, little thought was given to the study of bathing needs in terms of a town-wide plan. Individual establishments were operated as a matter of private concern. The subsequent expansion in municipal baths and the increasing demand for the development of varied bathing facilities—especially after the waste and pollution of so many natural bathing resources—have been factors in emphasizing the importance of town planning for public bathing and in developing suitable standards. Baths have been recognized as an essential element to be considered in the town plan along with other recreation areas and community services.

Town planning as affecting and being affected by planning of baths:

Town planning materially affects the requirements for bathing. The organism of an urban area may be subdivided, from a modern town planning point of view, into residential sectors of different sizes. These sectors may be classified as follows: The primary housing group (estate), the residential neighborhood, the town or city sector, the city itself and the metropolis. The neighborhood is composed of groups of residences, whose educational center is the elementary school. Its population varies from 3'000 to 12'000 inhabitants. Each group of neighborhoods forms a part of a larger unit, occupying a greater area, which constitutes a town sector for which the secondary school is required.

The whole plan of a town is based on the proper grouping of these different units. At each level of grouping, community services and recreation facilities are called for. Requirements for bathing should also be classified with regard to these residential sectors and located in relation to them. They can be advantageously located by considering their relation to residential areas of all types, to schools, recreational and green spaces and particularly to transportation facilities.

Town planning, on the other hand, can help bring to the people the priceless benefits which water, open space, green areas and sunshine yield—for example through open-air baths. Hence, bath- and town-planners should work together; each requires advice from the other in determining the needs of the people and types of facilities which enable those needs to be satisfied.

Well-balanced planning

Well-balanced planning for public bathing is essential in an urban area. Ample space alone does not assure well-balanced planning. A sufficient number of facilities of different types, appropriate size and suitable location is needed to serve the recreational needs of the people. These needs cannot be satisfactorily met if the town's bathing facilities are, for example, concentrated in one large center, even though it affords the required reasonable standards for the population.

On the other hand, small specialized centers do not necessarily make possible many popular forms of bathing and other activities that can only be carried on in a relatively large center.
Types of bathing centers

Bathing requirements can best be determined in relation to the sum total of a town's characteristics. There should be different types of grounds developed for a variety of uses. Each type will fulfill a specific function in each sector of the community. Some centers are used the year round, others during a single season. Many provide recreation, entertainment and relaxation for individuals, others afford opportunities for highly organized competitive sports. Some others satisfy the demand for swimming instruction. These types can be classified as follows:
1. Paddling facilities for children in the neighborhood.
2. Instructional pools in schools.
3. Open-air baths.
4. Indoor baths.
5. Bathing stadium.

They differ widely in the activities they make possible, in their construction, operation cost, space requirements, location, and in the number of persons served.

General characteristics: The size of any one of these bathing centers, varies according to the population which it is intended to serve. Each bathing ground presents a distinct problem requiring individual analysis and treatment for planning and design. But regardless of the type of bathing ground, there are certain factors and objectives which should be considered and sought in the planning such as:
1. A central site is preferable in each community, dependent on the plans and sites of other recreational areas.
2. Effective use of the area: Since the ground area is seldom larger than necessary, every part should have a definite function.
3. Adequate space for the facilities, according to reasonable standards.
4. Ease of supervision and operation.
5. Utilization of natural features.
6. Safety and convenience of the people using the center.
7. Economy of construction and maintenance.
8. Appearance should be attractive in order to draw the public.

3.2. Standards

Suitable space standards should be established to be used as guides for the selection of sites and to determine whether or not facilities erected will be satisfactory for bathing and other recreation activities now and in the future. These standards, which are practical, must reasonably and adequately meet the needs to which they are related. They are usually intended to meet average conditions.

The recreational value of a bath depends, to a great extent, on its size and how much space it offers per visitor. Overcrowded baths offer little possibility for recreation. Superfluous space is not economical. Good results can only be
attained if the right relation of space per visitor is retained. This poses the question: How much space is needed? What is the right ratio of each type of bath to population? What is the reasonable and desirable bathing-capacity of baths? The following sections include a review of various standards. Some of them have been established by bath-planners or swimming associations as minimum requirements and others are actually practiced in some towns.

**Switzerland**

**Standard baths by M. E. Haefeli**

The architect has evolved his standards from experience in the planning and designing of several swimming pools. He suggests what he calls standard baths. An urban area with a population of 100,000 inhabitants is proposed and subdivided into five residential sectors, each sector with a population of 20,000. Population density is assumed to be 100 inhabitants per hectares. That requires an area of about 200 hectares. Such a residential sector under average conditions will need one secondary and three elementary schools.

For the entire urban area, a large indoor bath is suggested. This bath, which would have a pool measuring 14.00 by 50.00 m and 500 dressing-units, will afford 0.007 m² of water per inhabitant, or 1.4 m² per dressing-unit. The relation between the number of dressing facilities and population of the area catered for, will be 1 to 200. That is, for 1,000 inhabitants there will be 5 changing units. This bath is assumed to serve recreational purposes, and another one is to be provided for training and competitive events, situated in or adjoining the town stadium. In his opinion, the sports bath should be maintained separate from the recreational bath.

**Indoor baths**

**Open-air baths**

One open-air bath is to be provided for each residential sector. The effective service radius, according to the population density assumed, will be about 800 m. The open-air bath comprises the following:

<table>
<thead>
<tr>
<th>Wardrobe 'D' unit</th>
<th>Total area 'At' m²</th>
<th>Water area 'Aw' m²</th>
<th>Parking area 'Ap' m²</th>
<th>Ground area 'Ag' m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'000</td>
<td>20'000</td>
<td>2'000</td>
<td>2'000</td>
<td>14'000</td>
</tr>
</tbody>
</table>

This standard open-air bath will provide 100 dressing-units for each 1,000 inhabitants. It affords an average of 10.00 m² total area per visitor (i.e., per dressing-unit), of which 10% is water. Total area of the bath is generally provided as follows:

- 7.50-9.00 m² per visitor in crowded areas.
- 8.00-10.00 m² per visitor for population up to 20,000.
- 9.00-12.00 m² per visitor in suburban areas.

The relation 'Ap' to 'D' is taken as a scale for the density of use of the bath. In our case 8 m² per dressing-unit is considered reasonably sufficient, whereas 5 m² would be too small and 10 m² too great.

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34 Notably, the Allenmoos open-air bath which is considered the prototype of modern Swiss outdoor pool-design.
Frequency of use: On days of maximum frequency, dressing facilities are presumed to be used up to two-and-a-half times. In other words, the number of visitors may reach in this case 7'000 per day. The preceding standards are established on the basis that the number of visitors in a year (season) will be 7 visitors per inhabitant.

**Germany**

**German Swimming Association**

The German Swimming Association recommends a minimum space standard of from 0.03 to 0.05 m² water surface per person in an urban area of 30'000 to 40'000 inhabitants. The last figure is considered the maximum population for which the bath would be comfortably located and easily reached. The effective service radius in this case varies from 1'000 to 2'000 m.

**German Olympic Association**

The German Olympic Association has established the following standards: "Standards and principles for the planning of recreation and sports centers."

**Indoor baths**

A normal bath is required for an urban area of 30'000 inhabitants. The normal bath usually comprises a swimming pool of 12.50 by 25.00 m (about 300 m²). Then it will afford about 0.01 m² of water per person. In larger urban areas, these standard figures will decrease. In a town of about 400'000 inhabitants, subdivided into 5 sectors, an indoor bath is required for each. Each will serve about 80'000 and water area per person will decrease to about 0.005 m². One of these five, in the center of town, will be a large one and serve as the central bath for the entire town.

**Open-air baths**

The following table shows how much space per person is required within communities of different sizes:

<table>
<thead>
<tr>
<th>Type of community</th>
<th>Total area m²</th>
<th>Water area m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Small communities</td>
<td>2.00</td>
<td>0.20</td>
</tr>
<tr>
<td>Communities up to 30'000 population</td>
<td>1.00</td>
<td>0.10</td>
</tr>
<tr>
<td>Larger communities</td>
<td>0.50</td>
<td>0.05</td>
</tr>
<tr>
<td>30'000-40'000 population</td>
<td>0.50</td>
<td>0.05</td>
</tr>
</tbody>
</table>

The open-air bath allows from 1 to 2 m² of total area per inhabitant, of which 10% is water. The larger approximation is for small communities and the smaller one for communities up to 30'000 population. An area of 0.50 m² per inhabitant may be sufficient for urban areas having more than 30'000 (30'000-60'000 population).

---

35 Meeting at Hannover in February 1961.
However, an urban area of more than 50'000 inhabitants, requires two bathing grounds and if possible an indoor open-air bath too. For larger towns reaching 400'000 population, 6 to 8 open-air baths are required.

**Instructional pools**

According to the recommendations of the German swimming association, one pool is required in every residential area with 750 to 1'500 pupils.

**England**

Experience has shown that a town with a population of 40'000 or more is fully capable of supporting a bath of 33.33 m (100 feet) by 12.50 m (42 feet) in size, whilst smaller towns with populations from 15'000 to 40'000 can support a bath of 25.00 m (75 feet) by 10.00 m (35 feet). In larger urban areas, the number of baths which can be economically maintained is correspondingly greater. In this case two or more pools may be placed in one building.

According to these standards, the ratio of covered baths to population is relatively great in England. An open-air pool, built to adjoin the covered bath, has the advantage of being able to accommodate the increased number of bathers during the summer months.

The required economic area of the pool or pools, is calculated so as to allow each bather 1.80 m² (20 sq.ft.) of water surface for a period of \( \frac{3}{4} \) to 1 hour. On this basis, the pool of (100 ft. by 42 ft.) can accommodate 210 bathers at one time. It affords about 0.01 m² per inhabitant. The effectiveness of this ratio depends on frequency of use—in other words, the number of visitors per inhabitants per year.

**United States of America**

The American Association of Public Health, recommends a reasonable minimum requirement of 3.25 m² (36 sq.ft.) of water for each adult swimmer and 16.2 m² (18 sq.ft.) for non-swimmer. Assuming an equal number of swimmers and non-swimmers, and that, on the average, not more than two-thirds of those present will be in the water at one time, an all-round average figure of 16.2 m² (18 sq.ft.) of water per bather is suggested. In some localities, it is assumed that only 50% of non-swimmers would be in the water simultaneously.

Swimming pools are in many cases attached to educational centers. They are open to the public after school hours and during week-ends and holidays. The indoor-outdoor all-weather pool is extremely common.

However, general standards cannot be accepted as the final answer to the needs of every locality. The following actual planning standards of public bathing requirements in different localities are mentioned for the purpose of comparison. In every locality we shall try to review briefly the present position regarding the number, type and situation of existing establishments and how much space they allow per person. We shall also indicate the population served, as well as the extent to which facilities provided have been used. In addition, the future planning standards aimed at, will be mentioned.
Planning of public baths in Zurich, Switzerland

Population served and general characteristics: Zurich has a population of about 440'000 inhabitants distributed in eleven residential sectors as follows:

<table>
<thead>
<tr>
<th>District</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>11</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
<td>14'209</td>
<td>36'657</td>
<td>55'435</td>
<td>37'984</td>
<td>14'806</td>
<td>45'551</td>
<td>41'093</td>
<td>25'429</td>
<td>43'913</td>
<td>36'473</td>
<td>88'083</td>
</tr>
</tbody>
</table>

The average rate of growth in the last decade (from 1950 to 1960) has been about 1.2% p.a. The average population density is 51 inhabitants per hectare of land (gross area including woods).

The following table shows the age composition in percent:

<table>
<thead>
<tr>
<th>Age Group</th>
<th>0-7</th>
<th>7-14</th>
<th>15-19</th>
<th>20-34</th>
<th>35-49</th>
<th>50-64</th>
<th>65-69</th>
<th>70 and more</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>7.92%</td>
<td>8.13%</td>
<td>6.82%</td>
<td>25.70%</td>
<td>20.00%</td>
<td>20.40%</td>
<td>4.42%</td>
<td>6.61%</td>
</tr>
</tbody>
</table>

The average air temperature in °C per month in the year 1961 as well as the number of hours of sunshine is as follows:

<table>
<thead>
<tr>
<th>Month</th>
<th>Average temperature</th>
<th>Hours of sunshine</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>0.2</td>
<td>20</td>
</tr>
<tr>
<td>February</td>
<td>5.2</td>
<td>120</td>
</tr>
<tr>
<td>March</td>
<td>6.9</td>
<td>210</td>
</tr>
<tr>
<td>April</td>
<td>11.4</td>
<td>147</td>
</tr>
<tr>
<td>May</td>
<td>11.1</td>
<td>174</td>
</tr>
<tr>
<td>June</td>
<td>16.3</td>
<td>215</td>
</tr>
<tr>
<td>July</td>
<td>16.5</td>
<td>244</td>
</tr>
<tr>
<td>August</td>
<td>16.6</td>
<td>252</td>
</tr>
<tr>
<td>September</td>
<td>17.7</td>
<td>222</td>
</tr>
<tr>
<td>October</td>
<td>10.4</td>
<td>121</td>
</tr>
<tr>
<td>November</td>
<td>3.8</td>
<td>65</td>
</tr>
<tr>
<td>December</td>
<td>1.0</td>
<td>57</td>
</tr>
<tr>
<td>1961</td>
<td>9.7 (average p.a.)</td>
<td>1847 (total)</td>
</tr>
</tbody>
</table>

Existing bathing facilities and the consequent space standards: The total land area of the town is about 8'000 hectares, of which about 15 hectares are devoted to bathing grounds. These facilities comprise one large indoor swimming-pool and different types of open-air bathing grounds as shown in the following table:

36 According to "Planung Öffentlicher Badeanlagen" by "Gesundheits- und Wirtschaftsamt der Stadt Zürich."

37 According to the 1961 census.

38 They comprise three bathing centers (C), three bathing beaches (B) and eight bathing establishments on the lake and the river without beaches.
<table>
<thead>
<tr>
<th>Bath</th>
<th>No. and type of pool</th>
<th>Water surface m²</th>
<th>Green area m²</th>
<th>Relaxation areas m²</th>
<th>Boys</th>
<th>Dressing units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bürkliplatz</td>
<td>1S+1 NS+ 1 Sch</td>
<td>370</td>
<td>140</td>
<td>904</td>
<td></td>
<td>904</td>
</tr>
<tr>
<td>Schanzengraben</td>
<td>1S+1 NS</td>
<td>1'720</td>
<td>100</td>
<td>186</td>
<td>207</td>
<td>393</td>
</tr>
<tr>
<td>Wollishofen (B)</td>
<td>1 NS</td>
<td>600</td>
<td>3'130</td>
<td>500</td>
<td>277</td>
<td>355</td>
</tr>
<tr>
<td>Tiefenbrunnen Schulbad</td>
<td>2 S+2 NS+ 2 Sch</td>
<td>710</td>
<td>80</td>
<td>370</td>
<td>250</td>
<td>620</td>
</tr>
<tr>
<td>Utoquai</td>
<td>2 S+2 NS+ 2 Sch</td>
<td>850</td>
<td>320</td>
<td>254</td>
<td>301</td>
<td>568</td>
</tr>
<tr>
<td>Stadthausquai</td>
<td>2 S+1 NS</td>
<td>739</td>
<td>670</td>
<td>210</td>
<td>330</td>
<td>540</td>
</tr>
<tr>
<td>Oberer Letten</td>
<td>1 NS</td>
<td>500</td>
<td>500</td>
<td>123</td>
<td>138</td>
<td>409</td>
</tr>
<tr>
<td>Unterer Letten</td>
<td>1 NS</td>
<td>500</td>
<td>2'500</td>
<td>600</td>
<td>148</td>
<td>528</td>
</tr>
<tr>
<td>Mythenquai (B)</td>
<td>1 Sch+1 Pl</td>
<td>230</td>
<td>24'740</td>
<td>140</td>
<td>260</td>
<td>5'763</td>
</tr>
<tr>
<td>Allenmoos (C)</td>
<td>1 S+1 NS+ 2 Sch+1 Pl</td>
<td>3'160</td>
<td>22'000</td>
<td>516</td>
<td>516</td>
<td>4'340</td>
</tr>
<tr>
<td>Letzigraben (C)</td>
<td>1 S+1 NS+ 1 Sport+ 2 Sch+1 Pl</td>
<td>4'056</td>
<td>24'800</td>
<td>320</td>
<td>148</td>
<td>528</td>
</tr>
<tr>
<td>Tiefenbrunnen (B)</td>
<td>1 NS</td>
<td>820</td>
<td>20'300</td>
<td>330</td>
<td>296</td>
<td>1'323</td>
</tr>
<tr>
<td>Auhof (C)</td>
<td>1 S+1 NS+ 1 Sch</td>
<td>1'750</td>
<td>13'100</td>
<td>224</td>
<td>224</td>
<td>1'976</td>
</tr>
<tr>
<td>Enge Frauen</td>
<td>1 NS</td>
<td>91</td>
<td>—</td>
<td>300</td>
<td>72</td>
<td>380</td>
</tr>
<tr>
<td>Enge Männer</td>
<td>1 NS</td>
<td>91</td>
<td>—</td>
<td>300</td>
<td>72</td>
<td>380</td>
</tr>
<tr>
<td>Allmend</td>
<td>1 NS</td>
<td>—</td>
<td>unlimited</td>
<td>50</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>Katzensee</td>
<td>—</td>
<td>unlimited</td>
<td>unlimited</td>
<td>—</td>
<td>50</td>
<td>240</td>
</tr>
<tr>
<td>Au Höngg</td>
<td>—</td>
<td>—</td>
<td>unlimited</td>
<td>—</td>
<td>50</td>
<td>240</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>3'232</strong></td>
<td><strong>3'089</strong></td>
<td><strong>1'709</strong></td>
<td><strong>10'207</strong></td>
<td><strong>28'237</strong></td>
</tr>
</tbody>
</table>

The indoor bath has a water surface of 750 m² (water volume 1'600 m³) and 586 dressing units. It affords about 0.002 m² of water per inhabitants. Number of visitors in the year 1962 reached 584'237 which represents a ratio of about 1'000 per dressing unit. Dressing unit is utilized on the average in months of maximum frequentation from 3 to 4 times daily.

**Open-air baths:** The open-air grounds afford more than 0.1 m² and 64 dressing-room units per 1'000 inhabitants, of which 22% are for children. The relationship between the number of dressing-facilities and population has been developed since 1900 as shown below:

<table>
<thead>
<tr>
<th></th>
<th>1900</th>
<th>1910</th>
<th>1922</th>
<th>1939</th>
<th>1949</th>
<th>1952</th>
<th>1959</th>
<th>1962</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>37</td>
<td>42.5</td>
<td>68.2</td>
<td>55.2</td>
<td>59.5</td>
<td>57.5</td>
<td>62.9</td>
<td>64</td>
</tr>
</tbody>
</table>

This ratio will be increased to 70 per 1'000 inhabitants in the year 1964 when the bath at Heuried—which is to have 3'200 changing-units—is completed. Dressing facilities are distributed between the different types of open-air bathing grounds as follows:

---

39 'S' Swimmers' pool, 'NS' Non-swimmers' pool, 'Sch' Instructional pool, 'Pl' Paddling pool.
40 Number of visitors in a year per inhabitant is about 1.2 persons.
The number of visitors per dressing-unit in 1962 was about 70.
The 0.1 m² of water per inhabitant in Zurich, is due to the availability of natural bathing facilities. These natural elements have been developed and maintained by the authorities. For the health of the bathers, sewage is purified before it is allowed to enter the lake water.

The future estimated population of Zurich, when fully developed, will be about 565'000, distributed in the different districts as shown, fig. 108. Keeping pace with this steady increase in population is the departure point for planning of bathing facilities in Zurich.

**Indoor baths:** In addition to the existing indoor bath, which will be enlarged to serve as a central one, five normal ones are planned, as shown in fig. 109. Each one will serve a town sector of about 80'000 within an effective service radius of about 2'000 m. These planned baths together with the existing one, will allow the future estimated population about 0.008 m² of water per inhabitant.

One example of these baths is that planned one for the north-eastern sector of the town, Oerlikon, fig. 110. It will consist of two pools, one for swimmers which measures 20.00 by 25.00 m, and one for non-swimmers which measures 8.00 by 20.00 m. Dressing facilities will comprise 520 units consisting mainly of lockers, 30% of which are for children. The bath is combined with a recreation center.
110 Planned indoor bath for the north-eastern sector of the town Zurich.

a Model, view from the north-eastern side.

b Plans and section 1:2'000: b1. Main floor, 1 swimmers’ pool, 2 non-swimmers’ pool, 3 relaxation areas, 4 spectators’ stand, 5 stage, 6 auditorium, 7 foyer, 8 club-room, 9 reading room, 10 library, 11 festival-space, 12 patio.
b2. Basement, 1 main entrance, 2 ramps, 3 entrance hall, 4 women’s and girls’ cloakrooms, 5 men’s and boys’ cloakrooms, 6 cash-desk, 7 first aid station, 8 sauna, 9 gymnasium, 10 changing rooms for the gymnasium, 11 air-raid shelter, 12 caretaker.
b3. Section, 1 entrance hall, 2 swimmers pool, 3 copper roof, 4 sauna, 5 heating plant, 6 gymnasium, 7 cloakrooms, 8 festival hall, 9 reading room, 10 dwelling

<table>
<thead>
<tr>
<th></th>
<th>Changing cubicles</th>
<th>Individual cabins</th>
<th>Lockers</th>
<th>Hooks</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Female</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>25</td>
<td>10</td>
<td>90</td>
<td>35</td>
<td>135</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td>65</td>
<td></td>
<td>65</td>
</tr>
<tr>
<td><strong>Male</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>25</td>
<td>10</td>
<td>160</td>
<td>65</td>
<td>235</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td>65</td>
<td></td>
<td>85</td>
</tr>
</tbody>
</table>

Open-air baths

Beside the utilization of the lake water fronts for bathing, great attention has been paid to the planning of district bathing centers, on the grounds that they would occupy a central position in the community, and be less dangerous, especially for children.
The planning standards aimed at in Zurich, are to provide from 68 to 70 dressing-room units for every 1'000 inhabitants. It is planned to provide about 35'000 D for the population which is estimated to reach half-a-million in the year 1975. For every dressing-unit, one sq.m. of water is a minimum requirement. The 0.1 m² of water per inhabitant will be maintained in the future, by means of six planned open-air baths, improvement of some existing grounds, and the rehabilitation of the entire lake shore-line.

What bathing capacity is desirable for open-air baths? Public Health Authorities recommend small grounds in suburban communities and large bathing grounds within the densely populated central areas. In each case, the effective service radius would be the same, although the population served differs. The following examples, from different districts, give comparative data as to population served and number of visitors which can be accommodated.

**Auhof bath**: One of the existing baths which was recently erected (1958) for a residential area (Schwamendingen), which has about 34'000 inhabitants within an effective service radius of about 1'000-1'200 m. The population density is 58 inhabitants per hectare. The estimated future population is about 40'000. This bath covers a total area of about 22'500 m², of which 1'750 m² is water. It provides about 0.9 m² of water per dressing-unit. It has been heavily frequented in relation to other bathing grounds, especially by children, as the population served has a great percentage of children and young people.

**Heuried bath**: This bath is now under construction. Within an effective service radius of 1'200 m, it is intended to serve a population of 50'000 whose density
reaches in some areas 161 inhabitants per hectare (1961). It will occupy a total area of about 3 hectares, fig. 111.

<table>
<thead>
<tr>
<th>Water surface</th>
<th>Green area</th>
<th>Total area</th>
</tr>
</thead>
<tbody>
<tr>
<td>2'800</td>
<td>17'600</td>
<td>29'100</td>
</tr>
</tbody>
</table>

Water for the different bathing activities is about 10% of the total area, and is distributed as follows:

<table>
<thead>
<tr>
<th>Swimmers' pool</th>
<th>Nonswimmers' pool</th>
<th>Instruction pools</th>
<th>Paddling pool</th>
<th>Total area</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'150 m²</td>
<td>950</td>
<td>600</td>
<td>100</td>
<td>2'800 m²</td>
</tr>
</tbody>
</table>

It will afford about 3'000 dressing-units as follows:

<table>
<thead>
<tr>
<th></th>
<th>Hangers</th>
<th>Lockers</th>
<th>Hooks</th>
<th>Individual cabins</th>
<th>Changing cabins</th>
<th>Changing places</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>1'000</td>
<td>144</td>
<td>240</td>
<td>48</td>
<td>19</td>
<td>72</td>
<td>1'192</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
<tr>
<td>Female</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults</td>
<td>820</td>
<td>120</td>
<td>140</td>
<td>48</td>
<td>60</td>
<td>14</td>
<td>988</td>
</tr>
<tr>
<td>Children</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>140</td>
</tr>
<tr>
<td>Pupils</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Boys</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
<tr>
<td>Girls</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>240</td>
</tr>
<tr>
<td>Total</td>
<td>1'820</td>
<td>264</td>
<td>860</td>
<td>96</td>
<td></td>
<td></td>
<td>3'040</td>
</tr>
</tbody>
</table>

**Seebach bath:** The population of the area to be catered for is today about 18'000 inhabitants, within an effective service radius of about 800 m. Population density in this residential sector is 37 inhabitants per hectare of land (including woods). The population is expected to reach about 37'000. The area to be developed as sports and recreation center comprises about 6.4 hectares of which water will occupy about 2'000 m², fig. 112. Dressing facilities will be 1'200 units for adults and 1'000 for children, as well as 136 for pupils. In this case, it will afford about 0.85 m² of water per dressing-unit. Water surface will be provided as follows:

<table>
<thead>
<tr>
<th>Swimmers' pool</th>
<th>Non-swimmers' pool</th>
<th>Instructional pool</th>
<th>Paddling pool</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1'120</td>
<td>600</td>
<td>160</td>
<td>180</td>
<td>2'060</td>
</tr>
</tbody>
</table>
Affoltern bath: A small bathing ground planned to serve the north-western area which has a population of 15'000. The residential area for which the bath is planned is sparsely settled—population density is 26 inhabitants per hectare.

In the preceding examples, we have seen that the bathing capacity of an open-air bath may be from 1'000 to 3'000 dressing-units and population served vary from 15'000 to 40'000. The effective service distance is about 800–1'200 m.

Instructional pools

The town of Zurich possesses about eleven pools distributed throughout the open-air bathing grounds. The number of school-age children is about 37'000. Thus an instructional pool is provided for approximately every 3'000 children. It has been designed as a part of open-air bathing grounds on the basis that:

1. Swimming instruction would take place in the sun and fresh air.
2. An instructional pool built in public bathing grounds would only increase very slightly the costs of the latter's construction and maintenance. Up till now no instructional pool has been erected on school grounds.

Planning of public baths in Hannover42, Germany

It has been developed to correspond with modern town planning. In many cases, bathing grounds are designed as one unit of a complete sports and recreational center within each residential sector. The existing bathing grounds—indoor and
outdoors—allow 0.072 m² of water surface per inhabitant43, of which open-air baths alone afford 0.07 m². Future estimated population will be about 700,000. Water area will be increased to 0.075 m² per inhabitant—0.005 m² in indoor baths and 0.07 m² in open-air grounds.

The following illustrations show how bathing facilities have been planned in Hannover44:

The table and fig. 113 show the size and location of the available open-air baths. Within the municipal boundaries of the town, two indoor and nine open-air baths are available.

<table>
<thead>
<tr>
<th>Indoor baths</th>
<th>Water area m²</th>
<th>Relaxing area m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Existing</td>
<td>Planned</td>
</tr>
<tr>
<td>Goseriede</td>
<td>762</td>
<td>1,130</td>
</tr>
<tr>
<td>Fössebad</td>
<td>393</td>
<td>1,400</td>
</tr>
<tr>
<td>Sportpark</td>
<td>1,400</td>
<td>2,250</td>
</tr>
<tr>
<td>Stüken</td>
<td>400</td>
<td>1,200</td>
</tr>
<tr>
<td>Eilenriede</td>
<td>400</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Open-air baths</th>
<th>Water area m²</th>
<th>Relaxing area m²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kleefeld</td>
<td>3'155</td>
<td>27'000</td>
</tr>
<tr>
<td>Maschsee</td>
<td>6'000</td>
<td>18'000</td>
</tr>
<tr>
<td>Listerbad</td>
<td>9'780</td>
<td>28'000</td>
</tr>
<tr>
<td>Hainholz</td>
<td>1'950</td>
<td>17'000</td>
</tr>
<tr>
<td>Ricklingen</td>
<td>2'300</td>
<td>17'000</td>
</tr>
<tr>
<td>Badenstedt</td>
<td>472</td>
<td>3'000</td>
</tr>
<tr>
<td>Mittelfeld</td>
<td>1'500</td>
<td>18'000</td>
</tr>
<tr>
<td>Südstadt</td>
<td>1'500</td>
<td>15'000</td>
</tr>
<tr>
<td>Bothfeld</td>
<td>1'500</td>
<td>20'000</td>
</tr>
<tr>
<td>Leinhausen</td>
<td>1'150</td>
<td>2'500</td>
</tr>
<tr>
<td>Limmer</td>
<td>1'350</td>
<td>12'000</td>
</tr>
<tr>
<td>HSV-Bad</td>
<td>1'400</td>
<td>25'000</td>
</tr>
</tbody>
</table>

| Total          | 1'155         | 2'200            | 40'937        | 8'900            | 185'500  | 94'500  |

Fig. 114, shows the residential areas catered for by open-air baths within a service radius of 1'000 m for pedestrians, and 2'500 m for cyclists. This diagram shows that the open-air baths do not effectively serve the eastern sector of the town.

Fig. 115, shows by dots45 the actual number of inhabitants that every open-air bath should serve. Accordingly five more are planned. The effective service distances vary from 800 to 1'600 m, in which the populations of the areas served

43 According to the population in 1959—570'000 inhabitants.

44 Study made by the "Hochschule" of Hannover.

45 One dot = 50 inhabitants.
113 Size of the existing bathing facilities in Hannover. Areas are 3 times the actual size represented

differ from 7'000 to 50'000. Bathing capacities of open-air baths are accordingly influenced. While some baths are small and accommodate only 1'000 bathers, others can accommodate about 15'000 bathers at one time.46

Indoor Baths: One large indoor bath, which will have a water surface of about 1'400 m², is planned to adjoin the existing urban sports park. Two others are planned to serve as district indoor baths, having a water surface of 400 m². The residential areas catered for by indoor baths are shown on fig. 116.

One example is the indoor-outdoor bath "Fössebad" at Linden, fig. 117: It lies in a heavily populated district. The population of the area within the effective service radius of the indoor bath is more than 70'000.

The first stage of development brought the open-air pool into being. This covers an area of about 2 hectares with two pools of about 1'200 m². It has dressing facilities for 1'300 bathers during summer.

The second stage, the indoor bath, fig. 118, has brought a swimming pool which measures 12.50 by 25.00 m and an instructional pool 6.00 by 12.50 m. The indoor bath affords 0.006 m² of water per inhabitant.

The number of visitors in the first year of operation—1961—was 341'000, of which 183'000 during the summer months and the rest visiting the indoor bath.

Instructional pools are designed as a part of indoor baths. They are intended to serve the pupils whose schools lie within their service radius.

46 "Listerbad," the largest bath in Hannover, which covers an area of 5 hectares, can accommodate this number of bathers, i.e., about 2.5 times the number of dressing-units.
114 Areas of influence of the existing bathing facilities within an effective service radius of 1'000 m for pedestrians and 2'500 m for cyclists.

115 The actual population that should be served by the existing and planned bathing facilities in Hannover.
116 Bathing and sports centers in Hannover, showing residential areas catered for by indoor as well as open-air baths

117 A combined indoor—outdoor public bath at Linden-Hannover; "Fössebad": 1, 3, 6 cloakrooms for open-air swimming pools and service building, 2 paddling pool, 4 open-air multipurpose pool, 7 indoor bath building

118 Ground plan of the indoor bath "Fössebad": 1 entrance, 2 entrance hall, 3 cash-desk, 4, 7, 9 communal changing rooms, 5, 8 changing cabins for men and women, 6 hanger-wardrobe, 10, 11 shower-rooms, 12 changing-room for pupils, 13 instructional-non-swimmers' pool, 14 swimmers' pool, 15 sun-bathing areas

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Planning of public baths in Bochum, Germany

For our purposes, the characteristic feature of this town lies in its planning of school instructional pools. Bochum, with its population of 363'763 (1959), possesses 20 school instructional pools; 5 more are under construction and 3 planned.47

47 Sport und Bäderbauten, June 1962.
In each case, the location has been planned so that every school which lies beyond the 2,000 m-service radius of an indoor bath, should have or share an instructional pool with another group of schools. The number of students served varies from 500 to 1,500.

The following table and fig. 119 show the existing as well as the planned bathing grounds within the boundaries of Bochum:

<table>
<thead>
<tr>
<th></th>
<th>Water area m²</th>
<th>Relaxing area m²</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Indoor</td>
<td>Open-Air</td>
</tr>
<tr>
<td></td>
<td>Existing</td>
<td>Planned</td>
</tr>
<tr>
<td>Indoor baths</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stadtbad</td>
<td>750</td>
<td></td>
</tr>
<tr>
<td>Nordbad</td>
<td>320</td>
<td></td>
</tr>
<tr>
<td>Südwestbad</td>
<td></td>
<td>312</td>
</tr>
<tr>
<td>Ostbad</td>
<td></td>
<td>312</td>
</tr>
<tr>
<td>Instructional pools</td>
<td></td>
<td>787</td>
</tr>
<tr>
<td>20 Existing pools</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8 planned</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Open-air baths</td>
<td></td>
<td>3,150</td>
</tr>
<tr>
<td>Werne</td>
<td></td>
<td>330</td>
</tr>
<tr>
<td>Langendreer</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Dahlhausen</td>
<td></td>
<td>2,000</td>
</tr>
<tr>
<td>Bochum-Süd</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1,857</td>
<td>1,224</td>
</tr>
</tbody>
</table>

Through the different types of bathing grounds, Bochum provides about 0.02 m² of water per inhabitant (1959); and about 0.036 m² of water per inhabitant is planned for the future, when the population will reach an estimated 400,000.

Open-air baths do not play a great role here due to the considerable air pollution which affects the water. They are designed, in many cases, to adjoin indoor baths and accommodate the increase in visitors that occurs only during summer months.

**Local space standards**

We have seen from the preceding examples that no rigid formula can be prescribed for use in all towns or communities. Although all urban areas and communities have certain fundamental similarities, each has individual characteristics that distinguish it from the others. Consequently, local standards should be established according to the particulars in which the locality differs from other urban areas in its region. Naturally, conditions also vary from district
Existing and planned swimming facilities in Bochum, Germany

Factors which affect bathing planning:

2. Social and economic characteristics.
3. Climate.
4. Bathing opportunities in the surrounding region.

**Population**

**Growth:** Rarely do any two localities grow at the same rate. The estimated future population is a sounder basis for determining the effective standards than the present population of a locality. Consequently, bathing grounds should not be fully utilized from their inception, as the number of visitors increases from year to year along with population growth. In other words, the size of a bathing center should not be based on the existing population of the community it is intended to serve, and its capacity should not be fully utilized at first. Experience proves that the standards used in the original plans alter after a few years.
Density: Population density is also an essential factor. It is obvious that a town or community with a high density of population will need a larger proportion of the town's total area for bathing facilities than a town which is sparsely settled.

In densely populated areas, the effective service distance of a bath will be short. On the contrary, larger service distances are occasioned in most low-density areas. Residential areas with a high proportion of multi-family houses, will need more closely spaced bathing grounds than those areas in which one-family houses predominate.

Age factor: Analyses of age groups in the population of each community are needed so that bathing requirements can be provided adequately. In communities which reached peak development twenty or thirty years ago, the entire population is gradually ageing. Others, which have recently been built, contain a high proportion of young people, and the number of children is also considerably greater. Such towns or communities need many bathing facilities, because the great percentage of visitors will be children and young people.

Social characteristics

Leisure time
Leisure habits of the people and their attitude towards bathing
Standard of education
Health conditions
Social traditions and habits

The preceding characteristics are of prime importance in planning for bathing needs. They greatly affect frequency of use of baths. At the same time social traditions and habits affect the planning and design of bathing grounds. For example, use of a bath by both sexes, would not be feasible in some oriental countries.

Financial aspects

Sources of funds for land, construction and improvement are from the general appropriation of the locality. Accordingly, standards should be realistic and within the financial resources of each locality.

Local practices: Policies and practices with respect to fees and charges vary from one locality to another. However, in view of the importance of swimming for children, it is almost universally agreed that children of pre-school and school age should not be charged for bathing. With few exceptions, children are permitted free use of bathing grounds, as are pupils in groups for swimming instruction, during certain periods and days. Fees and charges in general should be nominal and only as a source to help for current operation.

Climatic conditions

Varied climatic conditions affect the planning and architectural structure of bathing grounds. Planning for bathing needs in tropical zones tends to provide more open-air grounds than in cold countries, where the proportion of indoor baths is relatively greater. The length or duration of the bathing season—based on the number of hours of sunshine as well as the air temperature—will give open-air bathing its meaning. In some countries bathing season does not exceed 100 days, while others have a season of more than 6 months.
Natural bathing opportunities

Natural bathing places, if the quality of water is suitable for bathing, may supplement open-air baths. Also bathing places in the surrounding region affect space standards in that locality.

Combined facilities

Bathing cannot develop in isolation, it is a part of a broader concept: recreation. In recent years, swimming pools have been designed as part of a complete recreational or sports centers.

The value of the latter are enhanced through bathing activities, which appeal to people of all ages, and contribute to the well-being of the individual. A recreation center without bathing facilities has become almost inconceivable.

On the other hand, grounds devoted entirely to bathing would have a limited value, especially if they could be used for only one season of the year. From the standpoint of economy, it has become necessary to utilize dressing and lavatory accommodations for other recreational purposes. A skating rink may adjoin an open-air pool, so that dressing facilities could also be used outside the bathing season—in the winter.

Classification of combined arrangements:

Complete integration: In this case, bathing facilities would be accessible to everyone within the recreational program of the grounds. Once the visitor has entered the center, he is free to enjoy swimming or to participate in other recreational activities. This conception is most often realized through paddling facilities in children's playgrounds. Swimming pools are also freely accessible along with other facilities in the case of school playgrounds, but it is a specific type of visitor who uses them. In stadiums and sports centers, dressing and shower-rooms can serve many purposes in various sports activities.

Partial separation: Swimming pools may be combined with some playing fields which would only be at the disposal of the bather. A visitor to the bathing grounds in this case could not enjoy all the facilities of the recreation center.

Complete separation: Although the bath is considered as one unit in a recreation center, the bather is completely isolated from other facilities, in this arrangement. He may enjoy other activities only after leaving the bathing grounds. This type of combination is still the most frequently practiced at present with regard to open-air as well as indoor baths.

Policies and practices followed with regard to fees and charges, as well as hygienic demands, determine the suitability of each of the forementioned types. Many authorities recommend the last two types of combination, because separate charging for bathing simplifies control and supervision and helps meet operating costs. However, the economic prospects should be investigated and a survey of existing facilities should be made, before combining bathing with other recreational facilities, or different forms of bathing under one roof. Also the hygienic effects of other sports activities on bathing should be taken into account. Combined arrangements should be made according to local needs.
Hot water and vapor baths—"Sauna"—are today incorporated into nearly all recreational and sports programs, in which they have proved their value. In Scandinavia and Russia, they are a characteristic feature of communal life. They are combined with schools, gymnasia, open-air and indoor baths, as well as sports grounds. In recent years, they have been equipped with enlarged "bathtubs" which can be used by small children for paddling. Vapor baths are also provided near bathing beaches, to get the reciprocal effect of heat and cold in natural surroundings.

In addition to combined arrangements with recreational and sports areas, the open-air pool connected to the covered bath, is a new trend. It is an advantage from the standpoint of economy, particularly in those climates where there is a high number of rainy and cloudy days. In some localities, the number of hours of sunshine does not exceed 200 per year, which makes this combination a necessity. In this case, open-air pools have the advantage of being able to accommodate the increase in the number of bathers that occurs only during the sunny days, without the need for a large indoor pool which would probably be useless in the winter. On the other hand, a ground entirely devoted to open-air bathing under these conditions would not be practical.

The economics of such arrangements were thoroughly investigated by one local authority in England48. It was found that an open-air pool connected to the indoor bath would accommodate double the number of visitors and would cost only about one-third as much as a second (indoor) pool. An indoor-outdoor "all-weather" arrangement would meet the needs of visitors during the winter, thereby balancing the seasonal utilization. Bathing programs can thus move outside in good weather and be held inside when bad weather conditions make this necessary.

Such combined pools have also proven themselves sound from the hygienic point of view49. The fear that the indoor bath would be contaminated by usage during the summer months proved unjustified, thanks to the showers and foot baths which separate the two pools and are kept under constant supervision by the staff. (Thorough cleansing should be assured before re-entering the hall from the outside.)

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48 See Hentry on "The planning and design of modern swimming pools".

49 German experience in Hannover.
4. Open Air Swimming Pools
Leer - Vide - Empty
4.1. Introduction

Open-air bathing is one of the most valuable and effective means of physical regeneration, along with playing and relaxing in the open. Man thrives best in the sunlight. Outdoor swimming pools have accordingly become popular in many communities—urban and rural—especially in view of the pollution of natural bodies of water. They possess the following advantages:
1. More hygienic
2. Less dangerous
3. Central position within each community
4. Higher water temperature
5. Bathing facilities with varying depths and accommodations for swimmers, non-swimmers, adults and children.

Swimming pools vary in size from a small playground pool to the larger bathing center accommodating hundreds of people at one time and covering several hectares. Since an open air bathing center serves an area comprising more than one neighborhood in urban areas, the site of it may be adjoining a secondary school, playingfield, park or recreation area, or may itself form a “bathing park”.

It is primarily a landscaped park, with trees, shrubbery and lawn, and is frequently of more or less formal design, having bathing facilities within. Such bathing parks, besides their main function as centers for bathing and swimming, are areas which provide the city-dweller with an opportunity to get away from the city’s noise and to enjoy contact with nature. They provide an attractive community setting and a place for quiet promenades and informal recreation. They are breathing spaces within crowded urban communities. Bathing parks have attained their importance as a result of the expansion of towns since the turn of the century. This expansion of the city has steadily increased the distance from its center to the country-side, which was accessible within only a few minutes in the town of the Middle Ages, as an example.
see fig. 120. This importance has been reflected in the increasing popularity of bathing parks as well as their more extensive development during the last few years.

**For recreation or athletics:** During the early stages of their development—i.e., until recently—public bathing grounds were thought of as diametrically opposed to athletic swimming facilities. One accepted that the public facility would be used by people of all ages, types, sexes, etc., whereas the athletic installation was designed for the use of sportsmen and was based upon internationally accepted principles and dimensions for competitive swimming, diving, water-polo and other sports.

Today, swimming instruction has become very widespread, and with it a great popularization of water sports and competitions. Thus, this separation between "public" and "athletic" facilities has increasingly lost its meaning. The general public wishes to participate in aquatic sports, at least on local scale; competitive swimming is no longer the exclusive province of the specialized athlete. The steadily growing number of public outdoor bathing facilities has awakened an active interest in swimming both as a recreation and a sport.

These considerations lead to the conclusion that a new era of planning for bathing facilities is beginning—an era which will see many factors, heretofore not taken into account, assuming a greater importance in the layout of bathing grounds and the disposition and relative size of swimming pools.

### 4.2. Planning and Design of Open-Air Swimming Pools

The usefulness of bathing grounds depends not only upon their size, location and effective service radius, but also upon the way in which they are designed, developed, equipped, maintained and operated. Great care in the construction of the swimming pool itself is essential, because if they are not built properly, the health and safety of the bathers may be endangered.

The following factors are essential in developing a bathing center:

**Considerations in site selection**

- The area should be easily accessible to people within the previously recommended service radius—within not more than half an hour's walking distance. It should be easily reached by a service road, so that supplies and equipment can be delivered as needed.
- It should afford easy drainage and water supply.
- Since open-air swimming pools are planned to be built below grade, consideration should be given to ground water conditions as well as surface flooding. (A waterlogged site requires special treatment to counter the upward thrust of the ground water; and to maintain watertight pools, thus increasing construction costs.)
- The area should be free of unusual hazards of smoke, gas, fumes, trash, dust or excessive noise—resulting, for example, from a neighboring industry—since such factors have a strongly adverse effect on outdoor pools, and put an extra load on water cleaning systems.
Natural or artificial protection from prevailing winds, is essential for outdoor pools. The most satisfactory arrangement is to locate the pools to the leeward of one- or two-story buildings if natural barriers such as woods are not available. The entire area should be free of any obstacles which would prevent sunshine from falling directly on the water of any of the pools in the open-air bathing ground.

**Beauty**

Whether derived from existing natural features or resulting from planning a certain amount of beauty in the surroundings, has always been considered an essential feature in a bathing ground.

**Fencing**

As has been mentioned before, a bathing ground should be enclosed to facilitate control and the collection of admission fees. A fence is essential around outdoor swimming pools in order to restrict access to bathers, thus securing a sanitary condition. The bathing park should be open for promenaders, but the bathing area should be separated from the general grounds where people may stroll.

**Components of open-air bathing centers:**

The total area “$A_t$” of an outdoor bathing ground is divided into:

- Parking area $A_p$
- Water surface $A_w$
- Buildings $A_b$
- Relaxation area $A_r$
- Playing areas (including small playing fields) $A_p'$
- Pool surrounds, paths, planted areas, etc. $A_s$

**Quantitative planning**

Distribution of space may be taken as follows, according to planning standards of the Health Authorities of Zurich:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total area</td>
<td>100%</td>
</tr>
<tr>
<td>Parking area</td>
<td>8.5%</td>
</tr>
<tr>
<td>Water surface</td>
<td>15%</td>
</tr>
<tr>
<td>Buildings</td>
<td>9-10%</td>
</tr>
<tr>
<td>Relaxation area</td>
<td>34%</td>
</tr>
<tr>
<td>Playing areas and gymnastic grounds</td>
<td>15%</td>
</tr>
<tr>
<td>Pool surrounds</td>
<td>4%</td>
</tr>
<tr>
<td>Paths and roads</td>
<td>8%</td>
</tr>
<tr>
<td>Planted areas</td>
<td>5-6%</td>
</tr>
</tbody>
</table>

In the “Standard Bath” of Haefeli, the distribution of space is as follows:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>$A_t$</td>
<td>100%</td>
</tr>
<tr>
<td>$A_p$</td>
<td>10%</td>
</tr>
<tr>
<td>$A_w$</td>
<td>10%</td>
</tr>
<tr>
<td>$A_b$</td>
<td>10%</td>
</tr>
<tr>
<td>$A_r$</td>
<td>35%</td>
</tr>
<tr>
<td>$A_p'$</td>
<td>15%</td>
</tr>
<tr>
<td>$A_s$</td>
<td>20%</td>
</tr>
</tbody>
</table>

According to planning principles of the German Olympic Association, total area should be divided as follows:

---

52 Meeting at Hannover in Feb. 1961.
Total area ........................................ 100%
Parking area (would be provided as an additional area). .... 10%
Water surface .................................... 10%
Buildings ......................................... 6%
Relaxation area ................................... 40%
Playing areas ..................................... 20%
Children's playground ............................ 3%
Paths and roads ................................... 10%
Planted areas ..................................... 11%

Water Surface "Pools"

An open-air bathing ground should have about 10-15% of its total area devoted for water—at least 1m² per dressing unit. This water surface usually includes pools for paddling, non-swimmers, swimmers, divers, and if necessary an instructional pool.\(^{53}\)

Types of pools

In open-air bathing grounds, multi-purpose, partially separated or completely separated pools are possible.

**Multi-purpose pools** are built with sections for non-swimmers, swimmers and divers. This form is usually found only at open-air bathing grounds in small communities, with pools of less than 1'200 m² total water surface. (A small pool is usually added as a paddling area for children.)

From the economic point of view, the rectangular pool is the most practical. "L", "T", or "U"-shapes, however, are more adaptable for multi-purpose use. They are more functional, because different pool sections can be easily isolated for greater safety.

In the multi-purpose pool, the water depth begins with 0.9 m, then drops to 1.25 m in the non-swimmers' section. In the swimmers' section the deepest part is 2.20 m. Lines of floats strung across the pool, define the different areas of a multiple-use pool.\(^{54}\) A sharply sloping floor in the non-swimmers' section should be rejected due to the risk of accidents.\(^{55}\)

**Separated pools:** In open-air swimming pools for larger communities, where the total area of water surface exceeds 1'500 m², complete or partial separation of pools is recommended, if not essential.

Separate pools for paddling and for non-swimmers, and pools for swimmers and even for divers, have many advantages where the volume of use justifies their construction. They are an asset with regard to safety, hygiene, organization of activities, discipline, the bathers' convenience and sport. All problems of depths for swimmers, players and divers, insecurity for learners, and the risk of interference between different activities, are eliminated.

With separate pools, water quality is better and the varying requirements for fresh water can be dealt with at different times. Further, local competitive events can take place in a separate pool while other bathers enjoy continued use of the bathing facilities.

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\(^{53}\) Instructional pools offer the advantage that during days of maximum attendance, they can be used by the general public for bathing (with instruction suspended).

\(^{54}\) See also pool markings.

\(^{55}\) The slope of the bottom should be gradual and not more than 1:15 (according to Heatly).
Size of pools

**Paddling pool:** The size of a paddling area depends on the volume of use and the percentage of paddling-age children in the communities. However, a minimum area of 75 m² should be provided for paddling within each bathing ground (depth of 0.0-0.40 m).

Paddling pool along with the children playground is usually set apart from other swimming facilities of adults (with separate resting place for mothers).

**Diving pool:** If separated from the swimmers' pool, the area for diving should be set according to the type and number of diving facilities, with water depth dependant on the height of diving boards.

**Swimmers' and non-swimmers' pools:** In the last few years, the area of water for non-swimmers has been planned on the assumption that the heighest percentage of visitors are just bathers. The ratio between the swimmers' and non-swimmers' water area in almost all open-air baths erected was 3:5 in favor of non-swimmers[^56].

Today the proportion of water area devoted to non-swimmers should decrease, for two reasons:
1. The number of non-swimmers has decreased due to widespread swimming-instruction and the growing interest in swimming as a sport.
2. Swimmers need more area to move in.

Experience has shown that a minimum ratio of 1:1 is required, if not more in favor of swimmers.

Water surface could be divided as follows[^57]:

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
<th>Area per visitor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total water surface</td>
<td>100%</td>
<td>1.00 m²</td>
</tr>
<tr>
<td>Paddling pool</td>
<td>5%</td>
<td>0.05 m²</td>
</tr>
<tr>
<td>Non-swimmers' pool</td>
<td>40%</td>
<td>0.40 m²</td>
</tr>
<tr>
<td>Swimmers' pool</td>
<td>40%</td>
<td>0.40 m²</td>
</tr>
<tr>
<td>Diving pool</td>
<td>15%</td>
<td>0.15 m²</td>
</tr>
</tbody>
</table>

Pool construction

Reinforced concrete is the most acceptable type of construction; it has superseeded the use of other materials in the construction of swimming pools. This material is waterproof, from the standpoint of holding water in the pool, or preventing seepage water from without. Most pools have been constructed of form-poured type of reinforced concrete.

Since the last two decades, a new process of construction known as shot- or jet-crete, has been extensively used for open-air pools which resulted in lowering the cost of construction. "The process consists of pneumatically applied mixture of sand, cement, and water which is applied under pressure against walls of natural or compacted soil. Steel reinforcing is placed in position around the walls and bottom of the excavation before mixture is sprayed on. Owing to the fact that the materials are applied under pressure, concrete of great density results and tests have shown a compressive strength double that of form-poured concrete."

The original costs of such method will be lower because construction time is shorter and forms are not required. However, the main disadvantage is that any settling of the pool or surrounding earth may result in broken pipe connections that are hard to repair.

[^56]: This ratio varies from 0.3-0.6 m² per visitor swimmer and 0.5-0.7 m² per visitor non-swimmer.

[^57]: According to Haefeli.
Essential features, such as overflow gutters, properly sloped runways around the pool, recessed steps or ladders, pool-lining and markings, coping and other fittings, must be carefully designed to assure a satisfactory pool.

**Pool lining (Surface finish)**

The finished surface of the pool should:
1. Be smooth; not offer a lodging place for bacteria, dirt or algae; be easily cleaned and non-absorbent.
2. Serve as an impervious barrier which will help to prevent moisture from reaching the outer walls.
3. Enhance the appearance of the water and the pool.
4. Improve visibility in the water area, thus adding to the safety of the swimmers.

**Tile-lining:** Many materials have been used to line the interior of pools, but by general agreement glazed tiles are the most satisfactory. White is the recommended color for the pool bottom, to enhance the clarity of the water and to make the bottom of the pool visible to the bathers. Light color tints of green or blue have been used in recent years for the lining of sides and end walls. The sides of the pool should be non-slip—lined with non-slip tile or other non-slip material—to a depth of about 1.00–1.20 m, to aid the swimmers in turning and pushing off.

Other materials, such as non-absorbent (waterproof) types of plaster finish, have been extensively used in outdoor pools, and give a satisfactory surface. When plaster lining is used—painted with chlorine-resisting paints—the overflow troughs and rims of the pool should be lined with tile.

Any painted lining requires constant upkeep and care. The low cost of the plaster finish (recommended only in outdoor pools) is offset by the periodic need for renewal. While the original cost of tile lining is much higher, it is easier to clean, requires less upkeep and gives a constantly good appearance. (It is far more durable for indoor pools, which are used every day of the year.)

The interior surface of the pool should be free of sharp edges and corners. The inner corners where side and end-walls meet, and where walls and bottom join, should be rounded to facilitate cleaning. Sharp edges on the gutter, ladder or coping are a definite hazard to the bathers.

**Pool markings**

Markings are essential as safety precautions, and for swimming competitions and practice, as well as being useful aids to instruction.

As a safety measure, to show the different areas of water depths (in multipurpose pools): Markings of contrasting colors, that can be readily seen, should show the water depth near the shallow end at spot where the pool bottom starts to slope at a sharper angle. They should also be visible at the deep end of the pool. They may be letters or numerals set in the surface finish of the coping or deck on both sides of the pool. The actual depth of water may be indicated which is the most effective method. Any obstruction or sudden change in elevation should be indicated by a different colored tile or other surfacing material; this refers to coping, steps or overflow gutters.

For racing practice and competition: In this case, markings serve as lane guides and turn-indicators for swimmers. The center of each swimming lane should be marked by a guide line of about 0.25–0.30 m in width on the bottom.
of the pool. This line should be of a color that contrasts sharply with the color of the pool floor. (Black is the best color for lines on a white bottom.) The lane marker-lines should be 2.50 m apart, center to center. The distance from the side walls to the center of the first lane marker-line is usually 0.50 m more than the half-width of a swimming lane. These marking lines begin about 1.20 m in from both ends of the pool. At a point on the line about 2.00 m from the end wall, a warning mark is placed. This mark is usually a bar 0.60–1.00 m long which crosses the lane marker-line.

The end walls have also marking lines or a "bull's eye" opposite each lane marker-line on the pool bottom. Sometimes, wall lines extend from the gutter to the pool floor and are in the same color as bottom marker-lines. The purposes of these markers are to aid the swimmer in keeping in his lane, to warn him of the turn as he approaches, and to mark the wall area (or spot) where the turn will be made.

Swimmers' pools frequently used for competitive swimming, have the lanes marked by numbers which designate the lanes in which competitors will swim. These numerals may be located on the side of the coping of the ends.

Distance markers, above the surface of the water, may also be provided to show distance intervals—usually 5.00 m—along each side of the pool. These markers may be indicated by vertical lines or spots.

All markings should be of the same materials as the surface finish, but of contrasting color. Tile lining makes the most practical material for marking. Adequate marking may be somewhat difficult to achieve if surfacing materials other than tile are used. Painted markings are a poor substitute because even the best waterproof paint soon disintegrates and flakes off, and has to be renewed periodically. However, paint may be used in outdoor pools, as the swimming season is limited and markings can be renewed after each season.

**Overflow gutters**

They serve the following purposes:
1. As a receptacle to catch and carry off discharges from nose, throat and mouths of bathers, as well as to remove scum from the surface of the water.
2. To absorb the splash and waves formed by swimmers when racing, helping to maintain a smooth quiet water surface.
3. To act as handrails to enable bathers to obtain a good grip on the edge of the pool.
4. To provide an overflow for recirculation of water.

Several designs for overflow gutters have been developed and all are found in use. They may be classified as follows, fig. 121:

a. Recessed or inset type: This type gives a flush wall and permits a raised deck around the pool. It absorbs the splash and reduces the waves effectively. Such type should be designed with sharply curved back wall in order to direct waves downward into the gutter.

b. Open or roll-out type: Such a gutter allows some mixing of deck drainage and pool water. It is used largely on outdoor pools.
c. Back-set type: Constructed similarly to the recessed gutter, this type has no overhang. It is easier to clean, but does not reduce waves as effectively as the former, and allows some mixing of deck drainage and pool water.
d. Deck-level or flush deck type: The main advantage is that it is easier to leave and enter the pool. But decks become very wet, as heavy waves and splashes will ride over the drains to the deck area.
e. Semi-recessed type: This type stands in between the back-set and inset overflow gutter, having the advantages of easy cleaning and good wave-reducing.

**General requirements:** Overflow gutters should extend completely around the pool. They are best constructed in pre-cast units. Great care should be taken to ensure that the edges of the troughs are horizontal. They should be of sufficient width to be easily cleaned and deep enough to keep swimmers' fingers from contacting the bottom when they grip the rim. Outlets, covered with removable grates or strainers, should be provided not more than 3.00 m apart in the sloped bottom of the troughs. The distance from the rim of the gutter to the top of the coping or deck may vary from 0.20-0.45 m in type “a” or “c” to a flush gutter rim and water level in the case of type “d”.

The overflow gutter drainage may be open, in which the run-off goes directly into the sewer, or closed, in which the water recirculate in the same way as the rest of the pool water, going through the filters and then back into the pool. The closed re-circulation plan has been widely used in recent years, having the advantage of constant "skimming" overflow action which gives a more sanitary pool with a reduction in loss of heat and water.

The closed system is only recommended in the case of separated pools and above all for the swimmers’ pool. Being accustomed to water, swimmers do not take quantities of water into the nasal passages, mouths and throat as beginners do, which results in an increase in mucus discharged into the gutter. Pools constructed with a closed system of re-circulation should have provisions for opening the overflow drainage to the sewer when desired.

**Other pool fittings**

**Ladders:** Steps and ladders leading from the pool—often used in entering the water—should be recessed into the pool sides, thus leaving the pool walls free of obstructions. They should be located at or near the four corners of the pool, surfaced with the same materials, and reached down to a depth of about 1.20 m below the surface of the water.

The step or rungs should be at least 0.10 m in width and 0.45 m long. The treads should be flat, non-slip and built into the pool side to eliminate the risk of accidents (front edges should be flush with the sides of the walls or slightly recessed). The rungs may be either free from the walls at the back or have slits or holes for drainage.

Ladders, steps or stairs should be of contrasting color for safety, and have a handrail of non-corrosive metal on the coping or deck.

**Inlets and outlets:** For recirculating the pool water, they should be arranged so that treated water flows uniformly throughout the entire pool without dead spots. They also serve to maintain the water level at the desired height. They
should represent no hindrance to swimmers and be adequate in size to ensure proper circulation.

In pools with outlets near the bottom, inlets should be placed in the upper half of the pool walls (usually at points 0.40–0.50 m below the water level).

Pools with re-circulation through the overflow gutter (closed system); the best means of securing proper distribution of water is to have the inlets located in the lower half of the pool walls. This system allows the water to move upwards towards the gutters and downwards to the main drains. It is recommended as a means of insuring clean chlorinated water in all parts of the pool, at the same time, the deep set inlets do not represent a hindrance to swimmers.

Outlets at the deepest points of the pool, serving as main drains besides the re-circulation of water, should be of sufficient size to permit the pool to be completely drained in no more than four hours. The grating that covers the orifice of the drain, in the form of slits or holes, should not be hazardous to fingers or toes of swimmers. The area of the orifice or drainage sump should be five times the area of its discharge line so as to prevent a high velocity suction which may endanger life.

**Underwater viewing windows:** For open-air as well as indoor swimming pools, they are an essential operational and sports feature:

Operational advantages: They are for testing of the translucency of the water and prevention of accidents. Modern swimming pools may be equipped with underwater television cameras, projected on a screen located in the bath-attendant's room to follow swimming activities in the pool, thus preventing accidents.

Sports advantages: They are useful in coaching swimming and diving, checking breaks and for underwater photography. It has been found that training by underwater observation is much more thorough and allows the remedying of faulty movements not seen from above (e.g. the movement of divers underwater).

Accordingly, modern swimming pools should be planned from the very beginning with underwater vision windows. They are a feature which may be installed at the time of construction at relatively little cost, but if desired later, it will be practically impossible to install. In most cases, underwater windows are not adequate or are placed in the incorrect situation. A window for underwater viewing of 2.00 m wide and 0.50 m high is recommended, which should be of about 0.60 m below the water line and located on the side walls so as not to hinder swimming.

In pools, equipped with underwater television cameras, other windows (1.00 by 0.50 m) on both sides of vision windows are required to serve as artificial light sources during performances when photographs are taken (where the normal spot-lights are not sufficient).

At pools with diving boards arranged on the side walls, underwater vision windows should be installed on the end wall to see the divers from the side, but at the same time they should be at least 1.25 m under the water level, so as not to obstruct swimmers. Communication line to the trainer on the pool-deck is desirable, if not essential.

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59 Underwater television cameras are already installed in some of the Swedish swimming pools cf. indoor bath "Vasteras".
Access tunnel: Directly connected with the preceding feature, is the access tunnel which may completely surround the pool. This tunnel provides ready access to underwater vision windows and lighting as well as to all piping. These different functions should not contradict with or hinder each other.

Underwater artificial lighting: It is considered a necessity if swimming activities come in the late afternoon when neither natural nor artificial lighting are sufficient. It adds to the aesthetic environment of the pool and is a safety precaution. Lights should be well-diffused and staggered in arrangement (not be directly opposite each other on the two sides of the pool) to avoid shadows and glare.

Anchors: They should be provided for the floating surface markers, either in the multi-purpose pool to separate the areas of different water depths, or in the pool used for competitive swimming for racing lanes. These sockets should be of non-corrosive metal and be set flush with the pool wall surface. The floating marking lines are of stainless steel wire, strung with continuous round sections of cork, wood or plastic.

Coping or curb: Usually surrounds the pool and separates it from the deck, helping to keep the deck water from flowing back into the pool. It is entirely eliminated when using the flush deck, or roll-out type of overflow gutters. The coping should be of a color that contrasts with the deck and pool surfaces and of good non-slip material.

Starting boxes: Having different forms, they are a requirement of competitive swimming, and only provided at swimmers' pools, fig.122. The height of starting boxes varies from 0.30 m to 0.75 m above the water surface. The surface which is slightly canted downward towards the front, is usually square and measures about 0.45 by 0.45 m. They may be permanently installed or removable, the latter being obviously advantageous.

Many pools have a coping at one end, the top of which is 0.45 m above the water, and this serves in lieu of starting boxes, fig.122e.

The amount of deck space for different pools varies according to their use. At least 3.00 m width should be provided as run-ways around open-air pools, where it can also be used for sun bathing (this deck-space should be wider at starting boxes of swimmers' pool). A separate diving pool must provide considerable space behind the diving boards to accommodate the divers. In general about 4% of the total bathing ground area should be provided for pool or pools' surrounds. These should be of non-slip construction. Concrete surface and quarry tile are often used for the decks of outdoor pools. Any surface that has a tendency to be slippery may be a cause of accidents.

Adequate drains are essential to keep splashed water from accumulating, and carry of water used in hosing down the deck surface. They may be placed near the edge of the pool, just behind the coping or in a gutter located near the junction of the deck area and the neighboring barrier. However it is recommended that these are not located at the center of the area. As has been mentioned
before, some types of overflow gutters allow mixing of deck drainage, such as open type.
The criticism of the first type of deck drainage placed behind the coping is that the slope (1:50) will be downward towards the pool and that will admit the water used in washing the deck surface to get into the pool (working from the outside towards the pool). On the other hand, it has the following advantages:
1. It will catch water splashes out of the pool which are immediately carried away with the result in the deck area being dryer.
2. The cost is less because piping will be carried directly to the piping which accommodate the overflow gutters, in fact both systems become one. In the second type, drain gutter placed at the outer end, although it does not represent the disadvantage of splashing water used in washing the deck surface to the pool because washing will be towards the outside, it will provide an additional line around the pool deck which is not desirable from the aesthetic point of view.

Water surface and deck space should be separated from the remaining areas of the bathing ground by means of shrubs or railings. Deck space should only be accessible from paths through cleansing pools (foot-baths), where a sufficient number of showers should be provided. That is to prevent persons in street clothing from entering the pool deck and also to wash surface dirt from the feet. The foot-bath should be deep enough (0.15–0.20 m) and cover the total width of the passage way; it should be long enough to prevent any person from jumping over it. These fittings are essential in open-air pools, because visitors may go from the pool to relaxation- or playing-areas and back again to the water several times during his long stay.

Trees overhanging or adjacent to the pool or runways are not recommended and may cause unnecessary dirt in the pool.

**Deck Seating:** Built-in seating for bathers is desirable. Permanent seats are recommended from the standpoint of hygiene and appearance. Such seats should be constructed at the junction of the deck and surrounding barriers so as to leave the entire deck surface free from obstacles.

**Spectators' accommodation**

Although the swimmers' pool in open-air bathing grounds is not an exhibition pool for water shows, but there is a new trend to provide seating space for spectators for special competitive events. The stepping has the advantage that it can also serve as relaxing areas especially on days of bad weather and when there is no racing. Stands should only be provided on condition that they do not destroy the park-like setting of the open-air bathing grounds.

If provided, they can be arranged along the long side of the swimmers' pool in an east-west orientation, so that the spectators will not be blinded by the sun during the afternoon competitive events.

Championship pools for contests of national or international importance, should have accommodation for no fewer than 4'000 spectators. Such a type of pool may be combined with a normal recreational open-air bath, or stand alone as an aquatic stadium.

The first row of seats should be about 1.00–1.50 m above the deck level to keep officials and contestants from obstructing the view and to help to bar spectators from the deck area.

There should be a sufficient number of exist to the outside of the bathing ground.

Underneath the stand can be used for housing the mechanical equipment (filter plant) which will be in this case directly connected to the body of water-pools (swimmers' and divers' pools) thus saving piping.
Diving facilities

They are of two types: Spring and fixed boards, the provision of which depends on diving specific requirements.

Buildings

Buildings associated with outdoor swimming pools include the following:

a. Administrative (or service) building which contains entrances, first aid station, laundry, storage space, staff accommodations and caretaker dwelling, as well as various other service rooms.

b. Dressing accommodations, pre-bathing facilities and toilets.

c. Mechanical equipment for the recirculation system and heating.

The buildings cover an area varying from 6 to 10% of the total bathing ground. Another space-standard may be taken as 0.4 to 0.7 m² of buildings per each square meter of water surface provided.

Taking the height into consideration, built-up space may be provided as follows for every one square meter of water:

1.00–1.50 m³ in rural areas
2.00–3.00 m³ in small and middle communities
3.00–4.00 m³ in large towns

Buildings may be constructed of wood, masonary, concrete or pre-fabricated elements. The materials chosen should be sound from the standpoint of hygiene; light, and bright in color to give the informal effect required for the park-like setting of an open-air bathing ground.

Dressing accommodation

Planning standards with regard to the number of dressing facilities in relation to population served, have been discussed before in the section on town planning. In this chapter we shall deal with the different types of dressing facilities and the recommended type to be used at outdoor pools.

Types of facilities

a. The coat-hanger method of clothes-storage, for which cubicles for changing are provided. This method has become very popular at outdoor pools in almost all countries. One takes a special hanger, changes into a bathing-suit in a changing cubicle, deposits the loaded hanger with an attendant and leaves the cubicle free for the next person. In addition to changing cubicles, communal rooms (bays) may also be provided, to be used at the peak-periods as well as for school children. Coat-hangers are the most economical method and need the least space. This system has been widely adopted as the main dressing accommodation e.g. in Switzerland as well as in Germany at open-air bathing grounds.

b. Lockers: Instead of the preceding method of clothes-storage, one can deposit his clothes in a locker, which is then closed and the key retained by the user.

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61 In large bathing grounds, especially those in which competitive events may take place, other rooms are usually added for journalists, radio, television and for the contest-judges.
Which method of storage is preferable or should predominate, is a matter of economic conditions. While the latter costs more to construct, it has no operating costs, such as salaries for attendants. Final choice depends to an extent on the wage-scale in a given locality.

c. Individual cabins: Such a system is more widely used at indoor baths which are not expected to cope with the large crowds usually associated with outdoor pools. It is particularly valuable in winter, when people are more dressed, their outer garments and shoes often dirty or wet and in no condition to be brought into contact with other clothing, as is inevitable with other systems of storage. Provision of some individual cabins in addition to the main storage system at outdoor pools is both effective and useful. But it is not practical from the economic point of view to provide individual dressing cabins as the main dressing facility at outdoor pools.

Quantitative planning

A combination of the preceding types of dressing accommodations is usually adopted at open-air bathing grounds. In many cases, the first type is planned as the main method of storage, and other types as subsidiary. In this solution, dressing facilities can be divided as follows:

<table>
<thead>
<tr>
<th>Total dressing facilities</th>
<th>100 %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communal changing rooms (with hooks) for children</td>
<td>30 %</td>
</tr>
<tr>
<td>Clothes-hangers</td>
<td>50 %</td>
</tr>
<tr>
<td>Lockers</td>
<td>15 %</td>
</tr>
<tr>
<td>Individual cabins</td>
<td>5 %</td>
</tr>
</tbody>
</table>

In some others, lockers may be provided to serve as the main storage method, to which clothes-hangers are added as subsidiary facilities to be used at peak-periods. They can be divided as follows:

| Communal rooms for children (with hooks) | 30 %    |
| Lockers                                 | 50 %    |
| Hangers                                 | 12.5%   |
| Individual cabins                       | 7.5%    |

In both cases, 30% of the total dressing facilities should be provided in the form of communal rooms with hooks, for the use of children. Dressing facilities for adults, which form 70% of the total facilities, should be separated for the sexes. In some localities, they are provided in a 1:1 ratio (e.g. in Switzerland). In others, facilities for men predominate on the theory that male visitors to outdoor swimming pools form a majority varying from 55% to 60%.

Changing cubicles and seating benches: For every 50 clothes-hangers, at least one changing cubicle is required for men and two (or two and half) for women. Seating benches in the communal changing rooms used at peak-periods, usually have the following relation*: One seat for 20 hangers (men) and one seat for 40 hangers (women).

The minimum average space requirements for the different types of dressing accommodations, as executed in Switzerland, are:
<table>
<thead>
<tr>
<th>Type</th>
<th>Space requirement per unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cabins</td>
<td>3.00–3.20 m²</td>
</tr>
<tr>
<td>Lockers with seating benches</td>
<td>0.80–1.00 m²</td>
</tr>
<tr>
<td>Hangers</td>
<td>0.35–0.45 m²</td>
</tr>
</tbody>
</table>

These figures include covered areas for circulation.

They usually have the following clear dimensions:
- Changing cubicles 0.95–1.00 by 1.25–1.30 m
- Individual cabins (2.20 high) 0.95–1.00 by 1.30–1.40 m
- Lockers 0.25 by 0.50 and 0.90 m high

The height of the hanger-storage hall should be at least 2.80 m.

Regardless of type, it is essential that dressing accommodations should be well-lit, ventilated and free of draughts. Since they are mainly used in summer days, they should be airy, and of summer architectural character. The floor should be non-skid and laid at a slope of not less than 1:60 to surface water drains.

**Pre-bathing showers**

Separate shower-accommodations should be provided for both sexes adjoining or near to the dressing facilities. To encourage the habit of pre-bathing cleaning, there should be an adequate number of hot-water shower-cubicles, in addition to cold ones. For every one thousand visitors, 2–4 hot-water showers are sufficient.

Tile floors and walls should be of impervious materials to give the least trouble in maintenance. Plaster or concrete are not recommended for the shower cubicle, because plaster deteriorates as a result of high humidity and concrete walls give the area an unattractive appearance, are hard to clean, and absorb moisture. Showers should be well ventilated and ample drainage should be provided. The floor should have a non-slip surface, and a pitch of 1:50 towards the drain.

Toilet accommodations in the ratio of about 5 W.C.s for every thousand women and 2 W.C.s and 5 urinals for every thousand men, should be placed adjacent to dressing rooms, where bathers pass on the way to the bathing ground.

**Mechanical equipment (Water purification)**

Clean, pure, sterilized water as a medium for the various bathing activities is essential. In some localities, the quality of such water is required to be up to the standards of drinking water. This is made possible by the mechanical equipment which pipes, strains, filters, sterilizes, heats (if required) and re-circulates the water at a prescribed rate—the total re-circulation system. This
is among the most expensive installations at outdoor pools, in which insects, falling leaves and dirt are an extra load on the filter plant, besides the dirt introduced by the bathers themselves. Also chlorine is lost much more rapidly and water evaporation is greater at outdoor facilities.

Location of mechanical equipment: Below-ground space may be utilized for filter plant, such as a basement underneath one of the service buildings or adjacent to one of the pools in the area.

The filter house is an important work space and, as such, must be well ventilated and lighted and allow good working conditions for the service personal. It should be also located as near as possible to the pools, for the maximum efficiency and to save piping.

Types of filters

Filtration is accomplished by passing water through a filter bed. Filters are of different types and have different space requirements. Changes in filtration methods have largely stemmed from efforts to get more efficient filtration from less space.

With regard to sand as a medium of filtration, there are two types of filters in general use today:
1. Gravity sand filter (open).
2. Pressure sand filter (closed).

There has been no criticism of the function of the first type, which is found in connection with those pools built in recent decades, but the large area required to secure the rate of re-circulation demanded for pools, has led to its discontinuance. Pressure sand filters, which save considerable space, are going to be more widely used in future.

Filtration media other than sand have been used with success, among them is the infusorial (diatomaceous) earth filters. Many pools in America, have been equipped with such filters since the Second World War, but they have not yet found their way to the pools of Europe. They still have objections in some countries, although the advantages claimed for this type of filter are improved purification of water, compactness and space saving.

This type of filter "Kieselgurfilter" functions by means of "porous elements made of various materials, including porous stone, wire mesh screen, monel wire wrapped on a plastic core and everdur wire wrapped on a framework of the same material.

The Health Authorities of Zurich (Switzerland) has recently investigated the possibilities of this type of equipment for the purification of pool-water. Experiments have been made on a developed type of "Kieselgur-Anschwemm-Filter" at the indoor bath as well as an open-air pool of the town. Results, with regard to the quality of water purified and the operation of the filter, have been favorable.

Disinfection: For the sterilizing of swimming pool water, there are several methods and agents in use today, such as chlorine, chloramine, bromine, ozone, ultra-violet rays and others. Chlorine is still the most reliable agent and considered the best method of disinfecting swimming pool water. Chlorine may be added to the water before filtration (pre-chlorination) or after (post-chlorination).

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63 In USA, over 80% of the recirculation pools are equipped with pressure sand filter.
If chlorine is applied in the form of gas, a separate room for chlorination should be provided which is gastight and equipped with ventilating ducts. Copper sulphate is also added to prevent growth of algae in the swimming pools.

**Heating the water:** Heated water for outdoor pools is not required in moderate or hot climates. In some localities, especially those with rather cold weather—e.g. in Sweden—water is heated after filtration to a comfortable temperature for the bathers (slightly warmer than the air-temperature). From the health point of view, heated water at open-air swimming pools is not recommended even in cold weather, especially if it would create a great difference of temperature between water and air. The health of bathers, getting out from the heated water to the colder air, may be endangered. Some authorities recommend non-heated water because cold water has a more refreshing effect.

**Recirculating the water:** The dirty pool water is continually being withdrawn and replaced by fresh or filtered water. The rate of this recirculation is determined by the capacity of the filters. In the early open-air bathing grounds (e.g. Allenmoos), filters were designed to change the water of pools once in every 8 to 12 hours, which was an accepted standard for many years. Most of the modern swimming centers have provision for 6-hour and 4-hour turnover. The need for this periodic filtration of pool water is determined by the number of people as well as the type of bathers that use the pool within a specific period of time. The heavier the load, the more frequent should be the turnover. For non-swimmers' pools with relatively shallow water, the rate of change should be higher than that in swimmers' pools having more water. Whereas the accepted standard of turnover today for swimmers' pools is about 6 hours, in non-swimmers' pools provision should be made for a 4-hour turnover. From the standpoint of hygiene, the water of paddling pools should be drained to a sewer, and replaced by fresh water. This is because the water used for paddling gets soiled more quickly than that of other pools and should not be admitted into the recirculation system. Recirculation of pool water is accomplished by means of inlets and outlets which have been already discussed.

**Open Space (Surfaces)**

Although the water surface is the heart of any bathing ground, at outdoor pools open spaces and green areas are considered contributory to the recreational value of the total. In practice, only about 10% of visitors would be in the water at a time, while 80-90% would be on the green, play areas, at other recreational facilities or in the dressing rooms.
Open surfaces—without buildings and pools—should provide from 7–9 m² per visitor (i.e. dressing-unit), which includes relaxation areas, playing areas, pool surrounds and paths as well as planted areas. Proper relation between these different sections is essential.

**Relaxation space**

Areas devoted to relaxation should constitute about 35–40% of the total area of a bathing ground. This space should be loosely divided by means of plants and paths, so that visitors will fall automatically into groups, thus avoiding crowding and creating a park-like setting. They should be set apart from the noise of playing areas and fields. Provision of sufficient shade by means of plants or artificial sheds and screens is essential from the standpoint of bathers' health. Shaded areas should be about equal to those in the sun. Separate resting places near paddling pools should also be available for mothers and small children.

**Playing areas**

From 15 to 18% devoted to playing and gymnastic areas is sufficient. Some bathing grounds possess more areas for playing (e.g. Allenmoos, 26.4%), but experience has shown that they are not fully utilized.

**Paths and roads**

These circulation areas, which assist people in easily reaching the various facilities and preventing crowding, should not constitute more than 8%. Connecting the entrance with dressing facilities, as well as dressing facilities with the different pools and other recreational facilities, they should be durable. Quarry tile, concrete, or asphalt surfaces are widely used.

**Planted areas**

Planted areas, which may constitute about 5–7%, contribute largely to the beauty of a bathing ground. They create an appealing and interesting atmosphere for the bather, and aid the spatial separation between the different use-areas. Natural features of the site, such as big shady trees, should be retained. Along with planted areas, play-sculptures are essential for children and should be located within the playground.

**Other features:** As mentioned before, the present tendency is to treat bathing grounds as recreation centers, and for that reason they should be designed to include facilities that will attract all segments of the community. Vapor baths with the necessary attendants' rooms, may be combined with open air swimming pools, such combinations having proved their regenerative value. Other features such as restaurants and snack-bars have also been provided in some centers.

**Frequency of use**

The capacity of an open air bathing ground can not be planned according to the number of visitors during peak periods (or in days of maximum frequentation) because it is not practical from the economic point of view. The open-air bathing season varies from 100 to 120 days, of which 40 to 60 days are of normal frequency and only 10 to 20 days of maximum frequentation.
in which the number of visitors exceeds the number of dressing accommodations provided.
Planning standards, mentioned before, are based on average conditions. On peak days, the number of visitors to the bathing ground may be from 1½ to 2½ times the number of available dressing facilities. Obviously it would be uneconomical to maintain sufficient dressing facilities for so many people, since peak-utilization occurs during only about 10% of the bathing season.

Frequency of use, on the other hand, gives some idea of the adequacy and effectiveness of a bathing ground in a given locality. It shows whether areas provided per visitor are sufficient or not. If the number of visitors per season remains the same for some years under the same climatic conditions, in spite of the steady increase in population, this means, in many cases, that the recreational as well as bathing capacity of the ground or grounds are not sufficient to keep pace with the rising population and cannot accommodate more visitors. In this case, space standards would change to the worse if more visitors were accommodated at the same facility, thus diminishing its effective recreational value. Accordingly, erection of a new bathing ground is essential.

E.g., in Zurich, the number of visitors per inhabitant per season remained the same from 1954 until 1957-1958, although the population increased in that period from 414'000 to 433'000.

<table>
<thead>
<tr>
<th>Year</th>
<th>Visitors per Inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1954</td>
<td>2.5</td>
</tr>
<tr>
<td>1955</td>
<td>2.8</td>
</tr>
<tr>
<td>1956</td>
<td>2.3</td>
</tr>
<tr>
<td>1957</td>
<td>3.2</td>
</tr>
</tbody>
</table>

That was due to the inadequacy of the existing bathing grounds. With the erection of the new bath (Auhof) in 1958, as well as the extension of another one (Allenmoos), this figure increased suddenly to 4.

<table>
<thead>
<tr>
<th>Year</th>
<th>Visitors per Inhabitant</th>
</tr>
</thead>
<tbody>
<tr>
<td>1958</td>
<td>4.00</td>
</tr>
<tr>
<td>1959</td>
<td>4.60</td>
</tr>
<tr>
<td>1961</td>
<td>4.40</td>
</tr>
<tr>
<td>1962</td>
<td>4.60</td>
</tr>
</tbody>
</table>

This standard of measurement could be applied on a smaller scale for a bathing ground in a surrounding community or on a larger one for an entire urban area.

"On the other hand, if this factor increases with the increase of pop., it means that the ground is still able to accommodate more visitors and space standards are still adequate."
Leer - Vide - Empty
5. **Analysis and Criticism of Some Open Air and Indoor Baths**
Leer - Vide - Empty
5.1. The Open-Air Bath of Aarau, Switzerland

Population served: The open-air bath is intended to serve for an industrial small town (Aarau) about 50 km west of Zurich. Its population reached in 1960 about 17'000 inhabitants. This bath has brought to the people a new recreation center within an effective service radius of about 1.5 km. The need for such a bath became urgent after the authorities had realized that the quality of the water in the Aare River was, from the hygienic point of view, no longer suitable for public bathing. In addition to the town Aarau, the open-air bath would serve for the adjacent communities within a greater radius of about 3 km, fig.123.

Site: The open-air bath is situated on the banks of the river west of the town. This situation was chosen by the local authorities in order to group all the sports facilities in the main green zone of the town, fig.125. The main entrance to the bathing ground (with about 500 bicycle stands) lies on the way to the town center. It is spatially bordered and accentuated by the main wardrobe and service building. Parking areas for cars have been provided opposite to the entrance along the street frontage on the other side of the road.
A second entrance to the children’s dressing facilities is via the promenade path (parallel to the river). There is also a service entrance to the restaurant and the filtering plant on the western side of the site. On the northern side of the ground, an area of about 10 m in width along the river has been reserved as a promenade outside the bathing ground proper.

**Program:** The bathing ground, which covers an area of about 24'000 m², comprises the following facilities:

**Buildings**

**Service building:** Built-up space: 843 m³
There are two cash-desks, a first aid station, rest-room for the bath-attendant and staff, as well as other service rooms.

**Main wardrobe:** Built-up space 3'598 m³
Dressing facilities for adults are mainly of the coat-hanger wardrobe and locker type. In both men’s and women’s departments there are 550 hangers, 200 lockers and 12 changing cubicles. Three large communal changing rooms are also provided for each with benches which are used for undressing at peak periods.
Clothes-hanger storage space for both sexes is combined (back-to-back) so that one attendant may serve both sides at one time on days of low frequentation. Although 50% of the hanger wardrobe is intended for each sex, this arran-
Management may help to adapt the number of hangers for men or women according to the number of visitors of each, fig. 127.

In spite of the desire of local authorities to have a closed plan design for the main wardrobe hall, numerous "detached" planes floating in the air, shelter this pavilion, in order to avoid the oppressive quality of a straight-line, hard-edged roof, and to give as open and airy an atmosphere as possible. Moreover, shrubs and trees are continued to the interior of the dressing rooms, fig. 128.

126 The open-air bath of Aarau: 1 main entrance, 2 second entrance, 3 entrance from the adjacent sports area, 4 entrance to the restaurant, 5 bicycles, 6 cars, 7 service building, 8 main wardrobe, 9 individual cabins (women), 10 individual cabins (men), 11 restaurant-terrace above the filter-plant, 12 refreshment-bar, 13 school-children's cloak-rooms, 14 swimmers' pool, 15 non-swimmers' pool, 16 paddling pool, 17 foot-baths with showers, 18 relaxation area, 19 relaxation area for women, 20 playing area, 21 gymnastic area, 22 table-tennis, 23 abstract play-sculpture, 24 small children's playground, 25 Aare river, 26 promenade, 27 Schützenhausweg
Service building and main wardrobe, scale 1:1'200: 1 turn forecourt, 2 entrances, 3 exit, 4 kash-desk, 5 bath-attendant, 6 first aid station, 7 staff, 8 storage-space, 9 transformers, 10 club, 11 entrance for men, 12 entrance for women, 13 toilets and showers, 14 bad weather wardrobe, 15 clothes-hanger storage, 16 changing cabins, 17 changing bays and lockers

Main wardrobe which are sheltered by detached planes floating in the air

Children's cloak-rooms, scale 1:1'200: 1 entrance, 2 boys' changing room, 3 girls' changing room, 4, 5 instructors

A small section of the hanger wardrobe may be locked up in the case of bad weather to shelter the attendants. It should perhaps be pointed out that, in bad weather, the absence of bathers render this particular facility superfluous. There are:

3 hot water shower-cells, 9 W.C.s for women,
3 hot water shower-cells, 4 W.C.s and 8 urinals for men.

School children's cloak-rooms: Built-up space 885 m³

Special changing bays (without wardrobe and with separate entrance) are at the disposal of children. 500 hooks and seating benches are provided in each section for boys and girls as well as a room for teachers accompanying children to instruction classes, fig.129.

Individual cabins: Built-up space 1'137 m³

They are provided for men and women on the southwestern edge of the site in two-storied buildings. One section may be used as family changing cabins. The cabin measures 1.00 by 1.40 m, fig.130.

Restaurant and filter-house: Built-up space 1'674 m³

The restaurant has, on the roof- and garden-terrace, seating accommodation for a total of 150 persons. Adjacent to the kitchen, is the self-service buffet.
Underneath the restaurant-terrace is the filtering station. Beside this 1½ storiied building, further toilets facilities for both sexes are provided (3 W.C.s for women and 2 W.C.s and 3 urinals for men), fig. 131.

**Total built-up space:** 8'128 m², i.e., 3.40 m³ per one m² of water surface. Buildings, being located on the borders of the ground, have left the "heart" of the bathing ground free.

**Swimmers' pool:** Water surface: 1'070 m² (2'140 m³)
It measures 18.00 by 50.00 m and the depth varies from 1.80 to 2.40 m. It has 6 swimming lanes and a lateral diving bay with 1, 2, and 3 meter spring-boards and a water depth of 3.60 m.

**Non-swimmers' pool:** Water surface: 1'200 m² (920 m³)
It measures 48.00 in length and the depth varies from 0.50 to 1.20 m.

**Paddling pool:** Water surface: 1.20 m (80 m³)
Water depth varies from 0.00 to 0.40 m.

**Pool-layout:** Separate pools are used, each composed solely of straight, but irregular lines. Their informal arrangement is achieved by the situation of the individual buildings: The noisy non-swimmers' pool lies beside the children's cloak-rooms, play area and toilets, whereas the swimmers' pool, relatively quiet, is situated near the individual cabins and in the middle of the relaxation areas.

The paddling-pool area has been adjoined to the non-swimmers' pool and between the two pools, since adults accompanying their young children do not wish to stop swimming, which would result if the paddling pool and the children playground were set apart. In this bath, mothers can swim to their hearts content, while still watching their small children paddling in the adjacent pool. The paddling area is railed off to prevent collisions with the more energetic adults. Pools are surrounded by shrubs, to which access is only permitted through the foot-baths with free standing showers.
Open surfaces

(Without buildings and pools): The open-air bath has a total 19,300 m² of free surface, thus providing a space of 7.00 m² per each dressing unit (i.e. visitor). Relaxation areas are spatially separated from more active sports and gymnastics. On the northern edge of the site a large green area has been set out as a playing area, bordered from the north by a group of trees. Relaxation space (10,000 m²) is informally divided into small areas by plants and garden paths. Playing and gymnastic fields are situated on the southern zone of the site at its point of contact with the outer green area, to provide intimacy and protect against excessive noise.

A separate relaxation area for women is provided beside their individual cabins. Sufficient shade is made available by means of bushes and trees as well as buildings.

Architectural and Aesthetic Aspects

In this bathing ground, the designer has repeated much of his successful pre-war "Allenmoos" open-air bath in Zurich. The basic aim in the pool-design is to make it as unobtrusive as possible and to create a park-like setting. This led to an informal layout and gentle blending of the buildings with the park.
A free, uninterrupted view is available everywhere: to the east, to the town center over the large playing meadow; southwards to the parade ground; as well as on the western side towards the natural landscape of the Aare River. The southwest edge of the site is shut off against the excessive noise of the neighboring shooting ground by means of the two-storied cabins and group of trees. The 1 ½-storied restaurant protects the bathing ground on the western side from the wind. Its position is such that it may serve the bath and the athletic area.

The buildings are low, airy and transparent; their architecture is characterized by extremely light dimensioning of the structure. They are all open, except for the service-building and the kitchens. Trees and shrubs are integrated into the buildings, while outside, trees and shrubbery are employed to break up further the masses of these already fragmented shelters. Every effort is being made to provide as much green as possible. An open conception of design, especially in the dressing facilities, has been aimed at, since days of maximum frequency coincide as a rule with the hottest days of the season. Thus the bather should be provided, from the designer’s point of view, with as much open space as possible to change in, yet still be protected from view, wind, and rain. The individuality of the buildings helps to make the architectural aspect of each single building correspond to its function. On the other hand, the unity of the whole complex is achieved by using identical construction materials: concrete slab-roofs on red exposed stone slabs or on mushroom supports, prefabricated elements, and natural varnished wood with blue and yellow "eternite" doors panelling. This individuality, as well as the skilful utilization of a limited number of materials has resulted in the architectural richness of this bathing park. Moreover, the shape and arrangement of the pools correspond to those of a natural one. Finally, a delightful play-sculpture completes the richness of the scene, fig. 138.
The terrace of the restaurant

The paddling pool

Bulkhead type concrete element screen

The swimmers' pool as seen from southwest

Economic Factors

Main wardrobe

66 In the year 1954/55, these values should be raised about 15% in comparison with present-day prices. Costs represent about 114 s.Fr. per head of population which was estimated at the date of construction of about 14'500 inhabitants.

Costs of the bath

<table>
<thead>
<tr>
<th>Component</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total (1'605'000 s.Fr. without land)</td>
<td>100%</td>
</tr>
<tr>
<td>Buildings</td>
<td>45.5%</td>
</tr>
<tr>
<td>Water surface</td>
<td>22.5%</td>
</tr>
<tr>
<td>Filtering equipment (without filter-house)</td>
<td>10%</td>
</tr>
<tr>
<td>Work on surroundings, etc.</td>
<td>22%</td>
</tr>
</tbody>
</table>

Costs of the individual buildings

<table>
<thead>
<tr>
<th>Component</th>
<th>s.Fr.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cost per m³ of built-up space: 270'500/3'598</td>
<td>75.18</td>
</tr>
<tr>
<td>Cost per hanger-unit: 117'750/1'100</td>
<td>106.82</td>
</tr>
<tr>
<td>(in ratio to the costs of hanger-wardrobe)</td>
<td></td>
</tr>
<tr>
<td>Cost per locker-unit: 153'000/400</td>
<td>382.50</td>
</tr>
<tr>
<td>(in ratio to the costs of locker-wardrobe)</td>
<td></td>
</tr>
</tbody>
</table>
Individual cabins

School children's cloak-rooms

Service-building and entrance

Restaurant and filter-house

Swimmers' pool

Non-swimmers' pool

Filter equipment

Work on the surroundings

Cost per m³ of built-up space: 140'500/1'137 ........................ 123.57
Cost per cabin-unit: 140'500/254 .................................... 553.20
Cost per m³ of built-up space: 77'200/885 .......................... 87.23
Cost per one hook: 77'200/1'000 .................................. 77.20
Cost per m³ of built-up space: 89'300/843 .......................... 105.93
Cost per m³ of built-up space: 157'100/1'674 ...................... 93.85
Cost per m³ of purified water: 87'300/3'140 ....................... 27.80

(in ratio to the costs of the filter-house)

Cost per m² of water: 182'500/1'070 ................................ 170.55
Cost per m³ of water: 182'500/2'140 ............................... 85.28
Cost per m³ of water: 181'000/1'320 ............................... 137.12
Cost per m³ of water: 181'000/1'000 ............................... 181.00

(including paddling pool)

Cost per m³ of purified water: 157'000/3'140 ...................... 50.20
Cost per m² of free surface: 313'500/19'300 ...................... 16.00

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143 Number of visitors from 1956 to 1962
Bathing Season 1956: 118 days
Bathing Season 1957: 106 days
Bathing Season 1958: 122 days
Bathing Season 1959: 126 days
Bathing Season 1960: 122 days
Bathing Season 1961: 133 days
Bathing Season 1962: 113 days

144 Population of Aarau from 1900 to 1960

145 Increase in the number of visitors during the season 1961

146 Increase in the number of visitors during the season 1962

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67 These include earthworks, paths and plantation.
Cost of dressing-unit: 1'605'000/2'800 .......................... 573.20
(in ratio to the total costs inside fenced area)
Cost of dressing-unit: 488'200/2'800 .......................... 174.30
(in ratio to the total built-up space for dressing facilities)
Cost per m²-unit of water: 1'605'000/2'400 ......................... 668.75
(in ratio to the total costs inside fenced area)

Organization and Administration

The open-air bath is a property of the town Aarau. It is a public bathing ground with a nominal entrance fee of 0.30 Fr. 68 It is open every day from 7 o'clock until 20.00 from the middle of May to the middle of September (children of school-age must leave the bath at 6 o'clock in the evening). Since the bath was opened in 1955, the greatest number of visitors during one season has been 158'403 in 1962, an average of 1'400 visitors in one day, fig.143. The maximum number of visitors in one day during all of the former operation period was 5'177, whereas the bath's maximum capacity is 2'800. That is, the cloak-rooms were used 1.85 times. School children's cloak-rooms, closed to adults, are free to children. Hanger-, locker-wardrobes and individual cabins are at the disposal of adults on payment: (0.50 Fr. for a hanger, 0.70 Fr. for a locker and 1.50 Fr. for an individual cabin).

Water Purification

Water volume: 3'140 m³
The water which is changed completely only once or twice a year, is purified constantly via an open "Quartz" sand filter which has an area of 50 m². The re-circulation rate in the swimmers' pool and the non-swimmers' pool may be separately regulated (for swimmers' pool every about 10 hours and non-swimmers' pool every 8 hours). The water trickles through sand by the force of gravity and collects in a pure water chamber where chloride is added for disinfection purposes and sulphate copper to prevent the growth of algae. The sand is cleansed daily and aired.

This method of filtration is no longer practical, especially if a high rate of re-circulation for the pool water is required. Cost per one m³ of purified water in ratio to the total costs of filtration equipment and filter house, is (157'600 + 87'000)/3'140 = 78 Fr. This is nearly the same if pressure sand or infusorial earth filter is used.

The following data show the comparative cost per one cubic meter of water between the open type filter of the "Aarau" bath and infusorial earth filter which may be used in the new "Buelach" open-air bath near Zurich (under construction): Water volume: 2'632 m³.

<table>
<thead>
<tr>
<th>Quartz</th>
<th>Infusorial</th>
</tr>
</thead>
<tbody>
<tr>
<td>Built-up space m³</td>
<td>600</td>
</tr>
<tr>
<td>Cost per m³ of built-up space</td>
<td>110</td>
</tr>
<tr>
<td>Total cost of built-up space</td>
<td>66'000</td>
</tr>
<tr>
<td>Cost of filter equipment</td>
<td>114'648</td>
</tr>
<tr>
<td>Total costs</td>
<td>180'648</td>
</tr>
<tr>
<td>Cost per m³ of purified water</td>
<td>68.63</td>
</tr>
</tbody>
</table>

** Entrance fee is 0.30 Fr. for adults per single visit or 0.25 Fr. in subscription (until 1961, it was only 0.20 Fr.). Children of school-age living in Aarau are admitted free, whereas children of adjacent communities pay the customary fees.
This results from the extra costs of the large and expensive built-up space required for gravity sand systems to secure the rate of re-circulation possible by means of the infusorial type. It should also be indicated that the later is cheaper in operation.

5.2. The Open-Air Bath “Auhof” in Zurich, Switzerland

**Population served:** Within the general planning of open-air baths in Zurich, the “Auhof” bath has been developed as a district bathing center for “Schwamendingen,” the northeastern residential sector of the town. The nearest open-air bath to that district is the “Allenmoos” bath which is no longer able to accommodate an excessive number of visitors, and the service distance is too long. Accordingly, the need for such a bath was urgent. Erected in 1958, it was planned to serve a maximum number of population up to 28,000 inhabitants. Because the “Schwamendingen” district had more than 30,000 of a population in 1958 and developed to about 34,000 over the last year, space-standards have decreased.

Dressing facilities provided, at the date of erection, were 70 units per 1,000 of inhabitants. This ratio decreased to about 58 units after only four years along with the water surface which reached 0.05 m² per inhabitant. The bath serves the population of this district within an effective service radius of about 1,200 m.

**Site:** Adjoining an elementary school, the open-air bath lies on the Herzogenmühlestreet, opposite the secondary school “Herzogenmühle,” thus providing...
a grouped green zone in the heart of the district. The main entrance is via the quiet Luegislandstreet on the northern side, and has been set back by means of the parking area with space for 55 cars, 80 motorcycles and 230 bicycles. A narrow strip of green on the eastern side and along the total length of the bath and the school is reserved as a promenade, via which a separate entrance to the children's cloak-rooms is provided.

149 General plan of the school and the open-air bath: 1 service building, 2 women's wardrobe, 3 men's wardrobe, 4 school-children's dressing rooms, 5 swimmers' pool, 6 non-swimmers' pool, 7 instructional pool, 8 paddling pool, 9 to the filter-house, 10 sandpit, 11 classes-wing, 12 special rooms wing, 13 caretaker, 14 gymnasium, 15 kindergarten, 16 children's theater, 17 playing area, 18 gymnastic area, 19, 20 gardens
Program: Developed as a recreation center, the open-air bath comprises the following facilities, fig. 149.

**Service building:** Built in two stories with a cellar, it contains on the ground floor the administrative rooms on one side (cash-desk, safe-deposit, bath-attendant and first aid station), and on the other side a refreshment-bar. On the upper floor, are the four-roomed flat for the caretaker as well as a restroom for the staff with a kitchenette and adjoining cloak-rooms. This building is built in exposed red brickwork having a domestic character.

**Wardrobe-units:** Dressing facilities are provided in two units, one for men and one for women. Concentrated in arrangement, each block comprises basket-wardrobe, lockers and the individual cabins in addition to the required shower and toilet facilities, fig. 151.

The basket-wardrobe is the main facility and provides 620 units for each (84% of the total adults' dressing facilities), whereas there are only 104 locker-units and 20 individual cabins. Moreover, each block contains 10 and 15 changing cubicles (in men's and women's wardrobes respectively). A large communal changing room is provided only for men. There are 4 hot-water shower cubicles for men and women, 8 W.C.s for women and 4 W.C.s and 4 urinals for men. Foot-disinfection sprays are installed in the open passage way of both wardrobe buildings. Beside each unit there are also benches for foot-washing.

**Children's cloak-rooms:** Two large communal changing rooms are provided on the southern side of the ground adjoining the school gymnasium, one for boys (Buebe) and one for girls (Maitli). Each contains four bays with a total number of 448 hook-units. Additional facilities: Teacher's room with two changing cubicles; 3 W.C.s for girls and 2 W.C.s and 1 urinal for boys; two stands for foot-washing, fig. 152.

The total dressing facilities (for adults and children), a total number of 1'976 units, enable a daily frequention of about 3'000–3'500 persons. Buildings are rather concentrated and have built-up area (1'270 m²) of 0.7 m² per one square meter of water surface provided.
Filter-house: Filter (48 m²), along with the other service rooms, is located underneath the school gymnasium, and accessible through the entrance to the children's cloak-rooms.

This bathing ground has separate pools for swimmers, non-swimmers, a paddling area and an instructional pool.

Swimmers' pool: Water surface: 950 m² (volume: 2'006 m³)
It has a length of 50 m with four swimming lanes width, whose depth varies from 1.80 to 2.50 m. A lateral bay for diving is combined with the pool with 1, 2 and 3 m spring boards and water depth of 3.40 m.

Non-swimmers' pool: Water surface: 520 m² (volume: 495 m³)
The non-swimmers' pool is irregular in shape with a water depth varying from 0.00 to 1.20 m.

Paddling pool: Water surface: 150 m² (volume 21 m³)
The water depth varies from 0.05 to 0.40 m.

Instructional pool: Water surface: 180 m² (volume 178 m³)
For swimming instruction, a separate pool is provided which may be used by the general public for bathing (when there is no instruction). The pool measures
7.00 by 25.00 m with a water depth varying from 0.90 to 1.20 m. It has been set apart from the entire grouped water surfaces and located near the children's cloak-rooms.
The total area of the water surface (1'800 m²) provides about 0.9 m² per dressing-unit. Although this ratio is relatively high in comparison with the preceding example, it is rather small when related to the population of the area catered for (0.05 and 0.13 m² per inhabitant in Auhof and Aarau respectively), indicating the difference between a bath erected for a small town and another for a dense urban community.

**Pool-layout:** The different pools, except for the instructional one, are welded into a lagoon-like expanse of water and located in the middle of the open surfaces. The continuous and informal aquatic scene which has been achieved, is more effective in such cases of rather small water areas which would be unobtrusive if they were scattered in isolated small spots throughout the ground. It is also more practical from the standpoint of piping.

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159 Hanger storage-space of men's wardrobe
160 Lockers
161 Shower-cubicles and foot-disinfection on the wall
162 Shower-cubicles "details" which are equipped with automatic devices on the back wall
163 Foot-baths and free-standing showers beside swimmers' pool
164 Diving boards
Open surfaces

The bathing ground provides an open space of 8.30 m² per each visitor (i.e. dressing-unit). More than 8'000 m² of the total open surface are devoted to relaxation areas which are loosely separated into small units. A play area of about 35.00 by 70.00 m is situated south of the swimmers' pool and near the school playing-field. For small children, a playground with a sand-pit is provided on the far southwestern edge of the ground. Adjacent to the sandpit is a play-structure. Planted areas are reduced to bare necessity, except for the pool surrounds where shrubs and bushes provide natural barrier. Plants and trees have been provided in relation to the whole complex of school and bath. Play areas are minimal, in view of the shortage in the total available area, while relaxation areas are adequately developed.

Creating a park-like setting, an attitude which characterizes all the Swiss open-air baths, was also aimed at here. The site, barely-sufficient, has more or less a triangular shape which materially affected the layout of the bathing ground. The buildings, being concentrated, are located nearly in the middle of the ground, as a consequence of the necessary parking area, thus modifying the proportions of the site. The children’s cloak-rooms and filtering plant adjoin the school gymnasium forming a transitional link between the bath and the school and making for a minimal built-up area. Dressing facilities are assembled in one-storied buildings; only the service building consists of two stories to emphasize the main entrance. The cube-shaped buildings of this bath are rather stiff and contrast sharply with the lines of the preceding example. However, they are comfortably arranged, airy and simply developed.

Architectural and Aesthetic Aspects

Open surfaces are 16'330 m² without buildings and pools.
Construction: The high ground water level, along with the difficulties of laying the foundations, has played a great role in the development of the buildings. The combination of the different facilities in a minimum built-up area—only three building units—render the expensive costs of the foundation as the most economical and rational solution.

In tune with the gay and bright-colored vivacity which the bathing activities bring to the ground, bright colors for building-materials were rejected by the designer. For the two wardrobe-units exposed concrete is used, except for the unplastered red brickwork for the service building which produce a rather cheerful and well-groomed appearance. The partitions of the changing cubicles are in painted wood of a yellow transparent color. The overflow gutters of the pools are of prefabricated concrete elements and are of the semi-recessed type. They line the water-proof plaster of the internal walls of the pools.

The open-air bath is public property with the same entrance fees as the preceding example. It is administrated and controlled by the Public Health Authorities. The bath opened in 1958 and the total costs (without land) amounted to 3.4 mills. Sfr. It is open from the middle of May to the end of September (the open air bathing season in Zurich). Children are permitted free use of the bath during certain periods and days, as are pupils in groups for swimming instruction.

This bath was heavily frequented during the last few years of its operation, fig.171. About 173'200 persons visited the bath in 1961, i.e. 88 visitors per one dressing-unit per year. The maximum number of visitors in one day was 5'783
171 Number of visitors from 1959 to 1962
172 Population of Schwamendingen from 1956 to 1962
173 Frequency of use 1962
which gives a very high ratio to the number of dressing units available in this bath (i.e. the cloak-rooms were used about 3 times). Children constitute more than 60% of the total number of visitors per year.

As seen from fig.173, the number of visitors varies according to the weather conditions, in which days of maximum frequentation coincide usually with Saturdays, Sundays and the school-children's free afternoons. The pools contain 2'700 m$^3$ of water which is cleansed by means of an open sand filtering plant, fig.152.

5.3. The Open-Air Bath "Eriksdalsbadet" in Stockholm, Sweden

**Site:** In the central area, south of the town, the open-air bath is situated in Eriksdalslunden Park at Götgaten, fig.175. It is one of the newest examples and the largest of all.

Stockholm's central area was, until recently, served only by one open-air bath (Vanadisbadet, north of the town)\(^\text{71}\) of which the general public made use in tremendous numbers during the summer months. Eriksdalsbadet is planned to overcome the shortage and serve the south of the town's population which amounts to about 100'000 inhabitants.

The new bath is connected with the other parts of the town by excellent methods of communication. It can be easily reached by means of the subway to Skanstull station as well as by many other tram and autobus lines.

The main entrance to the open air bath is reached via a promenade path (in the surrounding park) north of the site from Ringvagen street. Parking areas are provided beside the entrance and on the eastern side along the ground frontage. There are also separate entrances to the spectators' stand.

**Program:** The bathing ground, developed as a recreation center, covers an area of about 3 hectares. The first stage of development brought, in July, 18th 1962, the open-air bath into being, while a small tract of land (about 2'000 m$^2$) is reserved for the later indoor swimming pool. The open-air bath comprises the usual facilities, fig.176.
Buildings

Built-up area is relatively high as a result of spectators' accommodation (about 11% of the total area). Dressing facilities are mainly arranged according to the changing system and coat-hanger method of clothes-storage. Two building-units are provided for men and women, in which there are 1'875 and 1'125 places respectively. Each section has its own shower and toilet facilities. They lie on the main entrance which has a free-standing cashdesk.

The administrative section, containing the usual offices together with a first aid station and filtering plant are located under the spectators' grandstand, which can accommodate 2'000 persons.

A self-service buffet with seating accommodation is provided on the general pool side, south of the ground.

176 Plan of the open-air bath “Eriksdalsbadet,” Stockholm: 1 main entrance, 2 women’s wardrobe, 3 men’s wardrobe, 4 entrance to spectators’ stand, 5 spectators’ stand, 6 sports pool, 7 diving pool, 8 diving tower, 9 general swimming pool, 10 instructional pool, 11 paddling pool, 12 showers, 13 terrace, 14 green area, 15 bicycles, 16 cars, 17 reserved for an indoor pool, 18 refreshment bar
Pools and surrounds

Total water surface: 1'900 m² (7.5% of the total area) Complete separation of pools for the different activities, even for diving, is provided. The bathing ground is divided up into a sports section with swimmers' pool, diving pool and the spectators' stand; a general section for non-swimmers; a section for swimming instruction and a children paddling pool area. This subdivision which is achieved by different levels, enables sports training and local contests to be organized without disturbing the remaining bathers. Although the bath is developed as a recreation center, the sports section is dominant and pools for swimmers and divers constitute alone about 75% of the total water surface. In other words, sports pool surface provide 0.47 m² of water per visitor (i.e. dressing unit) against a ratio of 0.16 m² provided by the general bathing section. This gives a ratio of 1:3 in favor of sports swimmers.

All pools are rectangular in shape except for the diving and paddling pools which are round.

**Swimmers' pool:** Water surface: 1'050 m² (volume 1'680 m³)
The pool which has an east-west orientation, measures 50.00 m by 21.00 m (8 swimming lanes, with starting boxes on each side). The depth of the water varies from 1.20 to 1.80 m (0.35 m the distance between the water level to the deck).

**Diving pool:** Water surface: 366 m² (volume 1'650 m³)
The pool measures 21.50 m in diameter and water depth is 4.50 m (0.30 m to the pool-deck). The pool is fitted with 5, 7.5 and 10 m diving platforms, 3 m springboards and an underwater viewing window.

**General pool:** Water surface: 312 m² (volume 480 m³)
The pool measures 25.00 m by 12.50 m and the depth varies from 0.90 to 1.40 m (0.35 m to the pool-deck).
Instructional pool: Water surface: 100 m² (volume 70 m³)
It measures 8.00 m by 12.50 m and 0.70 m in depth (0.30 m to the pool-deck).
For small children, there is a special round paddling pool with a surface area of 75 m² and water depth of 0.25 m.
The total sun-bathing and relaxation surfaces (along with pool surrounds) are approximately 17'000 m², an area of 5.70 m² per visitor. Sun-bathing areas constructed in concrete (8'000 m²) are about equal in area to those covered with grass as a consequence of bad climatic conditions.
Spectators' stand is also used for reclining and sun-bathing when there are no competitive events. Pool concrete surroundings are railed off from the outer green areas.

**Architectural and Aesthetic Aspects**

Since the bath is situated in a natural wooded park, plantations are entirely superfluous except for a narrow strip of flower-beds (with three flags) which separates the general swimming from the sports section. Notable features of the layout are the spectators' stand and the concrete sun-bathing terrace. Retaining on the adjacent wooded hill-side of the ground, the stand does not disturb the park setting. It is built in concrete whose surfaces are left in their natural color.

The concrete sun-bathing terraces, although spatially separating the irregularly scattered pools as individual units in different levels, achieve a unity in one dominating concrete surface, which is furnished with wooden reclining boards painted in bright colors.

**Organization and Administration**

The open-air bath is administrated by the Sports and Recreation Committee of Stockholm. Its maximum capacity is 3'000 bathers. In the first two weeks after operating the bath, 18–31 July 1962, a total number of 33'000 has been recorded, a daily average of 2'550 persons. About 40% of the visitors were children.

The bathing season for the Eriksdals swimming pool starts on the 15th May and ends on the 15th September. This for the Swedish people is quite a long season, one month longer than that for sea- and lake-bathing. This is made possible only through the water heating arrangements.

**Heating**

The water used in the swimming pool maintains, at certain times in the season, a temperature of only 6-8°C, then it has to be heated to 21–22°C. The heating plant also pipes warm water to shower-facilities. Most of the power required for heating is used mainly at night and as a result does not cost quite so much.

**Water Purification**

Swimming pools contain about 3'900 m³ water which circulates about 4.6 times every 24 hours, (the circulation pumps' maximum capacity is 18'000 m³ per day).

The water is cleansed through chemical, mechanical and sterilizing treatment as follows:

The water is pumped from the pools through a fine filter into a coagulation pool in which Alluminium Sulphate is put in at the same time in order that the silted materials in the water may be precipitated or flocculated. The precipitation is prolonged by the water passing through several coagulating tanks provided with mechanical stirrers.

After this process, which takes about half an hour, the water is fed into a sediment pool where it slowly flows forward and heavy particles sink to the bottom. The particles are removed by suction.

After the sediment pool, the water is pumped for mechanical treatment through pressure filters with an area of 120 m².

From the filters, the water is sent on and calcined soda is added to neutralize the water from acidity caused by the sulphate and give a high alkaline content for effective sterilization in order that a surplus of chlorine can be maintained in the water without danger to the bathers.

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*Water is kept neutral at pH 7-7.2. Salts are also added so that the water has a constant saltiness of 0.7% which corresponds to the salt content of Stockholm archipelago.*
The proportion of chlorine is added in gas form after which the gas mixes with the water which will then contain hydrochloric acid and under chlorine acidity. The mixture is then led through granulated marble which binds the hydrochloric acid. The drainings will contain an under chlorine acidity which has a strong sterilizing property but which has neither the chlorine’s strong smell or taste.

The chlorine value and degree of acidity is controlled daily and bacteriological examinations are made approximately twice a month by the State Institute of Public Health.

5.4. The Open-Air Bath "Tivoli" in Innsbruck, Austria

**Site:** Developed as a part of the sports center "Tivoli," it serves the 100'000 population as the central open-air swimming pool for Innsbruck (the Olympic winter sports town for 1964). It is situated south of the central area near the main station and reached via Anzengruberstrasse. Parking areas are provided adjacent to the bathing ground on the northern and eastern sides as well as under the spectators’ grandstand.

**Program:** The open-air bath, whose plan was selected by competition, is a combined sports pool, general swimming ground for recreation and sauna. It can hold up to 10'000 persons. The whole complex covers an area of about 6 hectares, fig.184.

**Entrance building and sauna:** Built in a one-storied building; the left wing contains the entrance hall with two double cash-desks (built in wood and steel with glass panelling) and administration rooms; bathing kit and equipment may be hired.
184 Plan of the open-air bath: 1 entrance-building and sauna, 2 swimming-stadium "swimming and diving pools," 3 lockers-wardrobe, 4 filter-house and restaurant, 5 swimmers' pool, 6 non-swimmers' pool, 7 individual cabins, 8 bridge, 9 paddling pool, 10 dressing facilities for mother and children.

185 Sauna bath
a. Changing room
b. Sauna room
c. Plunge basin
The sauna bath is located on the ground floor of the adjacent building, which is directly accessible from the street side through its own cash-desk. It comprises a changing room with 16 lockers, a washing room with 2 cold and three warm water showers, a plunge basin measuring 2.00 m by 2.00 m and 0.70 m in depth, a restroom with 10 beds, an open-air room and the hot room of about 15 m² in area and 2.50 m high. The hot room is faced with burnt pine. The upper story of this section (sauna) contains flats for the caretaker and engineer, fig. 186.

**Restaurant building:** Located on the general swimming pool side, it has a self-service buffet and a terrace which is partially roofed with concrete slabs. The water treatment installation is housed in the half-basement, under the restaurant, fig. 187.

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**Figures 186 & 187**

186 Entrance building and sauna, scale 1:600
- a. Cross section through the sauna
- b. Cross section through the entrance
- c. Basement floor: 1 heating plant, 2 coke-room, 3 resting-room, 4 storage-space
- d. Ground floor: 1 administration, 2 police-room, 3 first-aid room, 4 bath-attendant, 5 storage-space, 6 cash-desk, 7 staff-room, 8 equipment-room, 9 covered space, 10 cash-desk, 11 changing room for sauna, 12 showers, 13 sauna-room, 14 plunge basin, 15 atmospheric bath space
- e. Upper floor: 1 room, 2 corridor, 3 bathroom, 4 kitchen, 5 vestibule, 6 balcony, 7 stair-case

187 Restaurant and filter-house, scale 1:600:
- 1 terrace, 2 kitchen, 3 cold-storage-chamber, 4 sweets, 5 cigarettes, 6 entrance, 7 filter-basins, 8 rinsing-basin, 9 cellar of the restaurant, 10 lift, 11 basement floor, 12 restaurant-floor

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164
Dressing facilities: In this bath, two types only are available: the individual cabins and cloak-rooms with lockers, fig. 188.
In a huge building-unit bordering the total eastern side and about 260 m long, 960 cabins are provided in one floor. Being internally divided into bays, they can be used by families and single persons. The whole structure is built in concrete on mushroom-columns, whilst the cabin-partitions are in wood. Floors are paved in concrete. Some communal changing rooms are also provided.
The second cloak-room unit, which is located on the sports pool side, contains a total number of 2'720 locker-units, on the ground floor for men and on the upper floor for women. They are provided with changing cubicles (one cubicle for each cloak-room). There are three separate locker cloak-rooms, with lock and key, for the use of clubs. Lockers are constructed in aluminium. The upper concrete slabs are used as water storage tank for showers.
On the far eastern side, there are 64 dressing cabins available in a separate building unit for mothers and children, beside which there is a stand for feet washing.
Each one of the preceding building units is provided with its own toilet and shower facilities.

**Foot-bridge:** Crossing the bathing ground and spatially separating the two swimming sections, it serves as a link between the entrance and the individual cabins for persons in street clothes. It is constructed in steel and reinforced concrete with an 0.08 m thick parapet.

**Spectators’ grandstand:** It provides seats for 2'000 persons. It is constructed in vertical reinforced concrete frame-discs at intervals of 3.00 m and slabs extended between the frames in stepped form. Underneath the stand on the street side, there are 26 garages.
Building-unit with lockers
Changing-rooms with lockers
Water storage tank for the showers on the roof of the building accommodating lockers
Construction of spectators' stand: 1 garages

**Water surface**

Total built-up area is 6'420 m², 12% of the total ground area. The percentage is rather high as a result of the great number of the individual cabins and spectators' stand.

The open-air bath comprises a sports section with swimming and diving pools, a general section containing swimmers' and non-swimmers' pools and a section for mothers and children. These five pools provide 3'680 m² of water surface, an area of about one m² per dressing-unit and constitute 6.6% of the total ground area.

**Sports swimming pool:** Having a water surface of 1'050 m² (2'150 m³), it measures 21 m by 50 m and 2.00–2.30 m in depth.

**Diving pool:** Having a water surface of 525 m² (2'300 m³), it measures 21 m by 25 m and 4.50–4.90 m in depth. It has a diving tower which is built in concrete and fitted with 1, 3, 5, 7.5 and 10 m platforms and a 3 m springboard. At the sides, there are two 1 m springboards on tubular steel supports.
The sports facilities with the spectators' stand are isolated on the street side at the southwestern edge.

**General swimmers' pool:** Having a water surface of 792 m² (1'700 m³), it measures 22 m by 36 m and 2.30 m in depth.

**Non-swimmers' pool:** Having a water surface of 600 m² (620 m³), it measures 22 m by 27 m and 0.80 m in depth, with a lateral bay for a water chute. The water chute is constructed in concrete and has a terrazzo lining on the inside. General swimming section is located in the heart of the ground.

All pools are constructed in concrete with mosaic lining. Pool surrounds, which are only accessible through foot baths, are paved with prefabricated concrete tiles.

**Paddling pool:** It has an informal shape and various depths. Set apart on the eastern side and enhanced by spray fountains, it offers plenty of raised areas for squatting. It is built in concrete and faced with quarry tile.

This subdivision is carefully made so that swimming training and sports activities can be organized without suspending or disturbing the general bathing program. Sports pools have a compact arrangement which is favorable with regard to seating arrangement.

But it should be pointed out, that diving facilities are located on the end wall which is unfavorable, as a great percentage of spectators will not see the divers from the side.

The striking features of this bathing ground consist in the attractive arrangement of the paddling pool, the foot-bridge and the fine diving tower. Carefully planned, the paddling pool offer many opportunities for imaginative games to children and approximates a natural one.
199 Foot-bridge over swimmers' and non-swimmers' pools

200 Non-swimmers' pool with water-chute and restaurant-building

201 Children's paddling pool
The foot-bridge provides an elegant link between the buildings situated near the entrance and the huge building block of individual cabins. The person in street clothes will have an excellent preview of the ground; the bridge creates further plenty of shade underneath. The diving tower, as expressive as a piece of sculpture, dominates the whole complex of the bathing ground. Concrete—natural or painted—is the dominant building material and is employed attractively to give the ground a plastic architectonic expression. The view of the mountain range from the ground is superb. Lawns cover over 40'000 m², and plantation is continued to the inside of the individual cabin building.

**Operation and Costs**

About 4 million S.Fr.s were invested in that open-air swimming pool, i.e. about 1'000 S.Fr.s per dressing-unit. From 10th May 1961, when the bath opened, until 11th June 1961 about 11'000 visitors were recorded, a daily average of 400 persons over the first month.

**Water Purification**

The water treatment installation, which is housed under the restaurant, renews the water for sports pools and general swimmers’ pool in 10 hours, but for the non-swimmers’ pool in only 8 hours. Purification is by an open Quartz sand filter, which has a speed of 12 m per hour (i.e. 12 m³ per one m² filter per hour). Filter areas:
For sports swimming pool: (re-circulation rate: 215 m³/h).
Area: 215/12 = 18 m² (2 chamber 3.2 m by 2.9 m).
For Diving pool: (re-circulation rate: 230 m³/h).
Area: 230/12 = 19 m² (2 chamber 3.3 m by 2.9 m).
For swimmers' pool: (re-circulation rate: 170 m³/h).
Area: 170/12 = 14 m² (2 chamber 2.2 m by 3.2 m).
For non-swimmers' pool: (re-circulation rate: 80 m³/h).
Area: 80/12 = 7 m² (1 chamber 2.2 m by 3.2 m).

5.5. Bathing Beach "Tiefenbrunnen" in Zurich, Switzerland

Site and population served: Within an effective service radius of about 1'200 m, the beach serves mainly the adjacent residential district, which has a population of about 25'000-30'000 inhabitants (at the same time it receives visitors from other sections of town). It lies on the eastern shore of the Lake of Zurich, in the promenade area between the Zurichhorn park and the old instructional bath "Tiefenbrunnen". The site is bordered on the north by Bellerive-strasse, on which is the main entrance (about three minutes walking distance from the nearest tram-station). Parking areas for cars are provided on the street. Covering an area of about 24'000 m², the beach extends about 350 m on the water front.
Program: The site is used as a park and promenade for eight months of the year, while the bathing facilities are open only during the summer months. Accommodating over 3'000 visitors at one time, it has the following facilities, fig. 205:

Buildings

Built-up area constitutes about 11% of the total area of the beach site.

Main entrance and service building: The main entrance, formed by six free-standing concrete mushrooms, is bordered and accentuated by the service
Adults’ cloakrooms, entrance and central service rooms

- Cross section of cloakroom building, scale 1:300
- Upper floor of men’s cloakrooms, scale 1:600
- Ground floor, scale 1:600: 1 cash-desk, 2 lingerie, 3 telephone, 4 laundry, 5 covered drying space, 6 toilets, 7 showers, 8 staff-wardrobe (men), 9 staff-wardrobe (women), 10 kitchen, 11 first-aid station, 12 bath-attendant, 13 dining-room, 14 storage-space, 15 changing cabins, 16 hangers, 17 changing-bays, 18 toilets, 19 hot-showers, 20 perambulators’ storage room, 21 individual cabins, 22 lockers, 23 sun-bathing terrace, 24 stairs

Building and the women’s dressing-room building. It comprises a free-standing cash-desk (irregular hexagon) constructed of glass. One storey in height, the service building contains rooms for telephone, first-aid station, bath-attendant and the staff.

Wardrobe-units: The main dressing facilities for adults are provided in two building units on the right and left of entrance, for women and men respectively. Two-stories high and identical to one another, they include facilities of the hanger and locker type, as well as the required showers and toilets. On the ground floor are the hanger-wardrobe and the changing cubicles, showers and toilet facilities. The roof of the ground floor projects (on steel columns) about 3 m on the southern side, thus providing adequate shade underneath, as well as a protected space for rainy days, fig.206.

There are 48 and 44 changing cubicles for men and women respectively. In addition to this number of changing cubicles for the hanger wardrobe, there is a large communal changing room for each building unit.

Cold and hot showers are available: 3 hot-shower cubicles; cold showers stand beside each unit.

External stairs lead to the upper floor which contains the locker dressing rooms with changing cubicles as well as some individual dressing cabins. Along the entire length of the buildings on the southern side, are relaxation and sun-
bathing terraces (330 m²) on two levels, whose floors are of wooden planks. These terraces, which provide the bathers with an uninterrupted view of the entire beach, are protected from the north wind by the walls of the lockers building. The roof of the upper floor projects over half the sun-bathing terraces. On this floor there is a total number of 39 cubicles per each building unit beside the lockers, a part of which is utilized for changing and the rest as individual cabins.

**Individual cabins:** Three building units, perpendicular to Bellerivestrasse contain 66 dressing cabins which can be used as family-huts. The arrangement of these units has helped to provide small protected relaxation areas, fig. 213

**School children's cloakrooms:** Special changing bays with hooks are provided in two pavilions for boys and girls on the far western edge of the beach, fig. 207a.

<table>
<thead>
<tr>
<th>Total number of dressing units</th>
<th>Total</th>
<th>Percentage</th>
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<tbody>
<tr>
<td>Hanger units</td>
<td>1'900</td>
<td>62</td>
</tr>
<tr>
<td>Locker units</td>
<td>350</td>
<td>11.5</td>
</tr>
<tr>
<td>Cabins (including changing cubicles)</td>
<td>200</td>
<td>6.5</td>
</tr>
<tr>
<td>Hook units (for children)</td>
<td>600</td>
<td>20</td>
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</tbody>
</table>

Men's and Women's dressing facilities (which constitute about 80% of the total facilities) are in a ratio of about 8:7.

The beach provides about 100–120 dressing units for each thousand inhabitants of the adjacent residential district, and simultaneously shares about 10% of the total number of dressing facilities available (through open-air baths) in Zurich.

**Tea-pavilion:** Located on the far southern edge, the tea-pavilion has a terrace with total seating accommodation of about 150. The terrace is in a prominent, sunny location, and has a clear view of the entire beach, fig. 207b.

Open area (without buildings) provides a space of about 7 m² per visitor. Green areas are informally subdivided by plants and garden paths, thus giving a park-like appearance and avoiding congestion. A small area is set aside as a
small children's playground in a quiet place between the individual changing huts and the women's cloakroom-building. The beach site at its western point of contact with the adjacent park (Zürichhorn park) is fenced off by light wire mesh. With similar types of greenery, the beach and the adjacent park combine to give continuity to the landscape. Adequate shaded areas are supplied by the buildings as well as by the numerous trees provided throughout the entire park.

For swimmers: swimming is done in the lake proper, and two diving boards, 3 m and 5 m in height, are provided.

For non-swimmers: Since the banks of the beach have a steep slope, artificial bathing facilities have been provided for the safety of non-swimmers. For them, there are two sections with a total water surface of about 1'200 m² as follows:

**The floating pool:** Built of reinforced concrete, the pool has a round shape and measures 27 m total diameter. The pool deck-area which is fenced off from the
deep water of the lake, has an average width of about 2.50 m for sun-bathing, thus leaving a water surface of 380 m². The round pool has a depth of 0.85 m and is connected to the ground by means of a small movable arched bridge (about 14.00 m long, 2.5 wide and weighs about 300 t).

**The non-swimmers' bay:** Beside the floating concrete pool, a small bay (about 40 m long) has been built up with a shallow depth for non-swimmers. Flanked on two sides by a few wide steps, this portion of water has been marked off from the rest of the lake by means of ropes supported by posts. A play fountain is placed at the eastern side of the water surface. Through the two abovementioned features, the beach provides about 0.4 m² non-swimmer water surface per visitor.

**The paddling pool:** A pool for small children is provided on their playground. Informal in shape, the pool has a water surface of about 70 m².
Since the site is used as a park for about eight months of the year, it stresses landscaping more than architecture. To render the buildings as unobtrusive as possible, small units were preferred to large and "floating roofs" minimize the impact of the building blocks. Moreover, due to the dressing facilities, which are of the hanger type, the built-up area is further reduced, leaving the maximum amount of open green surface.

Location of the buildings along the entire northern and eastern side has protected the beach site from the north wind as well as from the external view and excessive street noise. The buildings are airy and open, with the exception of the service building and kitchens.

The striking features of this beach are the conetopped tea-pavilion, the small arched bridge, and the free-standing concrete mushroom columns at the entrance. Covered with asbestos-cement "Eternit" plates, the tea-pavilion dominates the entire beach. The sharp lines of the non-swimmers' bay offer a pleasant contrast to the informal (irregular) form of the entire beach line.

**Construction and materials:** Because the recently-filled ground of the site cannot carry heavy loads, wood construction has been largely used, except for the kitchens and tea-pavilion, for which reinforced concrete columns are used. External walls are constructed of pre-fabricated elements (asbestos-cement plates), and decorative bricks. A gay and bright atmosphere is achieved by the use of various colors: Red, yellow and white for the facade panelling, along with the green of the grass, produce a friendly and festive atmosphere.

The floating pool is of reinforced concrete and the internal walls are covered with water-proof painting "Icosit". Deck-space (pool surroundings) is paved in hard-wood planks.

The banks of the swimmers' beach are protected against erosion and waves by means of a variety of stone blocks anchored in concrete, fig.220. Although this is an essential feature from the construction point of view and adds successfully to the beauty of the beach, it may endanger the life of the bathers since entry into the water is rendered rather difficult.

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219 A piece of sculpture
220 Small children's paddling pool
221 Lake banks
Operation and Administration

The total cost of the beach was about 3'500'000 S.Fr.s. The beach was expected to be frequented by about 160'000 visitors per season (i.e., about 52 visitors per dressing unit per season). Charges and fees would comprise about 55% of the total maintenance and operation cost.

The following table shows the frequency of use from 1954 to 1962:

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<th></th>
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</thead>
<tbody>
<tr>
<td>Number of visitors (1'000)</td>
<td>197</td>
<td>197</td>
<td>227</td>
<td>185</td>
<td>283</td>
<td>308</td>
<td>196</td>
<td>305</td>
<td>285</td>
</tr>
</tbody>
</table>

The greatest number of visitors in one season to date was in 1959, when it was about twice the expected figure; that is, the beach was frequented by about 100 visitors per dressing unit in that season, which is a rather high proportion. In the year 1962 the total number of visitors was 284'807, of which children constituted only about 14%. This shows that children of school age visit those bathing centers within their own districts more often than distant beach-centers (for example, about four times as many children visited the Auhof center). The maximum number of visitors in one day during the season 1962 was 10'771 (on the 24th of June), whereas the beach’s maximum capacity is 3'050. That is, the cloakrooms were used about 3 ½ times each.

5.6. The Pioneer Health Center “Peckham”, London

The indoor bath and surrounding facilities form in this case, neither a sports center nor an institution for the treatment of disease, as the name might suggest. The center, designed as a family club, was a pioneer experiment in a new branch of science devoted to the health of man and of his society.

The pioneer Peckham Experiment, towards the study of human health, had its origins about 34 years ago, under the direction of two widely experienced biologists, Dr. S. Williamson and Dr. F. Pearse. They started work in a small house in Peckham, which they called the Pioneer Health Center, where a periodic physical examination was offered to local families. The center was limited to a small club room. Although the borough was provided with considerable sports and recreation facilities, there appeared to be some inherent lack of vitality in the families themselves. The biologists discovered that the families were isolated, friendless and completely shut in their own homes. “The periodic overhaul had proved itself as a sieve for sifting out disease and disorder, but it was not, as the doctors considered, by itself enough.” The biologists decided to close down the center and plan another with new facilities to promote social contact, where a family might find outlets for self-expression, and where it
might regain its lost vitality through a fuller use of its faculties. The Peckham Experiment then came to be housed in the center to which these pages are devoted.

Why Peckham? A crowded district, it had been chosen because it had at that time a mixed population which provided a cross section of low, middle and upper middle income groups, and probably contained a maximum number of people who might in prewar times be presumed healthy.

Program and Architectural Aspects

The three-storied building, which covers an area of about 1'500 m², was designed to function as a club for two thousand families and was equipped with a swimming bath, a gymnasium, a cafeteria, a theatre, a library, games rooms and nurseries. It was to furnish them with a special kind of environment, in which they might find scope for a wide variety of activities. The center was housed in a large, unusual (at that time) and beautiful building, new in structure and concept, built by the engineer Sir E. Owen Williams. The novel conception lay in the combination of all the various facilities under one single roof. In the center of the building was the swimming bath with a multi-purpose pool measuring 75 feet by 35 feet and a diving stage up to 7.5 m; the concrete tank of the pool was housed between the ground and first floors. Its water level was at the level of the first floor and the sloping sides of its glass roof, through which swimmers could see the sky, projected above the flat roof of the rest of the building.
Glass partitions encircled the bath chamber, round which was placed the cafeteria, where members could watch swimmers. They could also look down on the theatre stage, which was to one side of the swimming bath and into the gymnasium on the other side. On the southern side of the cafeteria floor (first floor) there was also a large social hall.

On the ground floor, as well as the gymnasium and the theatre, were the nurseries, a children’s playground, a paddling pool measuring 10 feet by 30 feet, changing rooms and lavatories, and the boiler house.

One side of the top floor was the only space closed to general circulation. This was the consultation block with its laboratory, private consulting rooms and changing facilities. The rest of this floor (second floor) was made up of large light open spaces for indoor games, study, library, work rooms, a wireless room, billiards, table-tennis, etc., fig. 224.

The general construction of this building is that of flat slabs on cruciform columns allowing maximum flexibility in planning: no immovable partitions. Partition walls were of glass, except where privacy was essential (e.g., for the consultation block). In this, the first “health laboratory,” the scientists required a maximum of visual control in order to observe people and their actions. It gave them a special insight into their chosen field of observation—the family. "Transparency was their new 'lens'."

By means of this special design, members, whilst profiting from the opportunities which the center offered, contributed also to the scientists' knowledge of health.

**Operation and Administration**

The pioneer health center “Peckham,” opened in 1935 and closed, due to lack of funds, in 1951. During the years prior to the war, in which the center operated, the members totalled 3,911 individuals (1,946 men and 1,965 women) from 1,206 families. There was in the total membership a preponderance of adults between 20 and 40 years of age and of children up to school-leaving age, indicating a relatively high incidence of young families. Of these, some 800 or 900 families were in constant daily contact at the center.

Families were neither directed nor organized. The basic aim was that health must develop spontaneously. Doctors were there only to observe, to assess capacity and to study health in community life. From this study they were able to formulate their guiding principles for the promotion of health.

It was a condition of membership that the member could not be an individual but a family unit:

1. Each family paid—before the war—a fixed subscription of one shilling per week.
2. Before the war each adult wage-earning son or daughter of member-families paid a fixed subscription of 6d. per week.

For this sum they had both a periodic health check-up and the use of the center’s facilities.

Small charges were made also to adults (all children’s activities were free) for the use of the center’s facilities such as the swimming bath, gymnasium and theatre.
c. Ground floor plan: 10 Covered playground for children of all ages, with Infants' Nursery located to catch the fall afternoon sun. 11 Gymnasium with easy access to the Nursery, playground, and to the garden. 12 Infants' and learners' pool. 13 Slipper baths. 14 Lavatories and spray-chambers for men and women on either side of the bath chamber. 15 The main entrance is at the back, leaving the front unobstructed for maximum utilisation of sunshine and open aspect.

225 View of the center from south
226 View from southwest
227 View from west

In the new environment of the center, those families who had previously been independent and who had kept to themselves, began to avail themselves of opportunities which, when provided by the borough, had been ignored.

Swimming: During the first three years after the center opened, 157 married women, most of them middle-aged, had learned to swim without coercion or persuasion of any kind. Of 160 children between the ages of 5 and 16 who joined the center in 1937, only 40 were swimmers. A year later, 128 of them could already swim or were teaching themselves to swim.

Social contact: Swimming, dancing, gymnasium, the theatre, members' concert parties and orchestras, games, handicrafts and studies, and shared interests of many kinds, created new acquaintances and finally friends. A release from social loneliness, and with it an increase in physical, mental and emotional energy was the momentous result. Skill and social integration increased side by side. After three years, about 80% of the people at the center were engaged in a new activity. A general shift towards health and vitality was reflected in the findings of the yearly check-up.

Economical Factors

Capital cost of the building: The total cost of building and equipment amounted—in prewar times—to £38'000. This amount was raised for the purpose by a committee in the form of loans and donations from private persons. Those who subscribed to the project, did so in the interests of research and also to render possible a social experiment of far-reaching implications.
228  Diving tower of the bath

229  Swimming pool space as seen from the cafeteria

230  Cafeteria as seen from bath-chamber

231  Interior of the cafeteria: cruciform pillars carrying the concrete floor slab
Maintenance and service costs: It was planned that the family subscriptions together with money spent in the club by adults, should cover running costs and ultimately pay a small interest on the capital cost of the building. It was estimated that the maximum weekly sum which could be derived from the lowest family income would be two shillings per week net (this included both the fixed subscriptions and the small charges made for adults), representing an income of £10'000 per annum, whereas maintenance costs and services were estimated at a basic minimum of £8'500 per annum, and not to exceed £9'700 per annum, at prewar rates. The war interrupted the experiment before membership reached the 2'000 mark, and so it could not be demonstrated that such a service could, in fact, be self-supporting.

Although maintenance and service costs could, during the four operation years prior to the war, be sustained at between the previously mentioned two figures, the income derived from each family did not, on the other hand, reach the estimated sum of 2 shillings per week.

5.7. The Indoor Swimming Pool "Akeshov" Stockholm, Sweden

As has been already pointed out, the open-air bathing season in Sweden, as in all Scandinavian countries, is a short one. Weather conditions permit outdoor activities only from the middle of June to the end of August. Accordingly, indoor athletic facilities, found throughout the country are developed and popular, particularly in Stockholm. In the field of indoor swimming, 67 pools are in operation in the country (as of the beginning of 1963) and many more are in the stage of construction or design.

Within the boundaries of Greater Stockholm alone (about 750'000 inhabitants), there are 12 indoor baths. These are comfortably distributed throughout the city, providing a ratio of about 0.004 m² of water surface per head of population, fig. 233.
In recent years, indoor baths combined with sports halls and other indoor athletic facilities have been extensively developed in Stockholm. A typical example of this new combination is the "Akeshov" center, which is particularly well designed.

**Site and population served:** The center of Akeshov lies within a group of suburban communities west of Stockholm whose population amounts to about 130'000 inhabitants. It is situated on "Bergslagsvägen," the main street which connects the center of Stockholm with the western residential sector. It is placed so as to be accessible to the nearby Ängby Secondary School, behind which lies a national park. The center is intended to serve the adjacent schools as well as the general public.

The main entrance to the swimming pool is via the main street, with parking space for about 73 cars, i.e. 1.5 parking places for each 10 dressing units or 2 parking places for each 10 m² of water surface. There are also other entrances to the relaxation areas and to the bowling hall nearest the street.

The indoor bath opened on June 14, 1959 (first stage).

**Program:** The indoor sports center (3'530 m²) has a total built-up space of 17'400 m³ and contains the following facilities:

- 36.00 m by 37.5 m, the sports hall lies on the main floor of the right wing. The entire area may be used as a sports hall by sports associations. By means of movable partitions, it can be divided into four areas so that they may also be utilized by the adjacent schools as separate gymnasiuums, each for 35 pupils.
The swimming bath

The hall is fitted with a movable stand which may be "telescoped," seating about 1'000 spectators.

In the basement of this wing (under the sports hall), are the central locker-room and four small athletic compartments as well as other service rooms.

Having three building units, it comprises two separate pools, one a swimmers' pool, and the other a small one for non-swimmers and learners, fig.235. They provide a total water surface of 387.5 m², i.e., about 0.004 m² of water per inhabitant or 0.83 m² per visitor.

**Main swimming pool building:**
Hall: Total area (including the pool): 730 m² (built-up space: 7'700 m³).
Pool: Water surface: 312.5 m² (volume 760 m³).
236 Main swimming hall
237 Instructional pool hall
The pool which measures 25.00 by 12.50 by 0.90–3.80 m, is fitted with 1 and 3 m diving spring boards, and a 5 m fixed board. The hall provides permanent seating accommodation for 200 spectators, whereas a further 200 places may be added for swimming contests. The distance between water level and the pool coping is 0.35 m. The pool walls are fitted with underwater viewing windows.

**Small swimming hall:** (Instructional pool building).
Hall: Total built-up area (incl. pool): 130 m² (built-up space: 700 m³).
Pool: Water surface: 6.00 × 12.5 m: 75 m² (volume: 60 m³).
The instructional pool which measures 6.00 by 12.50 by 0.70–0.90 m, is provided with an 0.60 m wide and 0.75 m deep sunken lane for the instructor, along its total length.

**Dressing-rooms building (Front building):**
In this building unit, which lies directly on the street front, are three sections on the main floor: the nearest section to the street side contains the usual administrative rooms with the entrance hall; the middle section comprises the various dressing facilities, whereas the third contains shower and toilet facilities, drying rooms and the Finnish baths (Sauna).
It also provides, with a separate entrance on the main street, eight bowling alleys, staff-rooms, heating and filtration plants in its semi-basement.
The various types of dressing facilities are grouped on one floor (ground floor) and have a total capacity of 471 persons. Male and female dressing facilities are in a ratio of about 3:2.
<table>
<thead>
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<th>Men</th>
<th>Women</th>
<th>Total</th>
<th>Percentage</th>
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<td>Dressing cabins</td>
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<td>Hanger-wardrobe</td>
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<td>96</td>
<td>248</td>
<td>52.7</td>
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<td>55</td>
<td>115</td>
<td>24.4</td>
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<tr>
<td>School children cloak-rooms (communal rooms)</td>
<td>60</td>
<td>12.7</td>
<td></td>
<td></td>
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<tr>
<td>Total number</td>
<td></td>
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<td>471</td>
<td>100</td>
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Shower and toilet facilities:

<table>
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<th></th>
<th>Men</th>
<th>Women</th>
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<tbody>
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<td>6</td>
</tr>
<tr>
<td>Foot washing stands</td>
<td>36</td>
<td>18</td>
</tr>
<tr>
<td>Finnish baths (compartment)</td>
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<td>1</td>
</tr>
</tbody>
</table>

Toilet facilities, 3 W.C.'s and 2 urinals for men and 3 W.C.'s for women, are placed after pre-cleansing rooms on the way to the swimming pools. The preceding rooms are fully separated from the swimming halls by means of the passage which comprises a free-standing refreshment-bar and seating accommodation for about 30 persons. Along this passage there are the first-aid station and storage-space for swimming apparatus. Through the other side further toilets are available to spectators, as well a spectators' wardrobe. It should be pointed out that there is no clear distinction between the 'dry' and 'wet' corridors, an important feature of indoor baths.

Sun-bathing terrace: On the north-western side, shut off from the surrounding green area by means of a grove of oak-shrubs, and accessible only through the foot-baths and showers, the outdoor sun-bathing terrace is framed on two sides by the two swimming pool wings. It is paved in concrete and covers an area of 550 m². The park stretches out behind this concrete surface and may also be utilized for relaxation and grass play. Relaxation and play areas total about 1'800 m².

The indoor sports center (swimming pool and sports hall) is designed as individual blocks linked together by means of low covered passages. The swimming bath itself consists of three units: Front wardrobe building, behind which, projecting above its roof, is the main swimming pool building, and, perpendicular to them, the small building unit housing the instructional pool. The main swimming pool building is oriented towards the west, whereas the instructional pool faces the south. Both buildings have a transparent architectural character. The buildings are constructed as a concrete-skeleton, with foam concrete insulation and external plaster. Free-standing supports behind the facade glass-
cabinet are connected at the base by means of built-in seating slabs. Diving boards are light and mounted on tubular stainless steel supports. The only criticism is that the fenestration of the large pool building (on the west side) is rather too small in relation to the total space. However, the interior is festive, equipped with gay lighting fixtures and bright murals. It, as well as the front building, has a butterfly roof which lends a light touch to the whole complex. The sun-bathing terrace, with the park in the background, offers a pleasant atmosphere for relaxation.
The total water volume of the swimming pools (820 m³) is constantly purified by means of two infusorial (kieselgur) earth filters having a filter area of 25 m². The sterilizing system—chlorine in the form of gas—is the same as in "Eriksdalsbadet". The water in the pools changes 6 times every 24 hours. Its composition is also kept neutral at the same rate as in the former Swedish example.

5.8. The Indoor Bath of "Vaesteras", Sweden

This is another example which points up the great progress which Sweden has made in building indoor swimming pools. The bath is built for "Västeras," a town west of Stockholm which has a population of about 76'000 inhabitants. Program: It is one of the Swedish indoor baths in which sauna and medicinal baths are incorporated into the building. Built in two storeys, the indoor bath covers a built-up area of about 2'800 m².
Administrative rooms and the cafeteria: From the entrance hall in the second basement floor, wide stairs—faced with marble—lead to a vestibule hall, behind which there is the cafeteria with a selling counter, kitchens and storage space. Toilets for both sexes are provided beside the hall and are accessible through the cafeteria.

In front of the stairs, there is a free-standing cash-desk where keys for cabins and lockers are distributed, as well as swimming kit and equipment. Adjacent rooms are for administration and rest spaces with changing facilities for the staff, men and women.

Men's dressing facilities, Sauna and Medicinal baths' wing: Dressing facilities for men consist of lockers within large communal rooms and individual cabins. Some of the individual cabins, as in the majority of Swedish baths, are large enough so that one may lie down and rest, a feature which illustrates the comfort and relaxation offered in the baths of Sweden.

To the left of the men's dressing rooms there is the medicinal baths wing which is accessible via a waiting room. On the right is the Finnish baths section,
which comprises a hot-air room, sauna-rooms, washing room, two massage cubicles, and a room with a plunge-bath.

**Mechanical equipment:** The space under the pool area provides an access tunnel for piping. The space under the shallow end of the swimming pool is utilized as rooms for filtration, chlorination, storage-space for chemicals, pumps, and for the mechanics. On this floor are also the engine-room with a switch cubicle, apparatus-room and storage-space.

**Women's dressing facilities and Sauna:** Dressing facilities for women are also provided in the form of individual cabins (large and small), and lockers. Female and male dressing facilities are in a ratio of about 1:2. Separate communal rooms are also provided which may serve for children of school age. Dressing facilities contain a total of 460 units, which afford about 30 units per 1'000 inhabitants.
On the way to the swimming pools, there are the usual Swedish washing-rooms comprising shower-cubicles and foot-washing stands. Incorporated within this section are four sauna-rooms, drying space and the upper space of the plunge-bath room. The southwestern wing, around the staircase, contains rooms for contest judges, journalists, attendants' room and storage for materials.

**Water surfaces (pools):** As in almost all Swedish baths, this one has separate pools for swimmers, non-swimmers and learners, and also a children's paddling pool. They are arranged in two wings at right angles, having a total water surface of 545 m². This represents an area of about 0.007 m² per inhabitant, or 1.2 m² per dressing-unit.

**Swimmers' pool:** Water surface 350 m² (64.2% of the total water surface). It measures 25 m by 14.00 m with water depth varying from 1.2 m to 3.65 m. The 7-lane pool is fitted with 1 and 3 m diving springboards, and a 5 m fixed board. The pool enclosure is oriented towards the south. The walls of the pool are equipped with underwater viewing windows and 18 light reflectors.

**Non-swimmers' pool:** Water surface 112 m² (20.6% of the total water surface); it measures 8.00 m by 14.00 and the depth varies from 0.9 m to 1.00 m. It is located directly adjacent to the swimmers' pool, separated only by a passage 5 m wide, in addition to the spatial separation achieved by the different heights.
Whereas the swimmers' hall has a height of about 8.5 m, the non-swimmers' enclosure, facing the east, is only 3 m high.

**Paddling pool:** Water surface 35 m² (6.4% of the total water surface). It is adjacent to the non-swimmers' pool so that parents may watch their young children while they are bathing.

**Instructional pool:** Located on the far northeastern side, in a rather closed space according to acoustic requirements, the pool measures 6 m by 8 m having water varying in depth from 0.8 to 0.9 m. The instructional pool has the familiar Swedish feature, a sunken lane for the instructor, for whom an adjacent room is also provided.

Between the paddling pool and the instructional hall, there is a rest-room with seating accommodation for bathers. It provides a quiet place for mothers to watch their children.

The water surface for swimmers and non-swimmers in this separate pool layout is in a ratio of about 3:1.
256 Non-swimmers' pool and spectators' stand

257 Instructional pool and sunken lane

258 Rest-space towards paddling and non-swimmers' pool
Along the northern side of the swimmers' pool, the spectators' stand, provides seating for about 850 persons; underneath it is a wide passage containing the spectators' cloakrooms.

This example does not only represent the bright interiors of the well-equipped indoor swimming pools of Sweden, but it is also built with the taste which characterizes Swedish architecture in general. The spatial arrangement is systematic and logical.

The notable features of this bath lie in the separate pool layout associated with small space-enclosures, the numerous large individual repose-cabins, and the underwater viewing windows. The latter are equipped with television cameras which project shots of the bottom of the swimming pool on two screens, one in the cashier's office and the other in the attendant's room. This ensures the safety of the bathers.

Although the Swedish tend to colored combinations, the pools are lined with white glazed tiles for hygiene and safety. The clarity and purity of the water can thus be more clearly judged. Pool surroundings are paved in small mosaic tiles. For acoustic reasons, Scottish pine stripping in transparent natural colors constitutes the internal finish of the swimming halls' ceilings. The planks, which are set 1 cm apart, are laid on a compressed glass-wool base for insulation. Veneer oak is used for the partitions of the individual cabins.

The bath was opened in October 1961. The total cost amounted to about 7 millions kronen (about 6 millions S. Frs.), that is about 11'000 S. Frs. per one meter square of water surface. It is opened daily from 11:30—2:00 o'clock.

Entrance fees for adults, 2.00 kr. using a locker, 2.25 kr. using an individual small cabin and 3.25 kr. using an individual large cabin.

There are 10% reductions in subscriptions (10 times) and 50% for children of school-age, as well as other reductions for athletes in training.

The entry-ticket permits the free use of the combined sauna baths, and bathing time—in contrast to most other baths—is not limited.

5.9. The Indoor Bath in Coventry, England

Coventry, an industrial town with a population of more than 260'000 inhabitants, possessed in prewar times 5 indoor swimming pools, of which one has remained since the war. This bath could not, of course, accommodate the excess number of visitors, as the demand was five times greater than its capacity. Thus it became urgent to provide suitable indoor swimming facilities for the inhabitants.

Development: With regard to the frequency of use of an indoor bath, it has been accepted by the bath-planners that the service radius would not be the
decisive factor, but instead, a suitable site, centrally situated, with adequate means of communication. District baths were, on this basis and from the standpoint of economy, rejected, although they would have a shorter effective service radius. Priority, accordingly, has been given to a large swimming bath for the entire town. The new bath serves as a central one and is planned on three basic functional conditions: Firstly, to provide an all-year-round recreation place attracting the inhabitants from all the town districts; for this purpose adequate means of communication are available. Secondly, as a swimming pool which may be used on occasions of national or international meets, for which a sports pool designed according to Olympic requirements and a spectators' stand for about 1'500 persons are provided. Thirdly, for the adjacent numerous schools, to provide facility for swimming instruction. These different functions could not be attained if the first plan—district baths—had been realized.

**Site:** The central area of Coventry, which suffered extensive damage during the war, is in the course of reconstruction. Within the immediate vicinity of the new Cathedral of Coventry, the central swimming bath is located, to the northeast, on the inner circulatory road adjacent to the central bus station, fig.260.
Space for cars is available in public parking areas provided or planned as an interconnected system of roof-top and multi-storey car parks, which allows motorists to park right in the heart of the town, as near as possible to their destination (one of which is the indoor bath). The public parking complexes have an access directly to and from the inner Ring Road as shown in fig.261. The area around the swimming bath is devoted entirely to pedestrians. Further pedestrian ways will lead, by means of under-and-over-passes, to the nearby residential areas and to the new railway station to the south. Moreover, there is limited parking on the site itself for the cars of staff. The main entrance lies on the north side and is accessible via the inner circulatory road. For non-bathers a separate entrance is provided at the back, leading directly to the restaurant. For spectators' adequate exits through wide staircases are provided to bring them directly to the outside. The site offers sun-bathing and green relaxation areas on the southern side.
262 Coventry indoor bath
a. Cross section through large hall, scale 1:1'000
b. Cross section through small hall, scale 1:1'000
c. Longitudinal section, scale 1:1'000
d. Swimming-floor, scale 1:1'000: 1 women's cloakrooms, 2 showers, 3 W.C., 4 sports swimming pool, 6 diving pool, 8 (7.5 m) diving board, 7 (10 m) diving board, 9 (1 m) spring board, 10 (3 m) spring board, 11 instructional pool, 12 multi-purpose pool, 13 sun-bathing terrace
e. Spectators' stand-floor, scale 1:1'000: 14 restaurant, 15 kitchen, 16 play-space, 18 club-rooms, 18 spectators' passage, 19 coiffeur, 20 spectators' stand

Program: The site for the new bath covers about 14'000 m², of which about 5'000 m² are devoted to the building. According to the fore-mentioned basic functional conditions, the building is a combined sports, recreational and instructional bath. It consists of three separated sections, so that each program may be carried on without interruption.
**Water surface**

**Sports hall:** For the training of swimmers, as well as for competitive events, this unit comprises a T-form pool, fig. 263. The pool has two sections: for swimming, measuring 165 feet by 55 feet (about 50.30 m by 16.66 m) with 8 swimming lanes; the depth varies from 1 m on both sides to 2 m in the middle section, thus affording an ideal medium for water-polo. The diving section, which measures 10 m by 18.50 m, has a water depth of 5 m. The diving pool is fitted with 1 m and 3 m spring boards and 5.75 and 10 m fixed boards. The arrangement of diving pool with boards offers the spectators a good side view of divers. Since the competitive events usually take place in the afternoon, the eastern exposure does not disturb the divers.

**General swimming hall:** This section contains a multi-purpose pool, measuring 110 feet by 10 feet (about 33.33 x 12 m) and with a depth varying from 0.80 to 3.85 m. Diving facilities at this pool consist of 1 and 3 m spring boards and one 5 m fixed board. There are 4 sun-bathing terraces projecting out from the general swimming hall (on the same level) surrounded with glass.

**Instructional pool:** This lies between the two main swimming pools and is accessible through the main entrance hall. It lies on the same level and not in a basement as in many indoor baths. The pool measures 40 feet by 25 feet (about 12.20 x 7.60 m) and has a constant depth of 0.80 m. The total water surface covers an area of about 1'300 m².

**Dressing facilities**

These are provided for adults in the form of changing cubicles and storage space for the hangers in use. Cubicles have doors on both sides, thus separating the “dry” corridor and “wet” corridor, fig. 264. This arrangement prevents persons in street clothes from entering the wet pool surroundings. 74% of adults' dressing facilities are located under the spectators' stand beside the sports pool, whereas the rest are beside the general pool. Female facilities are
on the main floor of the pools (first floor), and those for men are located underneath (on the ground floor); access to showers on the main floor is by means of internal stairs.

Male and female dressing facilities are in a ratio of about 1:2. For children of school age separate communal changing rooms are provided adjacent to the instructional pool.

**Shower cubicles:** They are provided both for men and women on the main floor and consist of 20 and 14 cubicles respectively, excluding those for children.

**Other features**

**Games deck and club-rooms:** Combined with the general swimming hall, playing space with two club-rooms is located in the upper floor over dressing facilities. Seating accommodation may be provided in 5 small annexes with a view of the pool below. The partition-walls of the rooms can be moved up so that the total space may be used for dancing, accommodating about 500 persons.

**Restaurant:** It is located, with the kitchen, on the upper floor of the instructional pool, with a separate entrance on the souther side.

The playing deck, the restaurant, as well as the spectators' passage on the upper floor are open to public circulation and separated from the bathers' areas.

**Architectural Aspect and Construction Materials**

The various pools are located in three areas which are separated by means of glass partitions, thus achieving a transparency throughout the entire complex, an English feature which has its origin in the prototype pioneer health center of
Peckham. The southern, as well as the eastern side, are completely exposed to
view from the outside by double-glass walls. One sees greenery and trees in
three directions. This transparency has gone a long way towards bridging the
gap between open-air pools and the dark interior of almost all covered baths.
It heightens the attraction of this indoor bath.
The building is constructed of reinforced concrete, with outer double-glass
partitions preventing loss of heat. The massive walls are covered in some cases
with glazed tiles and in others with mosaic tiles. For the main columns as well
as the main roof, an aluminum covering is proposed. The basic aim is to use
the most durable construction materials so as to minimize maintenance costs.
The internal walls and floors of shower-rooms, toilets, etc. will be tiled with
ceramic. For acoustic reasons, sound-absorbing plaster covers the ceilings of
the halls and the massive walls. Teak is proposed for all wood elements.

The water of the pools is to be changed once every 3½ hours. The purified water
will be pumped into the pool through inlets about 0.30 m apart at the bottom.
The capacity of the 4 filter-units is 60’000 gallons per hour.
Temperature of the different areas will be as follows:

Swimming halls: 72° Fahrenheit (about 22.0°C)
Washing rooms: 86° Fahrenheit (about 30.0°C)
Changing rooms: 65° Fahrenheit (about 18.3°C)
Entrance hall: 60° Fahrenheit (about 15.5°C)
Pool water: 75° Fahrenheit (about 24.0°C)

5.0. Tokyo Indoor Swimming Pool (Aquatic Stadium)

The population of Tokyo has increased from 2'500'000 in 1945 to about 8'500'000
at the end of the fifties (1958). A companion picture to the numerous open-air
aquatic stadiums of Tokyo, this bath has been designed to serve all-year-round
public recreation and at the same time to fulfill all the requirements of national
and international swimming meets. The building had to be completed in time
for the third Asian Olympic games held in May 1958.
Site: The indoor pool is located near the national stadium, in the northwest
corner of the Outer Gardens of the "Meiji Park," fig.266. It is near the "Send-
agaye" station of the national railways. The district is served by subway, munici-
pal street cars and buses, as well as by rail.
The pool site can accommodate a limited number of cars, and parking pro-
blems have been solved with regard to the whole complex of the sports district
as follows: the narrow band between the "Loop" (the main street through the
gardens) and the Shibuya River, one hectare in area, is planned as the main
parking plaza and can accommodate up to five or six hundred cars. This is
General layout of "Meiji Park" where the indoor swimming pool lies in the far north-western corner.

Destined of course for the indoor pool and the other sports facilities in the vicinity of the national stadium. The main entrance to the pool is from the western side.

**Program:** The total area of the site is about 4 hectares (37'600 m²) of which the building covers an area of only 5'289 m², fig. 268. The building consists of a basement (3'849 m²), main floor (5'289 m²) and two upper floors (2'582 m² and 1'686 m²).

**Water surface**

Total water surface: about 1'400 m².
The racing and diving pools were separated in order to improve safety conditions and at the same time to avoid difficulties which swimmers are said to experience in going from shallow to very deep water and vice versa.

**Racing pool:** Water surface: 1'000 m².
Having 9 racing lanes, it is 50 m long and 20 m wide, and has a constant depth of 2.10 m. The pool is equipped with 38 underwater lighting fixtures (each 300 W) as well as 3 underwater viewing windows.

**Diving pool:** An irregularly-shaped octagonal pool is provided, 25 m wide and 20 m long. It is fitted with a diving board tower at a maximum height of 10 m from the surface of the pool. Oriented to the south-east, it offers almost all spectators a suitable side view of the divers.

**First main floor**

On this floor, fig. 268b, there is the main entrance for officials and reporters leading to the administrative wing. On the right there is the bathers' entrance—with ticket-office—leading to the dressing-rooms and washing facilities for both sexes. Underneath the main stairs (leading to the public entrance), is another ticket-office for spectators.

**Second floor**

The public entrance leads to spectators' accommodation which is separated from the bathers, fig. 268c. Two additional staircases lead to the upper floor of the spectators' stand.
On one side (the western side) are rooms for an air-conditioning plant, filter plant, boiler and other equipment, fig.268a. The other side is taken up by the deep end of the racing and diving pools.

The indoor bath's capacity is about 4'000 persons of which, 3'000 seats are for spectators and 1'000 are for bathers and others.

268 Tokyo indoor aquatic stadium  a. Basement plan: 1 racing pool, 2 diving pool, 3 air-conditioning machine room, 4 filter room, 5 electric room, 6 boiler room, 7 storage. b. 1st floor plan: 1 racing pool, 2 diving pool, 3 players' waiting room, 4 broadcasting room, 5 men's dressing room, 6 communal cloakrooms, 7 exchange room, 8 dispensary, 9 employees' room, 10 sport tool room, 11 officers' room, 12 instruction room, 13 shower room, 14 office room, 15 entrance hall, 16 ticket office, 17 officers' entrance, 18 contestants' entrance c. 2nd floor plan: 1 space above pools, 2 seats, 3 cloak room, 4 fan room, 5 hall, 6 lounge, 7 spare room, 8 balcony, 9 public entrance d. 3rd floor plan: 1 space above pools, 2 seats, 3 passage, 4 distribution board room, 5 storage, 6 tank
In spite of extremely severe time limits and a restricted budget (two months for design and only eleven months for construction), the necessary facilities have been incorporated in a plastic piece of architecture with a superior, distinctly Japanese form. The indoor pool is the largest and best so far built in Japan or even in the entire Orient and is one of the best equipped in the world. The plan was designed so that the various traffic lines used by swimmers, spectators, officials and reporters are separated.
273  Movable stands for contest-judging
274  Southwest side of swimming pool
275  General view from west
276  Southeast view
277  South side
278  Southeast corner
279  East side terrace
To make the building as open as possible, the reinforced concrete stand structure is placed to one side and the other three sides are covered with glass. The structure which covers the various facilities forms the notable feature of this bath. Basically, the structure was divided into two parts: a reinforced concrete substructure constructed on the site, constituting the stand and utility rooms below, and a pre-fabricated steel structure covering the stand and the large pool area. A two-hinge steel-frame was used to provide large openings and to give flexibility at the joints. The latter was desirable as a protection against secondary stress that might arise from variations in the soil under foundations. Use of prefabricated elements reduced construction time.

The ceiling follows the form of the steel-frame and attains maximum height over the diving tower. While inclined on both sides, the ceiling tends to rise slightly upwards on the stand. This gives favorable interior spatial balance, fig. 282.

The ceiling is covered with asbestos-cement slabs, from which circular acoustic plates (perforated aluminum sheets) are suspended. The diving-tower is constructed in exposed reinforced concrete, covered with transparent plastic paint.

Length of span of the two-hinge steel-frame: 50.00 m
Height of the building to roof: 39.02 m

Water Purification

Water volume of racing pool: about 1'700 m³
Water volume of diving pool: about 1'500 m³
Water is purified by means of pressure filters. The water is changed every 8 hours in the swimming pool and every 14 hours in the diving pool. There are 3 filters, two for the racing pool and one for the diving pool. All three may operate simultaneously for the racing pool, in which case water can be changed in only 5 hours. Chloride sterilization devices are provided in the filter pipe.

Heating and Ventilation

The water temperature of the racing pool is to be kept at the international standard of 24°C. This is made possible by means of a tubular heat exchanger. The room temperature is kept above 25°C, to prevent condensation on the surface of glass panes, walls, and ceiling. A hot-air heating system with four separately operated units is used in conjunction with a ventilation system. Hot air coming from the outlets and circulation grills provided in the ceiling and the lower walls ascends along the glass wall and spreads over the ceiling keeping the glass pane surfaces warm enough to prevent condensation. This method of heating is employed for about 8 months of the year.

Lighting fixtures

High-tension mercury lamps are provided as ceiling lights, submerged lights, and outdoor lamps, while fluorescent lights are used for other purposes. For each swimmer, the remaining distance is flashed in lights at his starting box.
Vorlage > A3
Leer - Vide - Empty
6. The Problem of Swimming Facilities in Egypt
6.1. Introduction

We shall briefly outline at first population, climatic conditions, existing facilities and certain obstacles to the planning of swimming facilities in Cairo, the capital of Egypt as an example.

Geographical situation

The city of Cairo is situated in the central region, on the River Nile between the Delta and Upper Egypt. Covering an area of about 21'500 hectares, it lies on the Latitude 30 and the Longitude 31; Attitudes vary between 20 and 40 m above sea level.

Population

According to the last census in 1961, the population of Cairo is about 3'734'000, of which approximately 388'000 live in the residential sector west of the Nile (now incorporated within the boundaries of the County of Giza). Male and female inhabitants are in the ratio of 191:183.

Population density: The city of Cairo is, from the administrative point of view, subdivided into 21 districts, in which population densities vary from 25 to 1'300 inhabitants per gross hectare. Low densities are found in the recently developed suburbs, and highest densities in the old districts, which are primarily slum-areas. The number of inhabitants per room is very high, and varies from 1 to more than 3 persons.

Population structure: Children of pre-school age (up to 5 years) constitute about 15.6% and Children of school-age (5-14 years) are 27%. An important and remarkable feature is that the number of illiterate people in Cairo constitutes as an average about 30% of the total population.

The following table presents population figures for the different districts with regard to gross area and density:
### District Population

<table>
<thead>
<tr>
<th>District</th>
<th>Population</th>
<th>Gross area (hectare)</th>
<th>Gross density (per hectare)</th>
<th>Number of persons per room</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>43'000</td>
<td>600</td>
<td>71.8</td>
<td>1.0</td>
</tr>
<tr>
<td>2</td>
<td>202'000</td>
<td>270</td>
<td>748.2</td>
<td>3.1</td>
</tr>
<tr>
<td>3</td>
<td>64'000</td>
<td>170</td>
<td>376.6</td>
<td>1.8</td>
</tr>
<tr>
<td>4</td>
<td>38'500</td>
<td>60</td>
<td>641.2</td>
<td>2.2</td>
</tr>
<tr>
<td>5</td>
<td>95'000</td>
<td>170</td>
<td>558.7</td>
<td>1.9</td>
</tr>
<tr>
<td>6</td>
<td>253'700</td>
<td>350</td>
<td>724.7</td>
<td>2.3</td>
</tr>
<tr>
<td>7</td>
<td>212'200</td>
<td>1'020</td>
<td>208.1</td>
<td>2.4</td>
</tr>
<tr>
<td>8</td>
<td>162'000</td>
<td>860</td>
<td>188.3</td>
<td>2.6</td>
</tr>
<tr>
<td>9</td>
<td>148'600</td>
<td>280</td>
<td>530.7</td>
<td>2.7</td>
</tr>
<tr>
<td>10</td>
<td>141'700</td>
<td>480</td>
<td>295.3</td>
<td>2.8</td>
</tr>
<tr>
<td>11</td>
<td>153'100</td>
<td>110</td>
<td>1'392.0</td>
<td>2.7</td>
</tr>
<tr>
<td>12</td>
<td>99'600</td>
<td>190</td>
<td>524.3</td>
<td>1.8</td>
</tr>
<tr>
<td>13</td>
<td>307'200</td>
<td>1'650</td>
<td>186.2</td>
<td>2.4</td>
</tr>
<tr>
<td>14</td>
<td>296'000</td>
<td>730</td>
<td>405.5</td>
<td>2.6</td>
</tr>
<tr>
<td>15</td>
<td>265'100</td>
<td>270</td>
<td>982.0</td>
<td>2.3</td>
</tr>
<tr>
<td>16</td>
<td>303'600</td>
<td>620</td>
<td>489.7</td>
<td>2.3</td>
</tr>
<tr>
<td>17</td>
<td>160'800</td>
<td>6'790</td>
<td>23.7</td>
<td>2.4</td>
</tr>
<tr>
<td>18</td>
<td>100'400</td>
<td>420</td>
<td>239.0</td>
<td>2.2</td>
</tr>
<tr>
<td>19</td>
<td>124'800</td>
<td>3'230</td>
<td>38.6</td>
<td>1.3</td>
</tr>
<tr>
<td>20</td>
<td>83'000</td>
<td>2'510</td>
<td>33.1</td>
<td>2.2</td>
</tr>
<tr>
<td>21</td>
<td>94'400</td>
<td>640</td>
<td>147.5</td>
<td>2.4</td>
</tr>
</tbody>
</table>

### Climatic conditions

The climate of Cairo is of the desert type. In winter it seldom rains and never snows; days are sunny. In summer, days are hot, especially before noon due
287 Plan of Cairo

A The town of Cairo
B Western sector (now incorporated within the boundaries of 'Mohafzet' el Giza)
C Northern suburbs
D Northeastern suburbs
E Southern suburb
F Satellite town
G New suburb (under construction)
Population ‘Gross’ density in districts of Cairo

1 Qasr el Nil, 2 Bâlâq, 3 El Ezbekiya, 4 El-Muski, 5 Abdin, 6 El Salyda Zeinab, 7 Old-Cairo, 8 El Khalifa, 9 El Darb el Ahmar, 10 El Gamâliya, 11 Bab el Shariya, 12 El Zâhir, 13 El Wâyli, 14 Shubra, 15 Rôd el Farag, 16 El Sahil, 17 El Matarîya, 18 El Zeitun, 19 Heliopolis, 20 El-Maâdi, 21 Helwan

Legend:
- Less than 75 persons per hectare
- From 75 to 150 persons per hectare
- From 150 to 225 persons per hectare
- From 225 to 300 persons per hectare
- From 300 to 375 persons per hectare
- From 375 to 500 persons per hectare
- From 500 to 625 persons per hectare
- From 625 to 750 persons per hectare
- From 750 to 1'000 persons per hectare
- From 1'000 to 1'500 persons per hectare
to a warm wind from the south, but they cool towards evening when the cool north wind blows.

The Nile, an open passage extending from the south to the north through the heart of the city, exercises a rather mild effect.

**Open-air bathing season:** While the outdoor swimming season in European countries lasts a maximum of 120 days, the season in Egypt as a whole is extremely long, extending for more than 6 months. In many cases, the open-air swimming pools remain open all-the-year round for training, even in the winter months.

The following table gives the climatological normals in Cairo recorded in different places (from 1923 to 1945) with respect to temperature, relative humidity, rainfall, wind and hours of bright sunshine:

<table>
<thead>
<tr>
<th>Month</th>
<th>Mean daily max.</th>
<th>Mean daily min.</th>
<th>Mean of day</th>
<th>Relative humidity%</th>
<th>Rainfall (mm)</th>
<th>Wind Direction (8 h.+14 h.+20 h.)</th>
<th>Duration of bright sunshine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
<td>Mean 14 h. Total No. of days with Percentage frequency:</td>
</tr>
<tr>
<td></td>
<td>0.1</td>
<td>1.0</td>
<td>N</td>
<td>NE</td>
<td>E</td>
<td>SE</td>
<td>S</td>
</tr>
<tr>
<td>----------</td>
<td>-----</td>
<td>-----</td>
<td>---</td>
<td>----</td>
<td>---</td>
<td>----</td>
<td>---</td>
</tr>
<tr>
<td>January</td>
<td>19.7</td>
<td>7.6</td>
<td>12.3</td>
<td>74</td>
<td>45</td>
<td>5</td>
<td>2.4</td>
</tr>
<tr>
<td>February</td>
<td>21.4</td>
<td>8.4</td>
<td>13.5</td>
<td>68</td>
<td>40</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td>March</td>
<td>24.5</td>
<td>10.6</td>
<td>16.3</td>
<td>65</td>
<td>36</td>
<td>4</td>
<td>1.2</td>
</tr>
<tr>
<td>April</td>
<td>28.7</td>
<td>13.5</td>
<td>20.2</td>
<td>58</td>
<td>30</td>
<td>2</td>
<td>0.6</td>
</tr>
<tr>
<td>May</td>
<td>32.8</td>
<td>17.1</td>
<td>24.2</td>
<td>52</td>
<td>26</td>
<td>2</td>
<td>0.4</td>
</tr>
<tr>
<td>June</td>
<td>35.3</td>
<td>19.9</td>
<td>26.8</td>
<td>55</td>
<td>29</td>
<td>0</td>
<td>0.1</td>
</tr>
<tr>
<td>July</td>
<td>35.9</td>
<td>21.7</td>
<td>27.7</td>
<td>61</td>
<td>33</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>August</td>
<td>35.2</td>
<td>21.9</td>
<td>27.6</td>
<td>65</td>
<td>39</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>September</td>
<td>32.6</td>
<td>19.9</td>
<td>25.3</td>
<td>69</td>
<td>42</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>October</td>
<td>30.6</td>
<td>17.6</td>
<td>22.7</td>
<td>72</td>
<td>42</td>
<td>2</td>
<td>0.3</td>
</tr>
<tr>
<td>November</td>
<td>26.4</td>
<td>14.0</td>
<td>18.7</td>
<td>74</td>
<td>46</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>December</td>
<td>21.4</td>
<td>9.6</td>
<td>14.0</td>
<td>76</td>
<td>47</td>
<td>5</td>
<td>2.1</td>
</tr>
<tr>
<td>El-ezbekiya</td>
<td>28.7</td>
<td>15.2</td>
<td>20.8</td>
<td>66</td>
<td>38</td>
<td>56</td>
<td>10.2</td>
</tr>
<tr>
<td>Abbassiya</td>
<td>27.8</td>
<td>14.6</td>
<td>20.2</td>
<td>66</td>
<td>40</td>
<td>34</td>
<td>14.0</td>
</tr>
<tr>
<td>Heliopolis</td>
<td>28.8</td>
<td>15.1</td>
<td>21.9</td>
<td>7(8h)</td>
<td>-</td>
<td>14</td>
<td>4.7</td>
</tr>
<tr>
<td>Almaza</td>
<td>28.2</td>
<td>15.6</td>
<td>21.1</td>
<td>59</td>
<td>35</td>
<td>27</td>
<td>10.2</td>
</tr>
<tr>
<td>Helwan</td>
<td>28.1</td>
<td>15.4</td>
<td>20.8</td>
<td>54</td>
<td>29</td>
<td>31</td>
<td>11.2</td>
</tr>
</tbody>
</table>
6.2. Present Facilities

Indoor baths

The only indoor swimming pool in Cairo was built in 1943 and belongs to the Ministry of Education. It serves as a training and sports bath. The pool itself measures 21 m by 50 m by (1.25-5.10) m and is fitted with diving boards up to 10 m and spectators' stands on both sides, fig.289.

During the summer months (June-September), i.e., the school vacation period, it is open for swimming instruction and training to children of school-age who have subscribed for the season. This indoor bath provides about 500 dressing units of the hanger type for male pupils only.

Although the bath is officially intended for swimming instruction, it should be pointed out that the great depth of the pool renders it unsuitable as a place of instruction. During winter, the bath is used for training and for local competitions and meets.

Heating and acoustic equipment is sadly lacking. The pool water for example, is only heated in winter, and consequently the health of bathers has been in many cases endangered. Moreover, the swimming pool is housed in a very poor building.

The second indoor swimming pool is a small one measuring 5 m by 16 m by (1.00-2.00) m and is built in a school under a classroom tract. The pool which was intended for swimming instruction, has been closed for two years.

Open-air pools

The existing open-air swimming pools form part of either public clubs, private clubs (i.e., for employees and workers of private establishments), are attached to schools or universities, or form part of some few recently developed youth centers. All of them serve a limited circle; even in public clubs entrance is restricted to members and subscription rates are too high for the general public. (Until recently these clubs were exclusively meeting-places for aristocratic society.)
Existing swimming facilities in Cairo

- Indoor bath
- Open-air pools as part of public sports clubs
- Open-air pools as part of private clubs
- Open-air pools as part of youth centers
- Open-air pools (private) at spas
- Open-air pools attached to schools
- Medicinal baths
The following table gives the necessary data on existing swimming facilities in Cairo:

<table>
<thead>
<tr>
<th></th>
<th>Date of construction</th>
<th>Water surface (m²)</th>
<th>Pool-layout</th>
<th>Number of dressing facilities (unit)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Indoor Baths</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gezira indoor bath</td>
<td>1943</td>
<td>1'250</td>
<td>Multi-purpose pool</td>
<td>500</td>
</tr>
<tr>
<td><strong>Open-air Pools</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Swimming Pools as Part of Public Sports Clubs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Gezira club</td>
<td>1955</td>
<td>1'715</td>
<td>Separate pools</td>
<td>1'590</td>
</tr>
<tr>
<td>2. National club</td>
<td>1945</td>
<td>1'000</td>
<td>Multi-purpose pool</td>
<td>430</td>
</tr>
<tr>
<td>3. Tawfigiya club</td>
<td>1958</td>
<td>400</td>
<td>Multi-purpose pool</td>
<td>690</td>
</tr>
<tr>
<td>4. Municipality club</td>
<td>1935</td>
<td>300</td>
<td>Multi-purpose pool</td>
<td>860</td>
</tr>
<tr>
<td>5. Maadi club</td>
<td>1921</td>
<td>375</td>
<td>Multi-purpose pool</td>
<td>130</td>
</tr>
<tr>
<td>6. Heliolido club</td>
<td>1941</td>
<td>1'085</td>
<td>Separate pools</td>
<td>2'290</td>
</tr>
<tr>
<td>7. Heliopolis club</td>
<td>1920/52/59</td>
<td>1'370</td>
<td>Separate pools</td>
<td>400</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>6'225</td>
<td></td>
<td>6'430</td>
</tr>
<tr>
<td><strong>Swimming Pools as Part of Private Clubs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. T. Harb club</td>
<td>1955</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>330</td>
</tr>
<tr>
<td>2. Hunting club</td>
<td>1958</td>
<td>400</td>
<td>Multi-purpose pool</td>
<td>300</td>
</tr>
<tr>
<td>3. National bank club</td>
<td>1958</td>
<td>300</td>
<td>Multi-purpose pool</td>
<td>480</td>
</tr>
<tr>
<td>4. Police club</td>
<td>1957</td>
<td>440</td>
<td>Multi-purpose pool</td>
<td>300</td>
</tr>
<tr>
<td>5. A. officers' club</td>
<td>1957</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>70</td>
</tr>
<tr>
<td>6. A. engineers' club</td>
<td>1957</td>
<td>250</td>
<td>Multi-purpose pool</td>
<td>120*</td>
</tr>
<tr>
<td>7. S. Party club</td>
<td>1940</td>
<td>200</td>
<td>Multi-purpose pool</td>
<td>-</td>
</tr>
<tr>
<td>8. Police union club</td>
<td>-</td>
<td>1'000</td>
<td>Multi-purpose pool</td>
<td>-</td>
</tr>
<tr>
<td>9. Shell club</td>
<td>1950</td>
<td>300</td>
<td>Multi-purpose pool</td>
<td>340</td>
</tr>
<tr>
<td>10. Laborers' club</td>
<td>1960</td>
<td>300</td>
<td>Multi-purpose pool</td>
<td>930</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>3'620</td>
<td></td>
<td>2'870</td>
</tr>
<tr>
<td><strong>Swimming Pools as Part of Youth Centers</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Gezira youth center</td>
<td>1957</td>
<td>1'000</td>
<td>Multi-purpose pool</td>
<td>600</td>
</tr>
<tr>
<td>2. Zamalik youth center</td>
<td>1935</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>650</td>
</tr>
<tr>
<td>3. Abdin youth center</td>
<td>1945</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>480</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>1'630</td>
<td></td>
<td>1'730</td>
</tr>
<tr>
<td><strong>Swimming Pools attached to Schools and Universities</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1. Faculty of engineering (Cairo university)</td>
<td>1934</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>80</td>
</tr>
<tr>
<td>2. Faculty of agriculture</td>
<td>-</td>
<td>400</td>
<td>Multi-purpose pool</td>
<td>100</td>
</tr>
<tr>
<td>3. Cairo University Sports Center</td>
<td>1958</td>
<td>1'000</td>
<td>Multi-purpose pool</td>
<td>900</td>
</tr>
<tr>
<td>4. Sports Institute</td>
<td>1938</td>
<td>350</td>
<td>Multi-purpose pool</td>
<td>600</td>
</tr>
<tr>
<td>5. Faculty of Medicine</td>
<td>1957</td>
<td>315</td>
<td>Multi-purpose pool</td>
<td>100</td>
</tr>
<tr>
<td>6. Victoria College</td>
<td>1943</td>
<td>380</td>
<td>Multi-purpose pool</td>
<td>-</td>
</tr>
<tr>
<td>7. Boy-Scouts center</td>
<td>-</td>
<td>250</td>
<td>Multi-purpose pool</td>
<td>200</td>
</tr>
<tr>
<td>8. Tawfigiya school</td>
<td>1946</td>
<td>180</td>
<td>Multi-purpose pool</td>
<td>130</td>
</tr>
<tr>
<td>9. Abbasiya school</td>
<td>1949</td>
<td>200</td>
<td>Multi-purpose pool</td>
<td>200</td>
</tr>
<tr>
<td>10. Faculty of Engineering (Ein Shams University)</td>
<td>1956</td>
<td>300</td>
<td>Multi-purpose pool</td>
<td>100*</td>
</tr>
<tr>
<td>11. Ramses bath</td>
<td>1920</td>
<td>275</td>
<td>Multi-purpose pool</td>
<td>320</td>
</tr>
<tr>
<td>12. Faculty of Arts</td>
<td>-</td>
<td>80</td>
<td>Multi-purpose pool</td>
<td>70*</td>
</tr>
<tr>
<td>(Ein Shams University)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>4'025</td>
<td></td>
<td>2'800</td>
</tr>
<tr>
<td><strong>Swimming Pools at Spas</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cap-ritage bath</td>
<td>1957</td>
<td>850</td>
<td>Multi-purpose pool</td>
<td>30</td>
</tr>
<tr>
<td>Helwan-plage</td>
<td>-</td>
<td>small lake</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Ain es-Sirah spring</td>
<td>-</td>
<td>small lake</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>
| Physical rehabilitation center | 1957 | 315 | - | - | 221
Criticism

The problem of swimming facilities is aggravated by the fact that the City of Cairo possesses some 40 swimming pools, of which none is open to the general public without subscription (on a daily basis). Two private pools in hotels do admit swimmers who have no subscription, yet the average man cannot pay the high entrance fees. One of these lies, furthermore, beyond the boundaries of the city. Cairo may thus be said to depend on (private) baths totally unsuitable for modern requirements.

- About 20% of these pools were built before the war and nearly all of them are poorly equipped.

- Most of the bathing grounds possess multi-purpose pools and in many cases they do not correspond to the function or functions for which they were intended. This confusion of functions may well endanger the lives of bathers.

- Almost all of the pools which have remained in operation are not equipped with filtration plants. Water is pumped from underground sources and is changed only once a day.

- The water, in the absence of filtration and re-circulation, is utterly unsuitable from the hygienic point of view: In addition to the dirt introduced by the bathers themselves, the water is exposed to great quantities of dust (especially in the summer months) and is readily polluted. The unsanitary habits of bathers also affect the quality of the water to a considerable degree. Moreover, the addition of chlorine (in some cases) in powder form is inimical to health.

- Almost all swimming pools are concentrated in more or less one zone area. Fig. 291 diagramatically shows in dots the population of residential areas catered for by the available facilities (within 800-1'200 m effective service radius for pedestrians). It reveals that the existing pools mainly lie along the riverside; the entire urban area, in the center and east, is neglected beyond the reach and is not included within their areas of influence.

- The total water surface covers about 20'000 m², giving a ratio of about 0.005 m² of water per inhabitant (if the pools were open to the public at large)⁷⁵.

- Dressing facilities are used in many cases for other sports activities and represent a ratio of about 4 units per thousand inhabitants. This is very low and completely out of proportion. Dressing facilities are moreover extremely primitive.

- All pools (with few exceptions) are restricted to a certain program, in which stress is laid on swimming instruction, training and competition. The time left for general swimming is negligible. Swimming pools in clubs act (for members) as a sort of lido where members rarely swim, preferring to sit by the pool in street-clothes drinking and conversing.

⁷⁵ These figures do not include those swimming pools at military schools and grounds.
Areas of influence of existing facilities within an effective service radius of 800–1'200 m
1 dot = 1'500 inhabitants
6.3. Obstacles to the Planning of Swimming Facilities

Financial

The principal problem: Lack of money invested in recreational facilities in general. The responsible authorities work within a very restricted budget. The extent of this problem can be clearly realized by reference to the amount of money destined in the last year for all recreational programs in Cairo: this would not be sufficient for one single bathing center planned and equipped according to modern needs.

Administrative

Although certain steps have been taken, the responsible authorities are either unaware of or completely misunderstand the importance of swimming as recreation. The general public shares this ignorance. There is moreover a lack of specialists in this field.

The problem of public bathing is fragmented between different departments. There is a lack of cooperation between them and between the departments and the town-planning office. No department exists for the organization of the system as a whole. Up till now no scientific survey of the available facilities has been made in an attempt to plan for the future.

In an attempt to establish a clear picture of the situation, I visited the various sites personally and reviewed the existing facilities. Nevertheless, because of the confusion in the planning of swimming facilities in Cairo, I have found it exceedingly difficult to arrive at any positive conclusions.

Sanitary conditions

A general unsanitary outlook is the natural outcome of the educational level. It is, for example, quite common for a football-player to plunge—sweating and in full kit—straight into the club pool, completely disregarding the possible consequences to his own health and the health of others.

Lack of space

Lack of open space and suitable sites for the establishment of recreational facilities in general is apparent, especially in old districts and central areas, where land is very scarce and expensive.

Construction

Variation in underground water levels is a problem facing pool construction. Water-logged grounds—especially at the time of the floods—represent a problem which may well disappear after the completion of the Aswan Dam which will stabilize water levels.

Water drainage

This problem does not exist for those sites adjacent to the Nile, since water could be drained off directly. In old districts, the main drainage system of the city is already overtaxed.

The difficulties which confront water drainage stem directly from the absence of filtration plants which obviate a complete change of water every day.
6.4. Planning of Swimming Facilities in Cairo

Immediate requirements

Swimming facilities should be a municipal function: For a long period, swimming (as a recreational activity) has been felt to be of no public concern, and nearly all attempts in Cairo, were made out of private funds, (occasionally with government subsidy). We have now reached a point where Cairo, the largest city in the Middle East, does not possess one municipal bath open to the public on a daily basis.

Increasing industrialization (in recent years) as well as the unbearable noise of the town have given rise to general emotional strain and overstimulation. At the same time, the recent reduction in the working day has provided most of the inhabitants with more leisure time. It should be noted in this connection that the Egyptian office-worker works a traditional 6-hour day.

Our culture, which developed in the past the most effective regenerative facilities (the islamic bath), seems to be stunted in modern times. No private agency can presume to cope with the present condition of widespread illiteracy, poverty and illness in Egypt. Swimming, a natural and effective means to help alleviate these social problems, should be made available to all, without distinction.

"A fair opportunity for all the people... for healthy life" Swimming facilities for rich and poor alike are, however, in keeping with the spirit of modern times as a distinctly democratic principle.

Adequate land and suitable sites can be acquired only through municipal action. Intelligent town-planning would then provide comprehensive facilities over the entire urban area.

The establishment of municipal swimming facilities does not imply that private clubs which can afford recreational facilities for their own members would cease to function. The role of local government is equally to encourage and assist the provision of such facilities in the private sphere for the general welfare.

Publicity: One of the important factors in the development of public bathing grounds in Cairo is the promotion of understanding and appreciation of swimming. Objection to the idea of "nakedness" (a sin for women in Islam) is widespread. Swimming itself is regarded with distrust since long-standing traditions and religious tabus object to "bathing in one's own dirt."

As an experiment, some of the existing swimming pools in clubs should be opened to the public before planning or developing public bathing grounds; special hygienic precautions should be taken to promote healthy conditions. To help dispel any misgivings about public swimming, an extensive publicity campaign—emphasizing the value of swimming, the importance of cleanliness and sanitary habits—should be launched with the help of the various media—newspapers, radio, television, exhibitions, demonstrations, etc. Such a publicity campaign would of course be directed principally at school children.

Town planning considerations

General requirements: The rapid extension of Cairo in recent years has deprived districts of many open spaces which might have been devoted to
recreational facilities. The problem is aggravated by the fact that primarily slum-areas in old districts have been replaced, under the very eyes of municipal authorities and existing legislations, by new slums.

Urban development in Cairo must be regulated by means of a master plan on a modern town-planning basis, which calls for both the gradual reconstruction of the present old districts and for expansion. Planning of swimming facilities and recreational grounds should be an integral part of these plans.

Long-range planning over about twenty years or more is required, with periodic re-evaluation of facilities, needs and new trends, at least every 3-5 years. Cairo would be subdivided into residential sectors and districts, which would each provide suitable and adequate sites for the necessary recreational facilities (among them swimming pools).

New legislation should provide for these necessary recreation facilities by judicious slum-clearance. On the other hand, plans for new housing developments should incorporate such provisions from the very beginning.

The problem should not only be dealt with within the municipal boundaries, but also in those adjacent suburban communities as part of a wider regional plan.

**Open-Air Bathing**

Open-air facilities are of prime importance in view of climatic conditions and should form an integral feature of Egyptian life.

District open-air bathing centers represent the ideal solution to the problem of over-crowded districts. Planning such facilities requires more careful analysis, district by district, of data on population under the various conditions (present and forecast)\(^\text{76}\), as well as the available recreational and swimming facilities.

I submit two points of departure which are vital to the determination of space requirements: the effective service radius and the desired size of the bathing center. In this we lack practical experience.

**The effective service radius:** Two factors should determine the effective service radius: the oppressive summer heat and the high population densities. Accordingly the radius should be as short as possible on an average, about 800 m and should not exceed 1'200 m at low-density suburbs (15-20 minutes walking distance).

This suggests an area of 200-400 hectares. Since the population densities vary considerably (10-557) we cannot give an absolute standard for the population served. Moreover, the low figures of population density do not represent conditions accurately as they are actually gross densities.

The effective service radius (under the present conditions) assumes a minimum of about 50'000-60'000 inhabitants served, by one open-air swimming center. This figure may increase to as much as 100'000 inhabitants in densely-populated areas. In suburban new housing developments, with a reasonable population density, the population should be restricted to about 20'000-30'000 inhabitants.

\(^{76}\) The rate of population growth in Cairo is on an average between 2.5-3.5% per year. However, in old districts reconstruction would lead to a population decrease and improved distribution.
**Size of swimming center:** Our second point of departure, is the size of the swimming center itself. A center for the aforementioned population averages should comprise a water surface varying from 1'200–2'000 m² in area. In this case, the center would be best developed on an area of 16'000–24'000 m². This will give the following average standard ratios:

- Water surface per inhabitant: 0.02–0.05 m².
- Total site Area per inhabitant: 0.3–0.6 m².

Although the ratio for high population densities (in old districts) apparently represents a rather low space standard per inhabitant, the following factor must be taken into consideration: In those districts, social and religious traditions are deeply rooted; these centers would consequently be frequented mainly by men (up to, or even more than 50%).

From this point of view, the space standards would be ample. However, we lack data on the number of visitors per inhabitant in a season.

**Number of dressing facilities:** Dressing facilities should be planned with regard to the total water surface. The number of dressing units provided could be as follows:

For each 10 m² of water surface: about 10–12 dressing units, i.e., 25–50 units per thousand inhabitants.

On the basis of the space standards we have proposed, the entire urban area of Cairo would require:

- Water surface: 120'000 m² (12 hectare).
- Total area of bathing centers (including water): 120–160 hectares (representing 0.55–0.75% of the total urban area).

These open green areas serve equally to break up over-crowded built-up districts.

**Combined facilities:** In connection with district swimming centers we should not neglect the traditional and highly-popular oriental vapor-baths, favored and appreciated by the old generation. The possibility of retaining this type of bath should be investigated. Its advantages are considerable:

A familiar institution, it will serve to increase the popularity of bathing; it enhances the regenerative value of modern bathing systems and provides for cleanliness in the mass of people whose domestic bathing facilities are still negligible.

Moreover, the re-introduction of the oriental bath with its hot water plunge wing (Maghtas) would serve as small indoor pools (in winter).

**Bathing in the Nile**

Out-of-doors swimming is practiced in the Nile during the hot summer months by some of the inhabitants, especially those who live in the adjacent districts. Swimming activities in this primitive form should be prohibited for the safety and health of bathers. The water of the river contains a high percentage of alluvium which harbours disease.

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"Higher figures are for suburban districts."
Floating pools: Instead, bathing establishments in the form of concrete floating pools should be provided as part of a general plan for the rehabilitation of the Nile. Water would be admitted to these pools through a filtration plant and would be constantly re-circulated to provide for hygienic bathing and swimming.

These "floating" pools would approximate to the atmosphere of a bathing beach and would be extremely effective for adjacent districts. Such pools would entail a minimum of problems in water supply and drainage.

Bathing beaches on the Nile: Another possibility should be studied. After the completion of the Aswan Dam, the alluvium will be partly or completely eliminated and the quality of the water may be suitable for direct bathing. Bathing beaches for a large percentage of the population might then be introduced. But before any steps in this direction are taken, the water must be thoroughly examined, to establish that it is entirely free from any danger to bathers from the physical, chemical and bacteriological points of view (as recommended before in the part on bathing beaches).

Sterilizing agents may be added and customary safety precautions must be insured.

(This solution calls for improvement of transportation means to the different parts of the city.)

292 Vacations exodus during summer months to bathing beaches
The Summer Vacation Exodus

Cairo's population should be given every opportunity to go to the seaside and bathing beaches during their long summer vacation to find escape from the city's heat and to change the rhythm of their life. Egypt in general, according to its geographical situation possesses a lot of suitable beaches on both the Mediterranean and the Red Sea. Only the wealthy and those of moderate means can leave the city during the summer months.

A re-organization is indicated so as to offer the possibility of a seaside vacation to a maximum number of population. For example, laborers, minor officials, school pupils or other segments of the public may be helped to have such vacations in groups by nominal subscription.

This entails cooperation between the various municipal officials on a regional basis. Such action should work towards the preservation of the available beaches, the planning of new ones, and the improvement of transportation facilities between them and the city. Many exceptional beaches are isolated because of inadequate transportation.

Installations which might destroy or detract from the natural conditions of beaches should be strictly prohibited by law.

A development of these natural beaches would alleviate the problem of open-air bathing in Cairo.

Indoor Swimming Pools

Climatic conditions render covered pools a superfluous feature. As we have seen, open-air swimming in Cairo is practical nearly all the year round. Indoor pools are not required on a district basis as a recreational feature.

Indoor pools are visited by those who like swimming as a sport or who are engaged in a special program of instruction. For them, a central large indoor bath is essential and may adjoin, along with an open-air aquatic stadium, the main sports stadium of the city. Planned according to Olympic requirements, it will be useful for national or international competitive meetings. The bath should have a total water surface of not less than 1'000 - 1'200 m², a separate pool layout and a spectators' stand for not less than 4'000 persons.

The present indoor bath may also be enlarged or replaced by a new one to serve the western and southern sections of the city.

Instructional Pools

Swimming instruction in Egypt is generally confined to professional training. This is not the purpose of swimming instruction: a child should learn to swim for swimming's sake.

The program of swimming instruction for children should be comprehensive and obligatory, in an attempt to improve on the general unhealthy conditions among the public and to prevent the hazard of death by drowning, which has reached catastrophic proportions in Egypt.

Moreover, all the pools used for instruction in Cairo were not built with this end in view and their depths exceed the recommended 0.80 - 1.20 m.
Swimming instruction can best be held at open-air grounds in separate instructional pools. This will be practical from the economic point of view: an instructional pool will increase only slightly the costs of construction and maintenance of a center, whereas, if it is constructed alone or even for a particular school, it would be expensive. Instructional pools might also form part of the new youth centers. Provision of instructional pools should be in accordance with the number of children of school age, so that each one should be permitted one hour of swimming instruction per week.

Paddling Facilities

In view of the present unhealthy conditions, especially in old districts, I should prefer to dispense with such facilities on a neighborhood scale. Paddling facilities, of course, will form part of the recommended open-air swimming centers. But today we may find other outlets to provide such facilities in public gardens, clubs and youth centers open to small children under complete supervision. These facilities should be for sanitary reason mainly of the spray type.

Site selection and development

- Sites for open-air bathing centers should be located as centrally as possible within the residential area served, so as to be easily accessible.
  
  In view of the rare and high cost of land in some districts, the area required for the bathing ground should be established in its entirety from the very beginning, even if the ground is developed in two or more stages.

- The topography of the site should be appropriately varied, situated in quiet, safe surroundings (removed from major trafficways and rail lines), and protected from commercial and industrial activities.

- Adequate water supply and drainage should be available.

- Water-logged areas should be rejected.

- Sole access should be by a service road.

- Swimming centers (for each district) must be conceived as bathing parks within the stone-building of Cairo's districts. They relieve congestion and function as "breathing space."

- Swimming pools may be (spatially) combined with other recreational facilities, but they should be completely separated for hygienic and sanitary reasons.

- Most people, according to the recommended service radius, using the open-air bathing center, will travel on foot rather than by automobiles or any other means of transportation. Parking areas are thus unnecessary except for few cars.

- For financial reasons, open-air swimming centers may be developed in two stages, provided that the total area has been acquired. Since the majority of the public would be just bathers (i.e., non-swimmers), we may begin with the non-swimmers' pool, the instructional pool and the paddling area. Developing the swimmers' pool in a second stage, would provide a good opportunity to attain the correct relation between water surfaces (Swimmers to non-swimmers).
We must proceed to determine the spatial distribution of the open-air bathing centers as follows:

- **Built-up area**: 6–8%
- **Total water surface**: 8–10%
- **Open surface**: 75%

The elimination of parking facilities results in a saving of 5–10% of the total area. If the site is sufficiently large (16'000–24'000 m²) this saving may be devoted to additional green areas or additional built-up areas such as for the oriental vapor-baths which have been outlined before.

**Buildings:** Built-up areas should be reduced to a minimum, to offer as much open and green space as possible. Buildings in general should be open, airy and well ventilated.

Dressing facilities should represent 20–30% for children of school age (hook-type). The rest may be divided between men and women in the ratio of 3:1 or 4:1. Men’s dressing facilities would be mainly of the hanger type since it requires less space and labour is cheap in Egypt. For women the individual cabins may offer more privacy and security.

**Water surface:** It would be provided—at best—in separate pools, as follows:
- Paddling Pool: 5–6% (at least 75–100 m²).
- Instructional Pool: 6–8%.

Water surface for adults may be subdivided between swimmers and non-swimmers in the ratio of 3:5 in favor of non-swimmers during the first stage of development.

Open Surfaces should provide 7.0–8.0 m² per dressing unit (i.e. visitor), of which about 50–55% is devoted to relaxation areas. Some playing areas and small gymnastic fields ought to be available, but they must not exceed 20% of the total open surfaces. The rest, which constitutes on the maximum average 25% (of the total open surfaces) will be devoted to pool surroundings, paths and plantations.

**Architectural and aesthetic aspects:** The plan should have a more or less informal design. Open surfaces treated informally and loosely divided into sections by means of garden paths and plantations would contribute greatly to the park-like setting. The suggested combination with vapor-baths should not destroy the park-like setting and should have a separate entrance from the outside.

In view of the climate, adequate shade must be provided to protect bathers against the abnormal heat (shaded areas should be as plentiful, if not more plentiful, than sunny areas). This could be achieved by means of projections, colonnades, and trees. Intelligent use of trees and shrubs will enhance the beauty of the park.

Artificial lighting should be provided to extend the bathing day.

Special attention should be given to the development of separate programs for women and girls who do not like to share the pool with men. This may be achieved by reserving special hours (in the morning) or days during the week.
Another solution may be developed by providing a special pool (or section) for mothers, attached to the paddling area and separated from the pools for men. According to social and religious traditions, and especially for the sake of women, the bathing ground or merely the separate bathing area for mothers, if provided, should be secluded. This may be achieved by trees and plantations, by developing an integral design of wall-fencing, and by locating the bath buildings along the outer ring of the ground.

Constructions: Special attention should be given to the construction of the swimming pool itself, especially to avoid (or counteract) the additional stresses resulting from heat when the pool is emptied for periodic cleansing.

Hygienic demands: Due to the pollution of water, filtration plants are a prime necessity. The water must be kept clean (of drinking water quality) by means of a filtration plant, in which re-circulation of water should be effected at least every 8 hours or more often, if warranted.

Disinfection of water must be thorough: by chlorination for example, so that all organic substances are decomposed and no coli bacteria are left in the water.

Bathers should take warm water showers prior to entering the water. They should be completely naked and under supervision during this pre-cleansing bath. For this reason, showers (hot and cold) and washing facilities should be adequate: at least 3-5 hot showers for each thousand visitors.

Feet disinfection must also be observed strictly.

The cleansing of changing rooms and lavatory accommodation is vitally important. Washing facilities in the W.C. are also indispensable: bidets may be provided. Cleansing baths after the use of the W.C.'s may also be developed. Adequate drainage around the pools is imperative. Lack of proper drainage would result in muddy ground due to the continual presence of dust in the air.

Pool surroundings must be fenced off from green areas and entry only permitted via foot-baths fitted with showers.

Maintenance: Once a center is completed, good maintenance is highly important to counteract the unsanitary habits of the people. Restrictions should be imposed. Planted areas require careful attention to preserve the park-like setting of the grounds and to develop as the landscape architect conceived them. Buildings must be kept clean, serviced and in good repair to give the aesthetic pleasure that any well designed structure can afford everyone who uses it.

In addition to the administrative staff, bath attendants and technical personnel, a doctor in a bathing center is essential, to make periodic examinations of the visitors and to check that bathers are healthy.
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Illustrations which are not mentioned above are either drawn or photographed by the author himself.
Schwimmbäder in der Stadtplanung

1. Geschichte der öffentlichen Bäder:

2. Die verschiedenen Typen der Bäder werden gemäß der erfüllten Funktionen eingeteilt:
2.1. Das Wohnungsbad für Reinigung
2.2. Wasserkuren (Hydrotherapie)
2.3. Bade-Gelegenheiten zur Erholung
2.4. Schwimmbäder für Unterricht
2.5. Sport-Schwimmbecken

2.1. Beschrieben wird die historische Entwicklung des Badezimmers im Dienste der Körperpflege, insbesondere die letzten Entwicklungsstufen bis zur gegenwärtigen Form. Es zeigt sich, dass das Badezimmer nach der letzten Entwicklung stärker beachtet wird als wichtiger Raum in der Wohnung.


2.3. Erholungs-Bäder und ihre Bedeutung im modernen Leben. Sie werden wie folgt klassifiziert:
a) Planschbecken für kleine Kinder. In diesem Kapitel werden die verschiedenen Arten der Einrichtungen besprochen und illustriert. Es behandelt auch Plansch-Einrichtungen als Element eines Kinderspielplatzes mit einigen bestehenden und vorgesehenen Beispielen, wobei jede analysiert und illustriert wird.
Für Strandbäder zeigt ein ganzes Kapitel die möglichen Verunreinigungsquellen, Anforderungen der Hygiene und Sicherheit sowie andere Anforderungen der Planung.


3. Dieser behandelt die Wichtigkeit der Stadtplanung für Badeanlagen, das heisst das Studium der Badeeinrichtungen im Rahmen der Stadtplanung. Die verschiedenen Typen von Badeanlagen werden wie folgt auf Stadtplanungsbasis klassifiziert:
- Planschmöglichkeiten für die Kinder der Nachbarschaft
- Freiluft-Quartierschwimmbäder
- Hallenbäder für einen Stadtbezirk
- Sportbad oder Schwimmstadion für die Stadt selbst

In diesem Teil wird die Notwendigkeit der Aufstellung von Planungsnormen besprochen, mit Abteilungen, die eine Übersicht der verschiedenen Normen geben, welche teilweise von Badplanern oder einer Schwimmgesellschaft als minimale Anforderungen für verschiedene Länder entworfen, ferner andere, die in einigen Städten ausgeführt wurden.

Die vorgeschlagenen oder tatsächlichen Planungsnormen behandeln Raumverhältnisse der Badeeinrichtungen, das richtige Verhältnis von jeder Badtype zur Bevölkerung, die vernünftige und wünschenswerte Badekapazität und den effektiven Einzugsradius. Dies liefert eine vergleichbare Übersicht der Planungsnormen in verschiedenen Gebieten.

Der Schluss dieses Teils ist verschiedener Tatsachen gewidmet, welche die Planung beeinflussen und lokale Raumnormen verlangen.


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In December 1960 he passed the research admission examination. Under the guidance of Prof. A. Roth, he then began his work on a thesis “Bathing Facilities in relation to Town Planning” which was accepted on the recommendation of Prof. A. Roth and Prof. B. Hoesli and passed the Doctorate Examination in July 1964.