

# LAND BELOW SEA LEVEL



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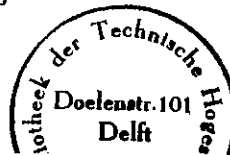
# *LAND BELOW SEA LEVEL*

**Holland in its age-long fight against the waters**

BY  
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*A nation is really civilized by acquiring the qualities  
it by nature is wanting in.*

M. Arnold

*„Tell them what you Dutch do,  
tell them what you are,  
tell them what you aim at.”*

GEORGE S. COPELAND

Chief of the U.S. Information Service in the Netherlands

# LAND BELOW SEA LEVEL

Holland in its age-long fight against the waters

To our Guests:  
*Errant soul who travels along all  
roads and beneath the skies of many lands,  
Golden Bee which anxiously distracts  
the honey from the humble flowers of civilization . . .*

VIOLAL

Dear Guests,

This booklet is not going to take you to our national emblems – the windmills, the traditional costumes of Marken and Volendam, the clogs, the tulip bulbs. Nor to the churches of Delft, Utrecht or 's-Hertogenbosch, nor to Museums, though there are some 260 in the Netherlands.

Our aim is to interest you in the art of building a land, for the country you are visiting is largely artificial.

Foreign guests are interested in the 'flowers of civilization'. Can one regard engineering works as such flowers? How often have engineers not spoilt the natural beauty of a country? Yet a country which is by nature a cinderella can be made to look like a princess by engineering. Civilization begins with engineering. Look at Egypt and Mesopotamia! Only after their peoples had learnt the art of irrigation could the process of civilization commence. After agriculture the first necessity was engineering. This alone made it possible for the first real towns to spring up, for henceforth large communities could be fed. Soon Learning – reading, writing and arithmetic – became necessary and the higher arts followed in their wake. It was the art of hydraulic engineering, which started the avalanche of learning in the world. The dominion over the waters set the wheels of our whole civilization in motion.

## Originally a 'sebcha'

In Holland too it was the dominion over the waters which brought civilization and riches. One half of what is now called the Netherlands was disdainfully referred to by a Moorish merchant as late as the 9th century as a sebcha, or salt water and mud plain. The other half of the country consisted of worthless sand, moor and heathlands. Engineering developed both parts.

We Dutch like to hear guests commenting favorably on our museums, our churches and our national costumes, but inwardly we flush with joy when some observant tourist notices the quality of our fields, houses, roads, canals and harbors. Our hearts are in the tasks of making our country better, larger, more productive and more beautiful. We want pretty houses, a lovely garden and a well ordered country in which to live; all must be fresh, lush and colorful. Above all, the light of prosperity and health must illumine the scene.

Modern social economists speak about 'challenge' and 'answer' (Toynbee). Our 'challenge' was the mud and peat sebcha. Our 'answer' we want to show you.

However dreary and inhospitable the sebcha may have been, it now holds a few records in modern civilization, including the following:

1. The highest yield of crops per acre in the world.
2. The highest produce of milk per cow.
3. The greatest longevity; the average lifetime is 70.
4. One of the lowest infant mortality rates in the world.
5. The income per square mile of the 'sebcha' is the highest in the world.
6. It is the most densely populated country.
7. The largest average family in Western Europe.

Note: The income per head of the population is not the highest in the world, for the Dutch have preferred a large family to great individual wealth.

Increase in population was the main motive power for our soil development. Not all the available labor was put into the making of the soil and in farming; industry employs about 40% of our labor to-day. It is true, however, to say that with us it was not Nature's drawbacks which limited the increase in population. The opposite occurred: until now we have not discovered serious limits to feed large communities either here or in our former colonies, even though Nature was adverse. The ever-increasing population caused more and more trade and industry to come into existence and more and more land to be wrested from the sea. There is some coal, but no iron, copper or other metal to be found in the Netherlands. Conditions had largely to be created. The Dutch like to be creators of their country, their wealth, their health, their homes and their work, even of their soils.

There is, of course, another side of this creative character of the Dutch. Engineers were inclined to make new land with absolutely straight roads, straight canals and straight dikes. They planted uniform trees spaced exactly six or seven yards apart along those straight roads and if any tree showed signs of individuality, it was removed and replaced by a new one conforming with the uniform Nürnberg-toy pattern. Only small trees were suffered to grow. You will see no big trees in Holland like those which make the British landscape famous. Such rigid and colorless engineering is disappearing to some extent; our fields are now beginning to be beautified by landscape planning. To be fair, however, the original lilliputism had a charm of its own, the charm of some rustic technical mind.

Often there is grandeur in straight lines, but then some great engineering feat must be the object. Nobody would like to see the Zuiderzee dam laid out with fanciful curves. It is good to be on the straight road on the dam, the ends of which lie below the distant horizon. The Roman roads, too, crossed the hills and valleys in an infinite straightness.

*(Photo K.L.M.)* The Hondshosse dike is built in a gap between the dunes near Schoorl. Sometimes there are three sea defense walls behind each other. The wall near the sea is called 'Watcher', the second one 'Sleeper' and the third 'Dreamer'. The defense against the currents of the sea is by means of artificial capes placed at regular distances. The initial cost and upkeep of these are great. The aim is to ensure that not a yard of land may be lost.

You will experience quite a different sensation if you travel upon the old dikes, of which there are many miles along the branches of the Rhine. The roads, built at a high level on the very top of these dikes, afford a wide view over the fields and rivers. The farms are built on the slopes of the dikes, as these were the only safe places in times of flood – each farmer hoping that the dike would not break at the point where his farm stood. In spring most of these old river dikes are particularly inviting, as they wind through and above the countryside, with its blossoming pink and white orchards. These dikes, which have no straight sections because they have been broken so often by the impact of water and ice, separate the water and land, and carry your automobile above both, making you feel like a bird flying above the country.

#### Great Variety

Variety is the quintessence of the Dutch landscape. In some districts it may be possible to drive a car for an hour without seeing much change in the landscape, but generally the scene changes more quickly.

Starting from the coast, with its sweep of white sand, we first meet the green dunes. They used to be pure white all over, but by applying special methods we succeeded in making them bear grasses and shrubs. In this manner all the blown sands are controlled. This reveals already the characteristic of the Dutch; they cannot leave nature alone, be it in the form of trees, dunes, heaths, or shallow seas.

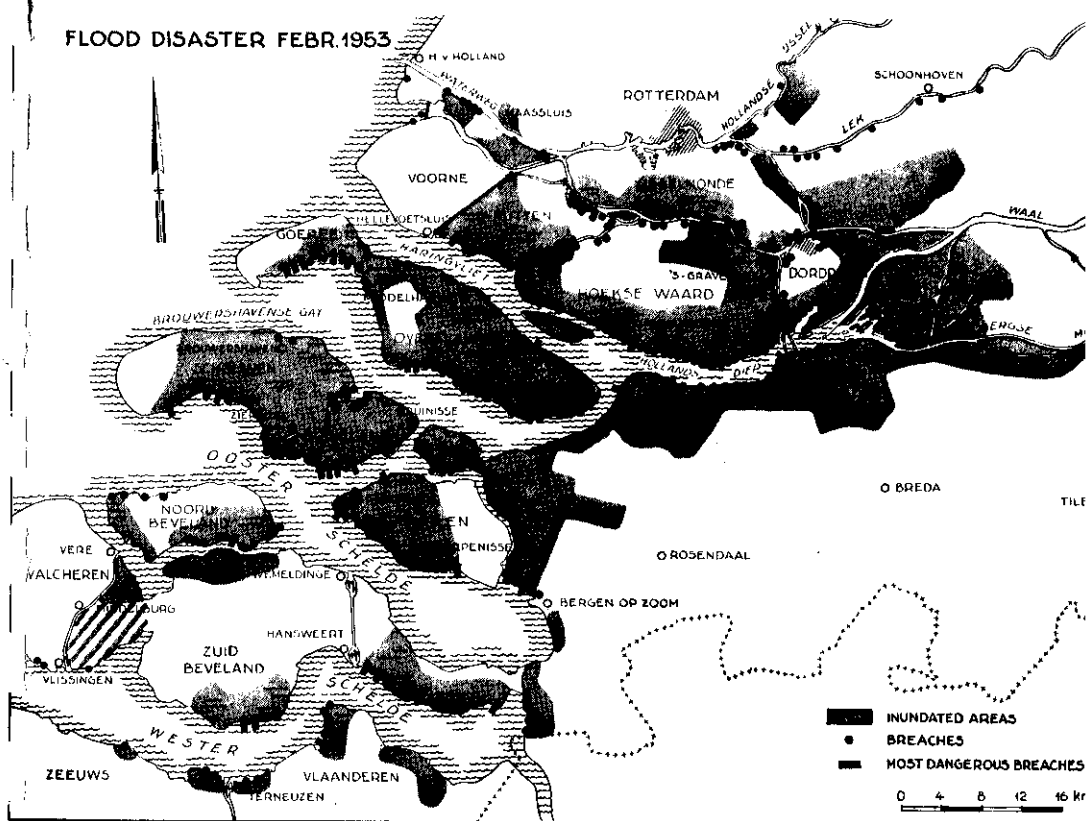
Just behind the sheltering dunes a belt of woods hides the villas set in flower gardens. Here are also the bulbfields, for the bulbs prefer dune sand to thrive. Farther to the East we find a narrow strip of 'old' land, followed immediately by 'new' land, that is reclaimed lake bottoms. Or you may have taken a country road, which has led you amidst lakes whose levels are above the fields. Or, again, you may have chosen a road through the parts of the country where the cows are transported in scows and where every meadow is an island. Soon, however, you will reach sandy soil again, covered with pine woods, moors, cultivated fields, blowing sands, grazing lands and villas in an ever-changing park-like landscape.

In the North the marine clay belt can be followed for a distance of about a hundred miles. This is a healthy and wealthy part of the country, no longer showing any signs of the fierce struggle with the sea. The unmistakable mark of victory is on the fields, though in February 1953 the exceptionally high storm flood brought it on the brink of disaster. The mighty pyramid-like thatched roofs stand proudly in the midst of the richest possible crops. When the coleseed is in bloom, about the middle of May, many people may prefer this to the bulb fields. It is as yet an undiscovered country. The great solitary farms surrounded by trees and moats break the plain; they make distances look great, because they are like coulisses through which we survey this variegated fertile field.

Even the Dutch towns show a marked individuality. Though the three main towns are practically equal in size (each with nearly a million inhabitants, suburbs included) and almost within sight of each other, the differences in character are striking.

Amsterdam, according to a song sung by our children, 'the great city built upon poles' – on herring bones, as our British competitors always said to tease us –

## FLOOD DISASTER FEBR. 1953



The flood of February 1st 1953 reached great heights and overtopped and destroyed the main dikes in South-West Holland. 630,000 acres were flooded and 750,741 inhabitants were affected. Between 1000 and 2000 people were drowned.

bears in its center all the dignity and beauty of a glorious past. The mighty merchants of that very mighty town of the 17th century, then larger, far more splendid, and richer than London (what a blessing in disguise it was when this old wooden city burnt down in 1667), can almost be seen still walking in the shadow of the trees along their 'gracht' (canal in the middle of the street).

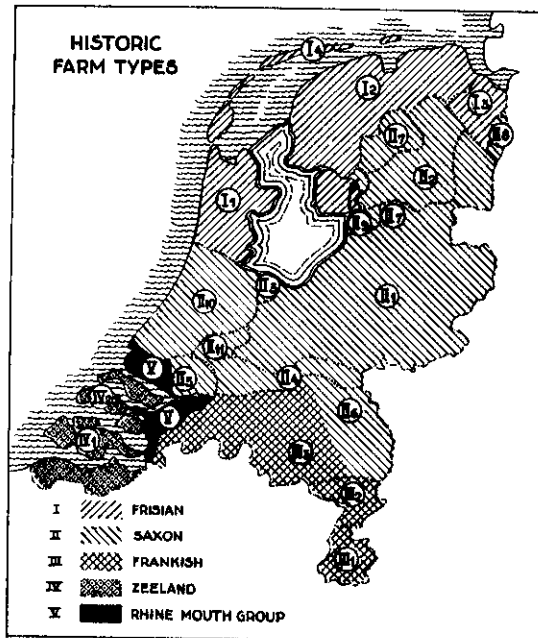
**Rotterdam** is becoming an ultra-modern town, especially so after 1940, when its old center was destroyed by bombing. This great port into which ships enter encountering no locks or docks, is the third in the world. In size it comes after New York and London and it is taking long energetic strides forward.

**The Hague**, never a town, but ever a village by volition and tradition – the largest village of Europe as we are taught in our Dutch schools – has the charm of a lady dressed in her Sunday best. It is the only place in Western Holland which is not wholly built on poles, the reason being that it is largely built on dune sand. Though situated on the sea, it did not want to have a harbor, except a small one for the Scheveningen fishing fleet.

### Tribal Variety

All our eleven or twelve provinces (the Zuiderzee polders may become the twelfth) have also a distinct individuality of their own. The three tribes, which we now

call the Franks, the Frisians and the Saxons, met at the mouths of the Rhine and stayed there, leaving their marks while developing their parts. The Frisians lived in the coastal plain, the Saxons inhabited the eastern sandy soils North of the Rhine, and the so-called Franks the sandy soils South of the Rhine. But moors, rivers, lakes and heaths subdivided the three tribes thoroughly, so that even in our modern days of traffic and mixing, the inhabitants of one village may still show



The peculiarities of the Dutch conglomeration are best seen from the types of farm houses. The different dialects and customs go together with the differences in farm building traditions. In the far South (III 1, 2) Roman type farms prevail, all the other types belong to the wood-structure type or roof-type. The Roman type, in the province of Limburg, is built around a square.

differences in costume, dialect and building traditions from the next.

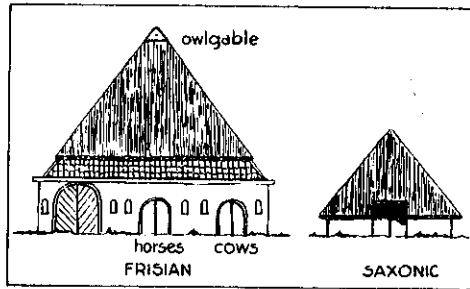
The provinces of the coastal plain are Groningen, Friesland, North Holland, South Holland and Zeeland. Originally this whole area was called 'Friesland', it was the 'sebcha'. But there was hardly any possibility of wresting a living from that bad moor and mud plain and a hut could only be inhabited in summer. In the nooks and crannies of the Zeeland archipelago we still find traces of an ancient race with black hair and dark eyes, which may have given the isle of Walcheren its name - we called all southern foreign people Waal (Walloon, Welsh), the eastern ones Slaves (note the word 'Serve', given by the Romans).

Also Brabant and Limburg, the Southern Frankish provinces, show some slight percentage of a dark haired race. The Romans were there for some centuries



and there are traces of Walloons. Limburg's farmhouses are of the Roman type, the midden in the middle of the surrounding sheds. Brabant has the 'long-gable' type, the different sheds placed like the sections of a caterpillar and all under one thatched roof. Farmhouses always give the best indication of tribal variety. They are conspicuous in the wide fields of the Netherlands.

The Saxon provinces in the East are Utrecht, Gelderland, Overijssel and



The main characteristic differences between Saxon and Frisian farms is seen from the back yard, which generally faces the roads. Both belong to the wooden thatched-roof type. Their construction and lay-out are much the same, but the Saxons have their main door in the axis, the Frisians do not. Owing to their great marshland crops the Frisians have much larger farms than the Saxons, who dwell on sandy soils.

Drente. Their type of farmhouse was originally a very simple one, a steep thatched roof with no walls and no partitions; the cows and poultry living in the same space as the farmers' family. There are still some of these 'loose houses', the word 'loose' meaning without partitions or 'open'.

The Frisian type of farm nowadays does not come farther South than the Great Central Swamp which begins at Haarlem—Amsterdam. In North Holland (or West Friesland) the roof is a pyramid, and the farmer lives under that one roof together with his animals, but well separated from them. In summer he may live in the stable, a gorgeous and clean affair full of porcelain and other ornaments. On the former island of Wieringen the type is still the same, though the outward appearance shows marked differences. In the province of Friesland-proper the farms acquire a distinct individuality, the 'head, neck and rump' type. The 'head' is for the family, the 'neck' for cooking and the 'rump' is the barn. This is the type also in the province of Groningen as far as Delfzijl, where the type changes outwardly, not inwardly. This East Frisian type has again one huge roof. This type continues all along the coast as far as Bremen, then it changes again in almost myriad forms in North Friesland. Very beautiful forms indeed, which might inspire any architect to new designs of country houses.

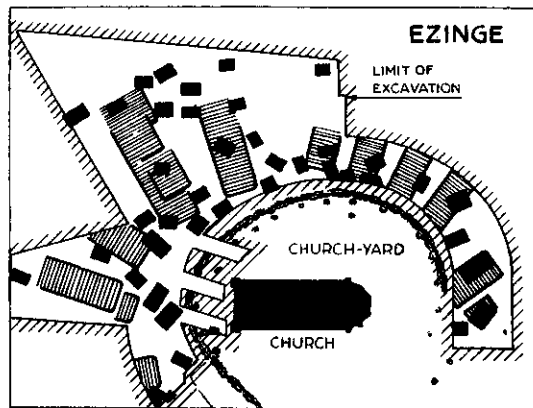
Family names ending in -ing or -ink, are Saxon, those ending in -ma, -ga, -stra, are Frisian.

#### A Mother-country

There is also great variety in the pattern of old land and new land – the ditches make the old land look like a jig-saw puzzle, new land, made after 1 000, has

straight ditches. Medieval custom was to make long thin parcelation, modern engineers make chess-block parcelation. Such variety in tradition due to historical background has given the Netherlands the name of being a 'mother country'.

England was a place where the emigrants of the eastern and northern Northsea shores went, a melting pot of the old days. France's plains saw great migrations too, but the watery region of the Rhine and Maas did not encourage mass movements.



The passing of the Anglo-Saxons about 400 A.D. along the Dutch northern shores according to archaeological excavation of artificial mounds (Prof. van Giffen). The original Frisian farms were standing in a circle on the mound (black hatching). They were burned by the Anglo-Saxon invaders who built their much smaller huts in large numbers without any general planning (red). After a long time they left or were assimilated, and the Frisian type of farm was built again. The present church (black) is of more recent date, standing about 12 feet higher than the level at the time of the Anglo-Saxons.

Archeologists recently discovered one mass-movement however: the migration of the Anglo-Saxons to England through the Dutch northern provinces. As a whole the original Dutch settlers stayed where they were, worked hard at the development of their secluded spots and multiplied greatly, while hoards and hoards found their way to France, England, Germany, Russia, South-Africa and America. Many of them emigrated because they wanted total religious freedom.

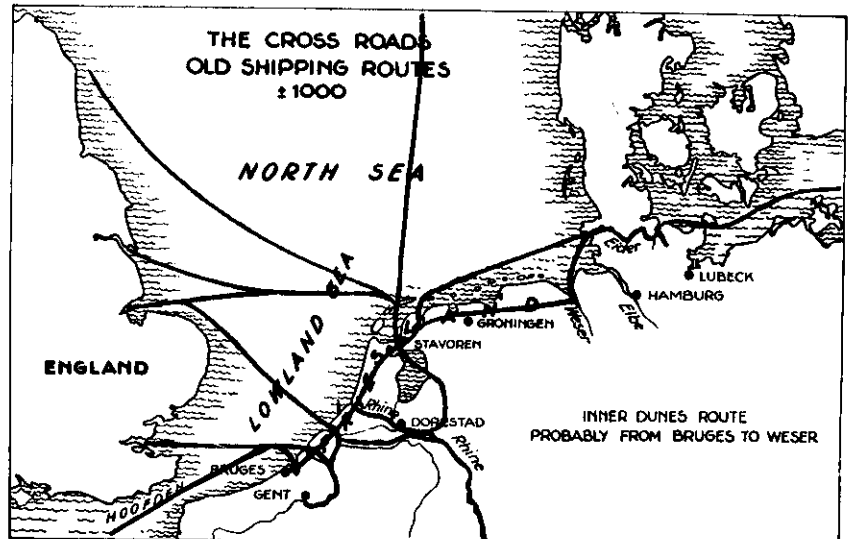
Here is another item which has caused great variety, but now in the mental realm. The Netherlanders are notoriously serious, perhaps for the following two reasons:

1. They have suffered in the past and suffer still in their struggle for survival, a struggle which was and is severe and which lasts already at least 22 centuries. In the past their 'weapons' were rather poor. The old Frisian laws speak about: 'we defend our land against the sea with three weapons: the spade, the fork and the hand-barrow'. At present they have all modern technical expedients at their disposal, yet the fight remains hard and the suffering great when under exceptional circumstances, such as the late floods, the water has the upperhand.

2. Two great religious clashes occurred on Dutch soil, which gave the inha-

bitants plenty of opportunity to weigh the arguments pro and con. The first was the clash between Christendom and Heathenism from 700 to 1000, a clash strongly reminding us of our springs, when tough northern air meets the mild winds from the South. One day it is spring, the next day the ice-giants reign.

The Coastal Dutch must have been like their King Redbad, who when he was being baptized and already had one foot in the font, asked questions about the



One of the main features for the development of the Netherlands is its position at the cross roads of Western Europe: the Rhine, Maas and Scheldt to the South, the Eider to the Baltic, the 'Lowland Sea' to England and Scotland, the North Sea to Scandinavia, the 'Hoofden' (head lands: i.e. Blanc Nez and Dover cliffs) to the Seven Seas. The 'Inner Dune Route' went from Bruges and Ghent through rivers and canals far to the North East, probably as far as the Weser.

new religion, and then withdrew his foot. The monks called him Redbad Unfrithman, Redbad Unpeaceful.

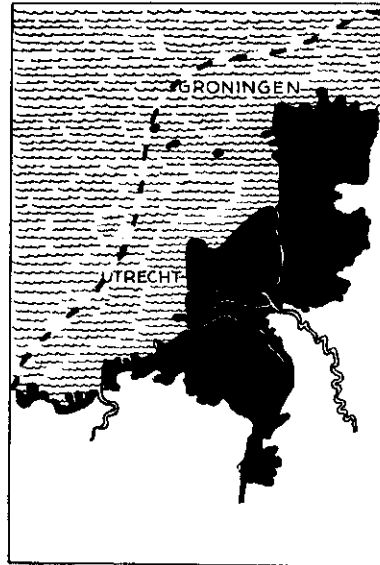
The second clash was between 1400 and 1600, when Protestantism was weighed in the scale against Catholicism and inquisition took its much hated toll. Historians agree that religious troubles have been very fierce in the Netherlands. Why is this so? Perhaps because the country lies at one of the cross-roads of western Europe, half-way between North and South. Perhaps also because its inhabitants originally worshipped the so-called Law of Eternal Right, or 'Ewa' (means ewig, eternal, aye, ever). 'The Ewa is innate in thee, teaching thee what is right and wrong'. 'Ewa is Divine Right, it teaches a man's mind to judge itself, and to conquer what is wrong, to help innocence and to ban cruelty'. Also: 'Human law is human, man-made'.

The fundamental belief is still that 'the Eternal is innate in thee', hence individualism, variety, emigration, stubbornness, sects, tolerance for refugees. When

the first Jews were taken during the last war, for instance, the whole city of Amsterdam went on strike as a gesture of utter disgust and indignation.

#### Internal delta

Many consider the Netherlands to be a delta. The form suggests it, but this is not right. Though the Rhine and Maas bring some sediment from the interior, their



The Netherlands as they would be if there had not been any human activity or if human activity had ceased. The coast would have been at Utrecht and Groningen.

combined delta is but a small one. It does not extend much farther than the town of Utrecht. On the best parts of this small delta apple, pear and cherry orchards thrive. These best parts are the silted-up branches of the ancient Rhine, the so-called river bank soils. The smallness of the Rhine delta is a sure sign that Western Europe has but little soil erosion.

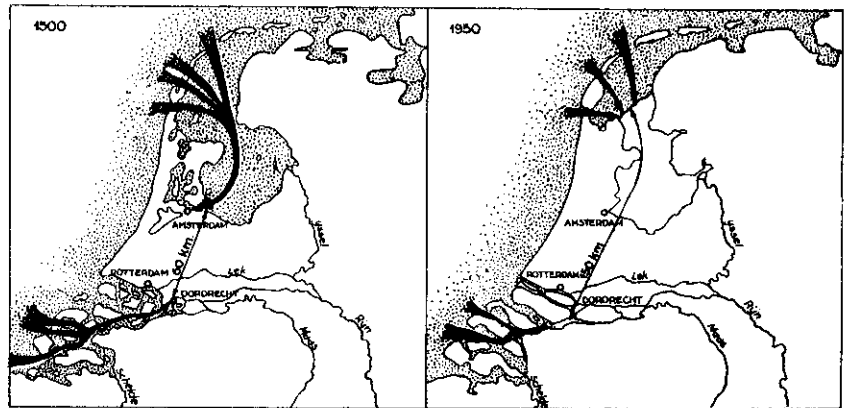
Our delta is an internal one, it lies far from the sea where the dune belt came into existence as a result of waves pounding on the shallow sandy bottom. If there were no dune belt, the lower part of the Netherlands would not exist and the coast would be roughly from Groningen in the North to Utrecht in the middle and Breda in the South. No wonder that the Dutch try to maintain their dunes, as well as the necklace of the Frisian islands in the North.

There was a time that we nearly lost this main part of the Netherlands, and if it had happened, Amsterdam, Rotterdam, The Hague, Delft, Leiden and many other well-known towns would not exist. The intercoastal plain, originally a vast moor extending from the Straits of Dover all along the southern shores of the

North Sea was threatened with destruction when the level of the sea rose ever so slightly. Here was a challenge!

### Two claws of the sea

The destruction of the coastal plain behind the dunes came from the South and from the North, like two claws of a crab closing upon its prey. We know little



Several claws of the sea, of which two were extremely dangerous, threatened to destroy the lower half of the Netherlands. The claws advanced bit by bit until about 1600, when they were checked by stronger dikes. The period 1580-1600 was the most dangerous. In that time of political troubles (revolt) a not too severe storm might have spelt the final blow to central Holland. From 1600 to 1932 there was an equilibrium between the forces of the sea and human resistance against them. In 1932 the main northern 'claw' was pushed back by building the Zuiderzee dam. The southern 'claw' is being pushed back since 1950. In 1953 it proved to be a formidable threat still.

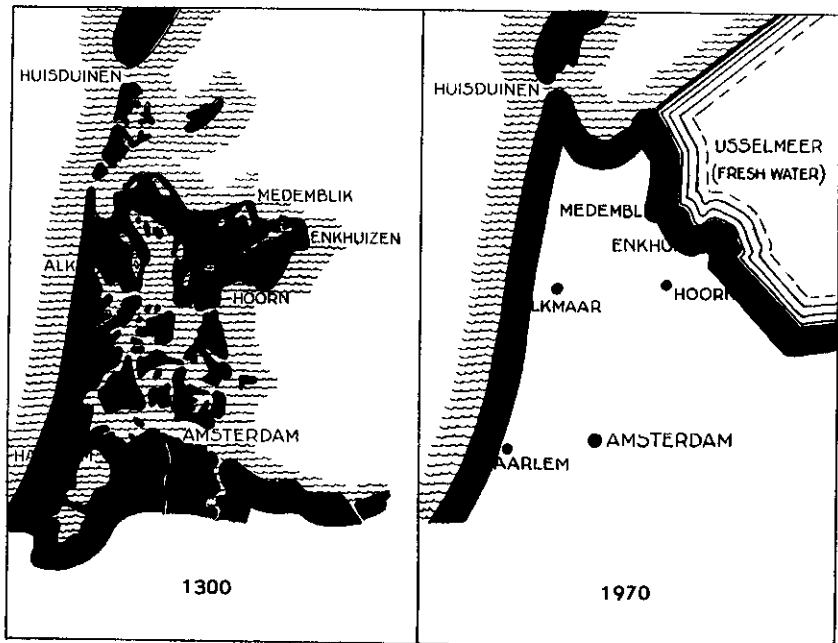
about the earliest inundations, but early classical authors already mention the floods. The aggression was slow but sure. In the North, about the year 1300, the Zuiderzee came into existence. Formerly there had been a freshwater lake here, called Flevo, or Almere, but the outlet of that lake widened and the sea-water now came as far as Haarlem and Amsterdam, then a tiny fishing village.

Another claw advanced in November 1421 from the South. In a single night a great polder, which had been made as early as 1270, was inundated and lost, wiped out as it were from the map, together with its 72 villages and its 50,000 inhabitants. Here the salt water came as far as Dordrecht. A small central part of the coastal plain, however, continued to exist between Rotterdam and Amsterdam, a distance of only 36 miles. This was all that was left of the once long peat district in the intercoastal plain between Calais and Denmark.

The sea did not penetrate farther, because of human action. Owing to better knowledge and organization, we have not lost much land since 1600. However, the situation continued to be critical for three centuries to come. Especially in the beginning of the Dutch war against the Spaniards about 1570, the so-called 'trouble-times', the sea had a very good chance to grab the last remnant. Those

36 miles of moors and lakes were defended so fiercely against the Spaniards and against the sea, that this small hybrid area was saved. Henceforth it became the center of the Netherlands. This center, called Holland-proper, has had a very narrow escape indeed, and by the laws of Nature should not exist at all.

Until as late as 1930 the safety of this center of the Netherlands was not very great, and even now in 1953 a storm may break the dike South of Gouda – one



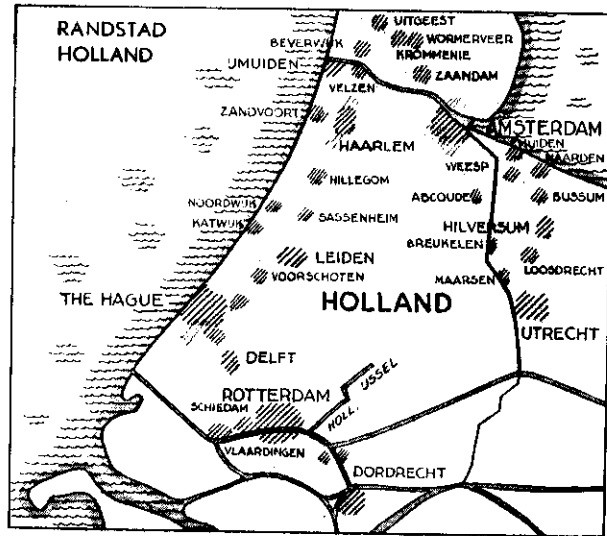
The North-Holland peninsula, one of the 'Seven Frisian Seelands', was separated from the other parts of Friesland about 1100 or 1200 and its bad general shape at about 1300 suggested but little hope for the future. However, gradually the sea has been and is being pushed out. In 1970 the shape will be as indicated.

of our weakest dikes – or rise higher than its top. But the northern claw was pushed back in 1932, when the new Enclosing Dike of the Zuiderzee was finished. In that year the distance between the two claws became 100 miles. The safety of the heart of the country has increased much, because of this Zuiderzee dam, but the southern claw is still threatening, as the recent events with their serious consequences have made abundantly clear.

### Three centers of civilization

Three successive centers of civilization have sprung up in the intercoastal plain between Cape Blanc Nez and the Weser. They were of more than local importance, they were the centers of Western Europe.

The first center was the Frisian one in the North. Excavations show that the first farms had been built about 400 B.C. on artificial heights. These farms were already large ones and their construction show the same characteristics as the present-day type of Frisian farm. They are essentially wooden structures, great thatched roofs only. The walls are small and non-essential. Pliny wrote about these mound dwellers in the year 47. They, the Frisii, were beings shivering in the cold



The so-called 'Randstad Holland', comprising the towns of Amsterdam, Haarlem, Leiden, The Hague, Delft, Schiedam, Rotterdam and Dordrecht, population about 4,000,000. It grew around the big central moor, called Holland-proper; first a moor, then a conglomeration of lakes, because the moor was burned in the stoves of the Dutchmen, and after that a fertile field, because the lakes were pumped dry.

winds, marooned on the top of their mounds like shipwrecked mariners. There were no trees, no cattle, no sun, no fires in their hearths except 'mud' fires (peat-fires). Their hands were their spades, etc. Pliny may have exaggerated somewhat, but we must believe him when he says that the country of the Frisii was hybrid, sometimes a sea, sometimes a mud flat, soaked in poisonous salt water.

In the marine clay belt of our northern provinces, now called Groningen and Friesland, the Frisians made about 1500 mounds. There must have been more of them, as the sea has swept away many others. Further East along the coast there may be a thousand more in East Friesland. Often these mounds, called wierden or terpen, still carry whole villages. Their content may be as great as one of the Egyptian pyramids. Imagine that they were made in a pyramid shape, what a fantastic sight the northern coastal clay belt would offer! In the wet North Sea climate pyramids of clay would not be permanent, as they do in the dry climate of Egypt; also the mounds were not built for monumental purposes, but out of sheer necessity. Without the spade and the hands used as spades the inhabitants



(Photo K.L.M.) The Biesbos. This deltaic region was formed after the flood of 1421 had destroyed a large area South of Dordrecht, originally the place which was called 'Holland'. The Biesbos is now being reclaimed, the many creeks will become tideless, but as such they will better serve the purpose of providing recreation (sailing, swimming). The population, now about 8 per square kilometre, will be increased to an estimated 150. The polder 'Holland', destroyed in 1421, had been made as early as 1270 by damming off the tidal mouth of the river Maas. The water of that river had to flow into the Rhine at Gorkum. This scheme had proved too ambitious, but it was kept up for some 150 years, then collapsed; about 70 villages disappeared.

could not possibly have survived. And even with that worthiest of all ancient tools, the spade, they were often decimated by the storm floods.

The ancient Frisians' center was North of the Zuiderzee, their 'towns' being Stavoren and Medemblik (Meadowlake), where for instance King Redbad (Red-beard?), the opponent of Charlemagne, held his court. 'King' means well-to-do farmer or war-leader. The 'Seven Frisian Zeelands' were wholly democratic republics with a parliament. There was a road from Stavoren towards the East, there was another from Groningen to the South, but these were the only ones. Further there was the waterway along the northern branch of the Rhine, called IJssel, and the Zuiderzee. This was all there was to connect Friesland with its neighbors. The swamps and lakes separated it thoroughly from the rest of Europe and made the Frisians feel as safe as the fishermen who founded Venice.

Accustomed to do everything by water, they partly developed into skippers and traders. Their ships darted from England to Schleswig and along the Rhine, Maas and Scheldt. The name Frisian at an early date became synonymous with trader. This first beginning of civilization in the Low Lands was largely halted by



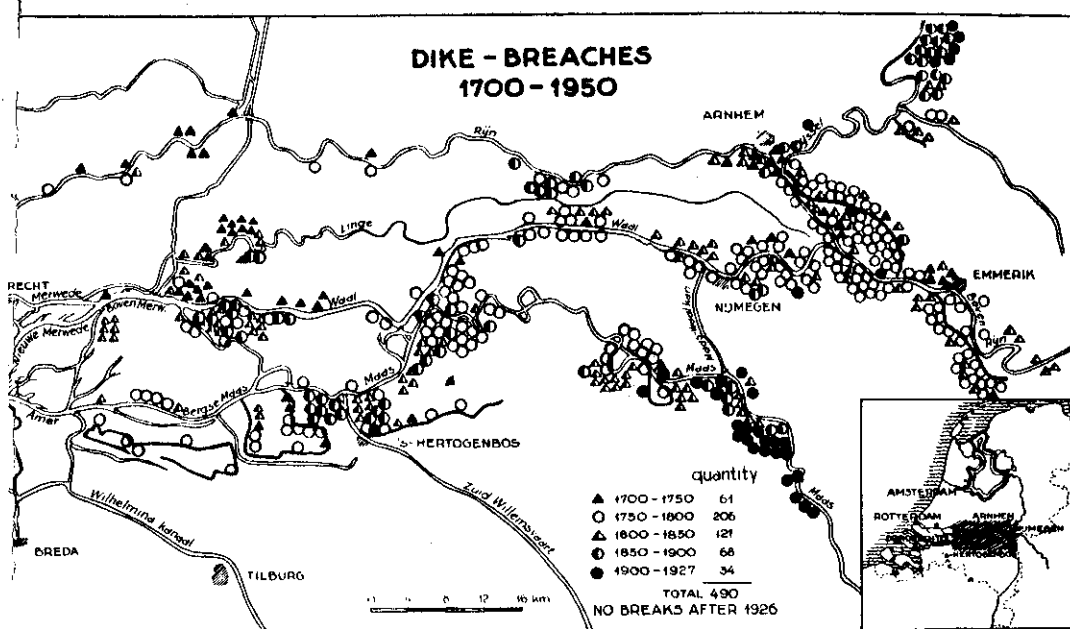


(Photo K.L.M.) The Cruquius pumping station near Haarlem was one of the three which pumped the Haarlemmermeer dry after some years of pumping (1852). Its machines are British, it is a museum today. The bottom of the lake can be seen in the right part of the picture. The water was pumped into the ring canal (left). Today modern pumps do the work of keeping the lake bottom dry. Schiphol aerodrome lies on that bottom.

the Viking raids from 800 to 1000; the gold coins of the traders were made into bracelets for the northern Belles. At the same time the sea seems to have damaged the Frisian marshes so badly that survival became exceedingly problematical. However, resistance was stubborn and success came in due course with a mighty effort to build dikes, but trade and commerce had by then found a new center.

The second center, the Flemish one, sprang up in the South of the intercoastal plain soon after the Viking raids ceased. Bruges (Bridge) and Ghent developed on the southern part of the peat plain which had been destroyed and afterwards had silted up at an early date. The first center in the North (Friesland) had had no towns to speak of, but the second center became the seat of very powerful towns with a huge international trade where Art flourished. Both the first and the second center were extremely democratic. The Flemish towns destroyed the mighty armies of Knights and so did the Frisians, as well as the Saxons at the same time. But eventually (1400) Kings and Dukes got the upper hand in Flanders and the great trade vanished, partly because of silting harbors. The Dutch coastal plain was always subject to natural changes.

The third center, called Holland, was the region between Rotterdam and Amsterdam, left over by the two sea claws. This name Holland may mean holtland =



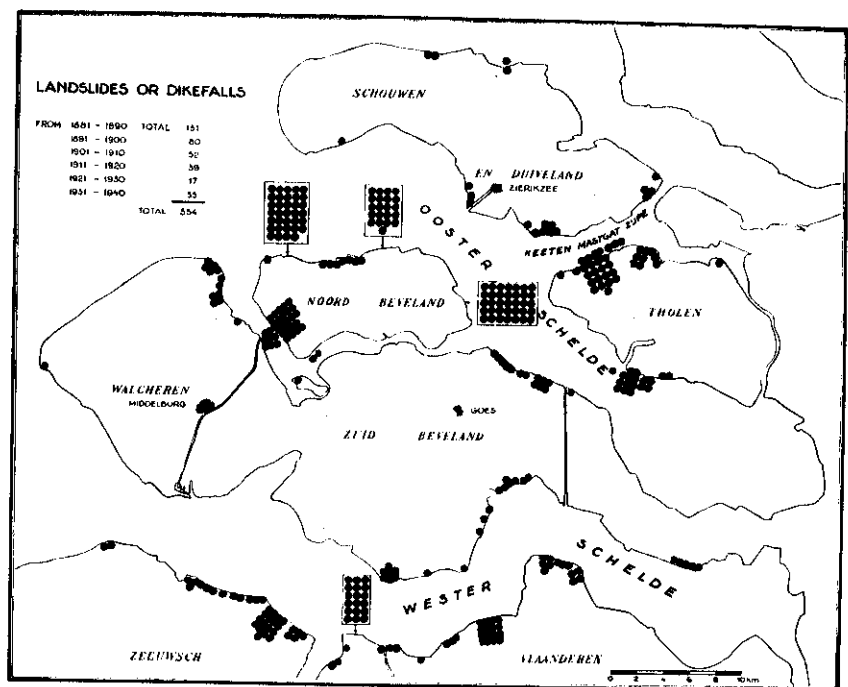
Since 1700 almost 500 breaks have occurred in the main river dikes. The period 1750 - 1800 was the worst with 4 breaks a year. After 1926 until 1953 no further breaks had occurred and in February of this year the breaks in the dikes of the down stream polders were not due to the overflowing rivers but to the water being driven in from the sea side through the simultaneous action of spring-tide and a very heavy northwestern storm.

woodland, or hollow land - weak, soaked land. The part of our country called Holland was originally the low land on both sides of the river Maas, the land South of Dordrecht, which was its capital. It was the land reclaimed in 1270 and utterly destroyed in that memorable night of the Saint Elizabeth flood of 1421, when 72 villages disappeared together with 50,000 inhabitants of which about 10,000 were drowned. Dordrecht remained a small island within its defense walls, but its trade suffered much, because the flood had taken away its hinterland and the vessels now sailed over the drowned country; they bypassed Dordrecht. The name Holland moved to the North where the central moor district, left over between the sea claws, was being reclaimed.

This third center was again democratic, as its art shows as well as its governmental institutions. Its rulers could only govern by way of service, not by dominion. The members of the famous House of Orange gave whatever service they could, but were never allowed to be bossy.

Around that large moor a score of villages developed gradually as the fertility of the moor was exploited more and more, especially after 1200. This string of villages became a string of towns, and each of these towns has expanded so much that they now almost touch each other. Draw a line from Utrecht via Hilversum, Amsterdam, Haarlem, Hillegom, Lisse, Sassenheim, Warmond, Leiden, The Hague, Delft, Schiedam, Rotterdam, Barendrecht and Dordrecht and you have about 40% of the population of the Netherlands (i.e. about 4,000,000) on that line.

It is now called the 'Randstad-Holland', or the Ringtown Holland. It has the form of an inverted interrogation mark. See page 15.

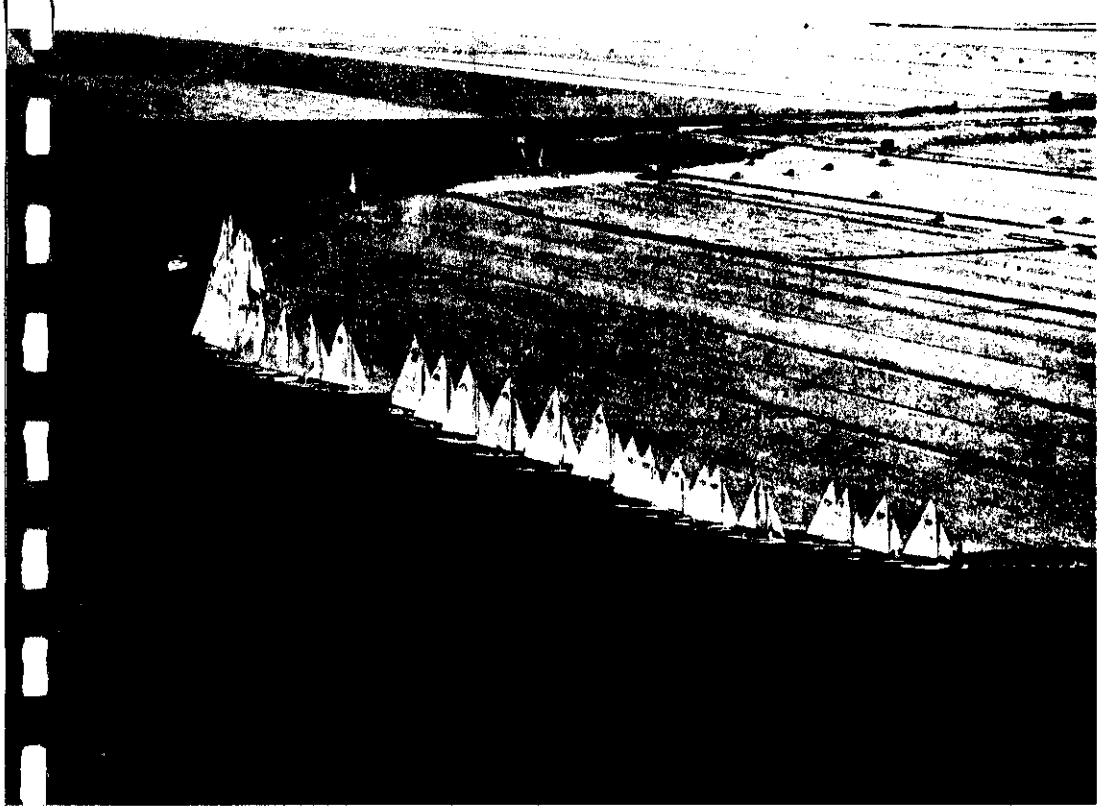


The above map shows the constant threat of landslides. Zeeland's tidal waters scour its shores in such a way that landslides occur, even though these shores are defended against scour. Viewed over centuries large areas have been lost in Zeeland by landslides and still they are always to be apprehended.

### A destroyed country made fertile

This Holland-proper is a peculiar country. Leave the highways and note that the canals are higher than the fields, that the lakes are like saucers filled to the brim, ready to spill over. A good, though narrow road to follow is the one from Leiden to Amsterdam, passing along the eastern shores of the lakes, a road well known by yachtsmen and flower lovers. The white sails of the small yachts flit over the lakes and through the canals, while the white-faced black cows graze in the depths on the meadows. All these meadows and fields, as far as the eye can reach, are lake bottoms kept dry by continuous pumping. The level of the lakes, though seemingly high, is about 5 ft below the average floods of the sea, and 15 ft below the highest storm tides. The level of the meadow is about 12 to 15 ft lower than the level of the lakes, and therefore about 27 to 30 ft below the storm tide in the sea. When you drive your car through these polders you must use your imagination. Fancy a glass plate high over the country and fishes swimming underneath it. But there are dikes all around the polders preventing the water from coming in. If the 'watcher dike' should be destroyed, there is still the 'sleeper dike' and behind that there may be the 'dreamer dike' or third defense.

The original level of the land may have been a little higher than normal high water in the sea, but gradually the land has been burnt in the stoves of the Dutchmen. In the East of the Netherlands people burned their woods, in the West they had no woods and therefore they burned their soil. This was the Dutch 'Rape of the Earth'. What the claws of the sea had left, man destroyed. Of course there was



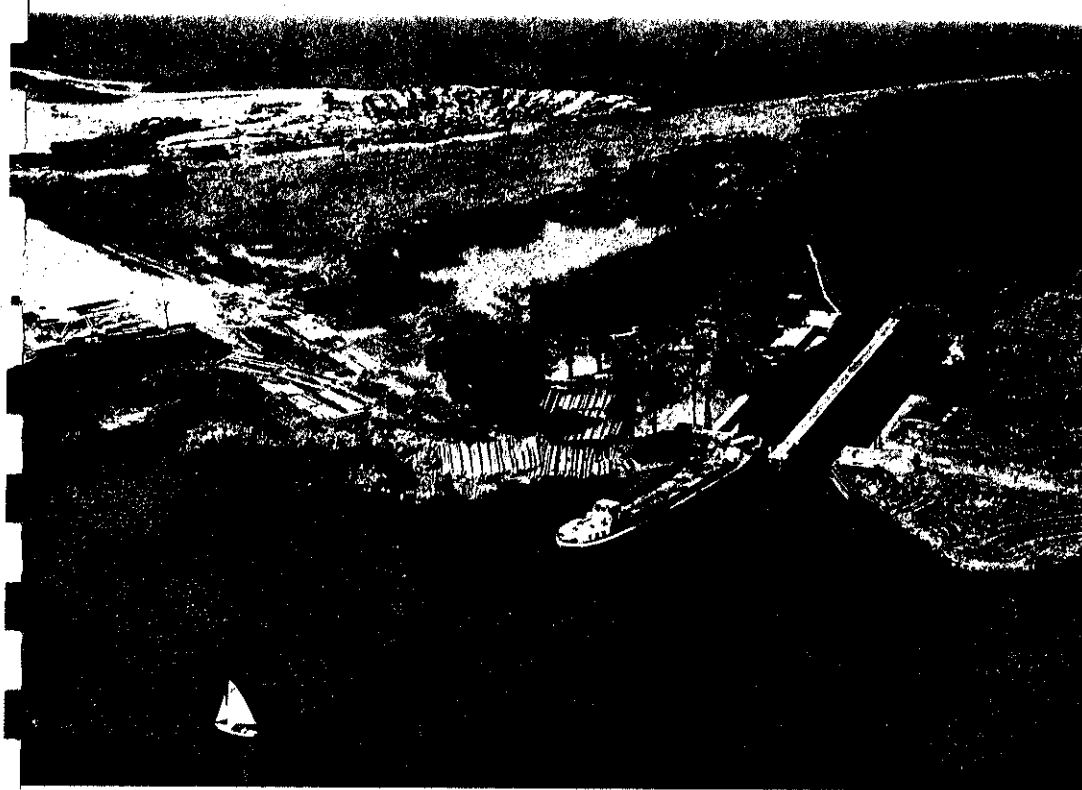
(Photo K.L.M.) The Sneekweek (pronounce Snakewake), i. e. the week of the large regatta on the lake near the town of Sneek. The places Sneek and Grouw are the centers of yachting in Friesland. Other sailing centers are between Leiden and Amsterdam, and near Hilversum. All lakes are interconnected by canals or rivers.

an excuse: man needs some warmth in winter and cooked foods as well, but nevertheless this destruction was paving the way for the annihilation of the whole of the low parts of the Netherlands.

But Nature has more doors than a single one and man is often clever at finding a way out. An ancient clay layer far under the peat proved to be fertile, and wind, later steam and electricity, became the servants of science and provided the power to pump the large manmade lakes dry. Mark the good crops on these lake bottoms, they are splendid, exceeding those of other countries as shown by the following figures for wheat crops:

In 1949:	Netherlands (all soils) . . .	4260 kg-ha
	England . . . . .	2820 kg-ha
	France . . . . .	1910 kg-ha
	United States . . . . .	1110 kg-ha

People had migrated into the big central swamp called Holland by means of existing or man-made creeks. They built their farms along those creeks and they carried the peat from the interior in such a way that all the spaces between the creeks became lakes. The old farms and villages stand on peat on the side of the main drains and are therefore rather high. These drains have kept a fairly high



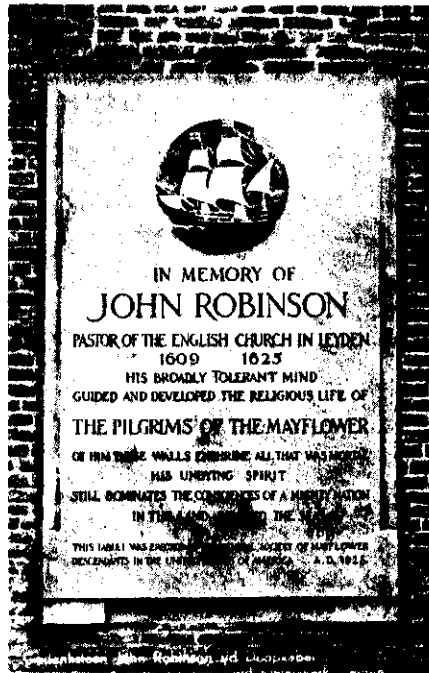
(Photo K.L.M.) Lock at Ter Horne in Friesland, an entrance to one of the main yachting districts.

level. Some new farms may have been built on the lake bottoms, but not many. Lake bottoms are 'new soil' with straight patterns and few inhabitants.

It is not difficult to reconstruct the old situation. Holland-proper had nearly become one great lake, but this lake was intersected by left-over bands of peat bearing a canal, a road and the farms. The existing lakes near Gouda and near Hilversum show how narrow stretches of the old peat soil were spared to separate the waters. People had learned to grow afraid of the waves lapping against the shores and eating them up, as it were. If it was too large, the lake became known as a 'Waterwolf', the great Haarlem lake, before it was drained in 1852, even threatened to destroy Amsterdam.

There are still some lakes in Holland which have not been drained. This is because the country needs reservoirs, called 'bosoms', fit to receive the water pumped out of the low polders before it can flow into the sea. Yachting is another reason for not draining all the lakes. The busy and densely populated 'Randstad Holland' needs many recreational facilities. I remember how a foreign official, studying recreation in Holland, stood on board a little yacht gazing silently at the white sails upon the wide expanses of blue water, hearing the lapping of the wavelets against the shores, the quiet song of the wind in the reeds, and the shouts of swimmers. 'They are perfectly relaxed and perfectly happy', he mused to himself. And a little later: 'It is obvious that they forget all their daily troubles, and this is what recreation is meant to do'.

If you are in need of relaxation after a strenuous time in the home towns, do not go to the ants, go to the cows and the lakes and become wise. Try to find Mary Spijker, the woman who makes friends with eels and fishes, and who calls each one of them by a separate name out of the water. They, the eels and fishes, have known the kind lady for many years, and the eels do not wriggle when Mary takes them out of the lake. When she calls a certain fish, up he comes, puts his



Because of religious tolerance many foreigners came to Holland and thus had their share in the general development of the country. This tablet in the Pieterskerk at Leiden is a remembrance of the Pilgrim Fathers of whom the Magistrate of Leiden wrote in 1526: 'These English have lived among us now these 12 years and yet we never had any suit or accusation come against any of them'.

snout above the water and wants a kind word, a petting and a fat worm. 'Fishing prohibited' stands on the farm where Mary lives. Once 'Brassy-One', her main pet, had been caught by a fisherman, and Mary discovered it in time. At the sound: 'Oh, my Brassy-One' the poor fish in the pail flapped his tail weakly. Needless to say that he was rescued and felt grateful ever after.

#### Soil artists

Flowers thrive very well on peaty soil, especially when this soil is renewed with fresh mud taken from the bottom of a lake. Hence the daily flower markets of

Aalsmeer, which are the world's greatest. The lilac islands in the Westeinder Plas, where the people of Amsterdam go sailing, are also unique. Noticing all these very fine flowers which grow so abundantly in gardens, in hothouses, on islands, and behind every window, one member of the World Soil Congress of 1950 said to another: 'The Dutch are so restrained, but in the matter of flowers they let themselves go'. Well, Aalsmeer (near Amsterdam), Boskoop (near Gouda), Naaldwijk



Sir Cornelius Vermuyden (abt. 1600–1675) drained Hatfield Chase and the Fen Country in England. He was befriended by Charles I, Cromwell and Charles II. He belonged to the so-called 'adventurers', the men who financed and actually drained the main English marshes.

and other flower districts are business undertakings, though beauty is its basis.

For a long time the inhabitants have experimented with their soils. They have never been afraid of huge soil transportations. Large areas of the coastal dunes have been moved inland to be mixed with the clay or the peat. Eventually it was discovered that fine bulbs would grow on dune sand, provided the water table was kept at 22 inch below the surface of the land. This had to be neither 21 inches nor

23 inches, and if the land surface was higher the only thing to do was to lower it, because the water table in the soil cannot be altered so easily. If the farmers in a certain polder have agreed to accept a certain level, it is of great importance to keep that level stable and fixed. So, if a bulb grower is not satisfied with that level, he has to raise or lower his land.

The lowering of the dunes to that level of 22 inches above the water in the



So-called water stones in old Dutch farms tell the tale of disasters. The farm here has five rooms, each floor about 4 feet higher than the preceding one. When the floods came the family moved to the necessary height. The cows were put in their roof stable about 15 feet above the fields. The farms were protected against waves, floating beams and ice by means of floating willow mattresses, which the farmer 'wove' around the building before the flood came.

ditches was no great impediment. One of the greater troubles was that microbic life in the bulb soil had to be kept in good order by turning the whole upside down. Deep sand layers are brought to the surface every now and then, by means of dredges. Thus the odd 1000 varieties of tulip bulbs and so many varieties of hyacinths, gladioli, etc. are produced on soil which is constantly kept under close supervision.

At Boskoop, North of Gouda, where garden shrubs are produced, the soil which generations of horticulturists had made became so famous that wagon loads of it were transported to Germany during the last war. The farmers have been soil



artists for many centuries. When the Counts of Holland had installed themselves at The Hague and, about 1200, had become wealthy enough through their exploitation of the vast marshes and because of other clever dealings of their own which may have been more or less legal, they cast their eyes towards the North, where the westernmost of the 'Seven Frisian Sealands' had become separated from the others because of the inroads of the sea, the Zuiderzee. The conquering of this small farmer's peninsula, called West-Friesland, took about a century and cost the lives of a brave Count of Holland and many of his noblemen, but eventually West-Friesland did become North-Holland. However, the Count would not hear a bad word about his new subjects, but said they were his best people, well versed in fighting the water and making the most of their soil. It was here that the pumping of lakes started. The famous 'engineer and mill-maker' Jan Leeghwater (1575-1650), who was in great demand draining lakes in the whole of Western Europe, was also born there in the well preserved village of De Rijk, between Amsterdam and Alkmaar, which is worth visiting.

'This is no soil' said a famous Russian soil scientist to a Dutch colleague, obviously meaning no 'natural' soil. The answer was: 'This may be no soil but it bears crops'. Clever farmers helped by modern scientists are now better able to improve upon Nature than centuries ago. There is as yet no end of improving upon Nature. A Dutch farmer is called a 'boer', which means a 'builder'; he 'builds up' the land as well as the crops. Boer and civil engineer both spring from the same old root which goes deeply into the soil.

The 'Boers' used the soil not for crops alone. They made mounds of it to survive, later dikes. They also made from it their pottery and bricks for their houses. For heating, they took a special kind of their soil, the peat. For covering their roofs they used sods and the local reeds, for floor mats the rushes, for sleeping mattresses straw. Boers became civil engineers when they started to make canals, ditches and dikes. For damming the tidal creeks and rivers they used the osiers, growing abundantly in their soaked country. This cleverness at using local material bore fruit. Since about 1100 or earlier, rulers in Europe have wanted Dutch marsh farmers to develop their countries by draining their marshes, making their harbors and controlling their rivers. Hence mass migrations. The service the 'Boers' rendered was highly esteemed in Eastern Europe. In the small country of the Netherlands alone they dug (with spades) a quantity equal to that of an imaginary shipping canal from London to Calcutta. The size of that canal would be that of the future Suez Canal, the Queen Elizabeth would be able to sail through it easily.

Now that they are helped by scientific research and the millions of horsepower in the form of modern mechanical equipment, great opportunities are opening up for them. Engineers and farmers are as eager as their fore-fathers to develop the world's soils. They are experts in soil treatment, and have been recognized as such since about the year 1000.

#### **Making a Country**

As soon as a child is able to understand, he is shown 'God's handiwork' in the palms of his own hands. In his left hand stands the letter M, in the right hand the



(Photo K.L.M.) The Northern coast of the Netherlands is largely natural, even wild and empty. On one of these barren islands a certain Count Clanrigarthy lived for 30 years 'together with several wives and a musical band'. This 'Mad Count' had to leave England when 'Dutch William' took over the throne of Great Britain in 1688. - Such areas as these are also going to be reclaimed.

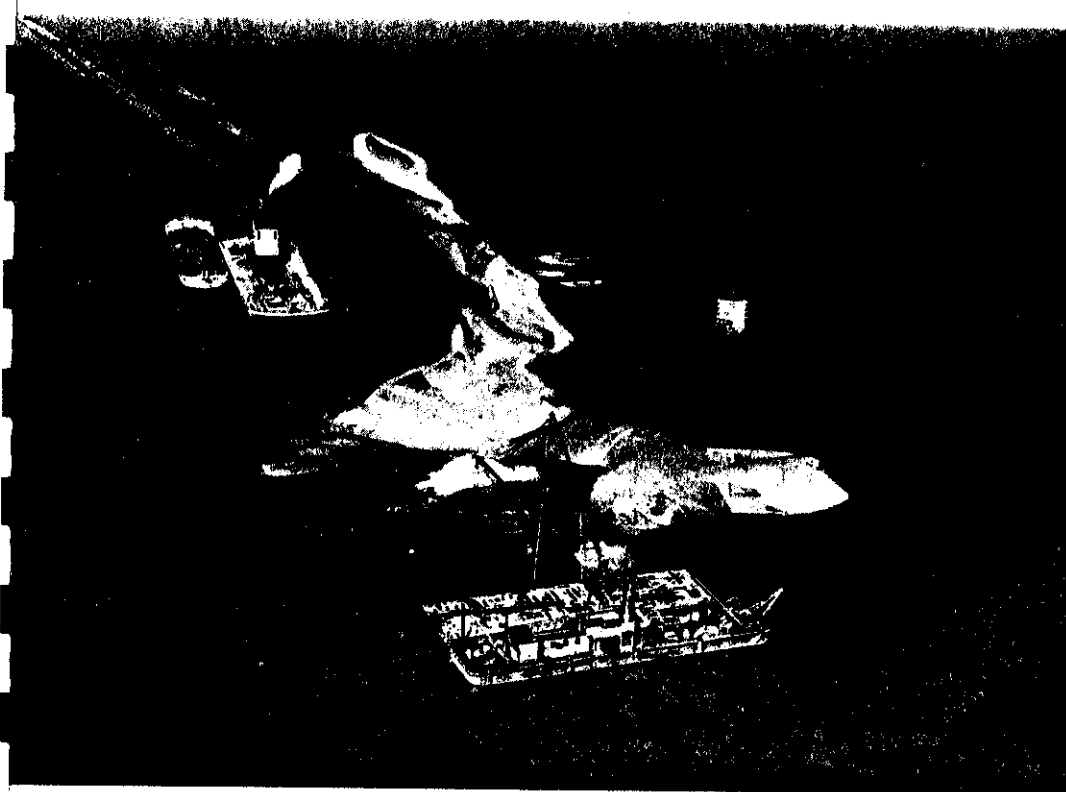
letter W, and this token means: Man Work! And this, the Dutch mother says to her sons and daughters, is a Divine Commandment.

Next comes the lesson about the great opportunity to work 'Thou shalt till the ground from which thou art taken'. You are put 'into the Garden of Eden to dress it and to keep it'. There is not a thing which can not be bought by labor and knowledge, according to the old Dutch rhyme:

Science never sleeps in a feathery bed,  
The schoolboy early must rise. No grain  
For those who do not plow and drain,  
But a sower may thresh and be glad.  
No warmth for sluggards who do not dig peat. Gains  
Are for those who use arms and brains.  
Those wanting a prize must run and ring,  
For labor God sells everything.

(transl. Jacob Westerbaen, 1599-1670)

Making a country means work, work, work, plus intelligence. This work is considered as a privilege, because Nature gives a farmer tremendous dividends for his labor. He puts a grain of wheat into the soil and the gain is 2000%. Corn gives even 33,600%.



(Photo K.L.M.) Dike making in the Zuiderzee. This work will continue until about 1970, when the Zuiderzee scheme will be practically finished. The present works are near the old town of Harderwijk. The Zuiderzee works belong to the greatest mankind has ever undertaken. They started in 1920.

The farmers of the marshlands are known to be a land-proud and home-proud people, but this pride is generally not of the boasting type. All old Dutch ballads seem to boil down to the theme: Pride comes before a fall. They sing about wealthy farmers, who feel like demi-gods in their huge farms surrounded by a moat and a parklike garden, their women cover'ng their heads with pure gold plates, sparkling in the sun. The 'widow' of Stavoren ordering a cargo of very good wheat to be jettisoned in the harbor, because it was not a cargo of gold, jewels and silk - they all get their just reward. In the ballad the wealthy farmers vanish together with the whole district in a single night of flood, the rich 'widow' becomes a beggar. The chronicles moreover show how all priests and clergymen seem to have taught that the many catastrophes due to floods had but one cause: the sin of the inhabitants. Keep humble, keep lowly in mind, was the incessant warning. Wealth is indeed the destruction of any nation. The Dutch proverb is: How strong legs must be that can bear wealth.

Yet, the joy of the farmers at the fertility and neatness of their fields and the strength of their dikes continued to exist in favorable times, but ever the remembrance of the catastrophes hovered above that inward and silent joy, which might be a sin.

I once witnessed how a boy of about 10 years of age and out in the fields reclaimed from the sea, asked his father: 'Boer, where is the best land for crops

in the whole world' – the word 'Boer' being a title of great respect and honour. The man, surprised, swept his eyes over the many-colored fields and said: 'here'. Much amazed about this the boy asked more questions, but the answer remained unvariably: 'here, under the dikes' – not at all boastfully, but just a friendly statement of fact. The father had traveled in foreign countries and we were all aware of the constant effort of all people of the district to first make the soil by coaxing the sea silt to settle and then improve that soil from generation to generation. And indeed, there were no weeds in the fields, the plants could not be more healthy and there was not a square yard of waste land. But being born on the best soil of the whole world? Well . . . , the boy could not take it.

Later, it happened that I had to travel widely and that it became my job to deal with land reclamation and country development. As such, I met the same unavoidable humble pride in all the marshes around the North Sea, the consciousness of being in a man-made country, or let us say a Garden. Inside the dike, a heaven, outside the dike, the permanent threat of the roaring sea and from above the constant warning: 'Thou shalt not eat of the fruit of the tree of pride'.

Making a country first and then making it blossom as a rose indeed is a great task, recognized as such since remote times. The lines of the Gudrun Saga, evidently written by a foreigner in Viking times:

'Hetzel, the Frisian Lord,  
Him serve both land and water'

show how even then people were impressed by the way Nature could be made to serve.

The Government is now beginning to realize more and more the importance of the task of developing the country, it comes to the aid of the farmers, who have tried in their own restricted but mighty ways to make the country. They not only tried, but they actually succeeded. They have wielded the spade for 23 centuries, and the work they did is very grand indeed, but the Government is now able to use mighty machines, it can tackle a task of the grandeur of the Zuiderzee scheme. The making and finishing of the Netherlands by means of multiple purpose plans has now started on a modern scale.

Age-old agriculture and its son, modern civil engineering, have come together again and are joining hands in making new countries, here and everywhere. The Zuiderzee works, of approximately the same magnitude as the works in the Tennessee Valley, are proof of what modern tools can do. The spade was mighty in its days, the dredges, draglines and bulldozers are far mightier.

In 1270 Dutch engineers already made two dams in the mouth of the river Maas, a tidal river of imposing width and strong tidal currents working on an easily erodible bottom. They have learned to make bigger and better dams now, especially after the closing of the four terrible gaps in the dikes of Walcheren, due to war action in 1944. The ancient Dutch method of laying willow mattresses on the sand bottoms of the tidal rivers is still used, but nowadays concrete doors of 200 ft length are floated into the gaps in the five minutes time that it takes the tide to turn. In 1932 the Zuiderzee was closed, in 1945 the four gaps of Walcheren, in 1950 the mouth of the Brielse Maas (near Rotterdam), in 1952 the Braakman on



(Photo K.L.M.) The fertility of the new soils is always great. Modern science and well selected farmers make for excellent crops. For every farm leased by the Government there are about 400 applicants.

the river Scheldt, and in the same year the Hamse Gat in the Biesbos. This means more land for agriculture, shorter dikes, greater safety, the expulsion of salt water, better and more fresh water storage inside the dikes, greater fertility and better roads and canals. Also better and more recreation possibilities, for the new lakes thus made attract our many yachtsmen.

The tradition has always been to shorten the Dutch coastline. Together with the starting of dike building about the year 1000, villages sprang up with names ending in 'dam': Rotterdam (the dam in the river Rotte), Amsterdam (the dam in the river Amstel), Edam (in the Ee), Schiedam (in the Schie), etc. Originally the Dutch coastline must have been great, because of all the tidal creeks. In 1840 that coastline had still a length of 1150 miles, in 1932 (Zuiderzee closed) 840 miles, in 1952: 800 miles.

This shortening of the coast will go on until a limit of about 300 miles is reached. The 14 gaps in that coastline will then be shut, except the mouth of the Rotterdam Waterway and the mouth of the Scheldt (Antwerp Waterway). Since 1930 two of the four Rhine mouths have been shut: in 1932 the IJssel by making the Zuiderzee dam, in 1950 the Brielse Maas.

Shipping locks and sluices must be avoided too, as salt water penetrates through these structures. If a ship of say 10,000 Tons enters the lock at IJmuiden (the world's largest lock) a 'phantom vessel' follows stealthily and dumps 3,000 tons

of salt into the Dutch inland water system, equal to 200 carloads of salt. This is so because the sea water is heavier than fresh water.

The shipping locks in the Zuiderzee dam also allow the sea salt to come into the interior and not less than  $\frac{1}{3}$  of the lowest discharge of the Rhine is necessary to expel some of that salt. This makes the Dutch civil engineers and farmers wince. Every gallon of fresh water can produce two pounds of dried wheat or other crop, and what an inexcusable shame it is to see all this fresh water flow unused into the sea! Therefore the string of islands in the North must be connected by dams. Also the southern archipelago must be closed and the sea must be wholly driven back. Hendrik Stevin wrote already in 1667 that this must be the great aim. That aim has become attainable now. The Dutch cannot afford to leave the sea inside the land, the damage is far too great, it runs into billions.

And what when the Dutch have 'finished' their land? Will they have fewer children? Will there be enough work in the future?

I see my 'mother country' smile. It has been called over-populated for 20 centuries. Moreover, though the Netherlands may be finished some day, not the world. There is the 'good Earth' everywhere, the 'good Waters' in the seas and also the 'good Air' above the world, and all these elements wait to give of their infinite riches to him who works intelligently, soberly and faithfully. The world is great and beautiful and waits development, the art in which the Dutchman has excelled from time immemorial. Today powerful machines extend his power a thousandfold – yet disasters like that of the year 1953 remind us, as of old, that we should not boast of what we have achieved, but that 'pride will have a fall' and that only the most assiduous work and perseverance will enable us, in the literal sense of the word, to keep our heads above the waters.

### Advisable tours in Holland

1. The Rembrandt country is typical polder country, the 'bosoms' are higher than the land itself.
2. River dikes with roads on top of them. Alblasserwaard and Krimpenerwaard is old morass country. Ancient farms with 'water-stones'.
3. Country of Leeghwater. Pettemer Dike, many drained lakes, quaint old towns like Hoorn, Enkhuizen, Medemblik (King Redbad's place).
4. Frisian marshes, wealthy farmlands.
5. Isle of Schouwen, in 1953 under water. Zierikzee was (and will perhaps remain) the best preserved old town. Tholen, the place where the Roosevelt family came from, also Vermuyden.

### Water Tours

6. Water tour through Zeeland. Good hydrographic charts are available. Well buoyed gullies, fast streams.
7. Biesbos delta. Wild natural area, creeks with sand bottoms largely dry at L.W.; at H.W. about 3 ft of draught. Maps available. The Biesbos will be reclaimed within a few years.
8. River tours. Main rivers are excellent for motor launches.
9. The old inner dune canals.
10. The Frisian lake district. Yachting.
11. The South Holland lake district. Yachting.
12. The Wadden Sea. Dangerous primeval area of sand and water. Guides in Harlingen, Terschelling, Oostmahorn, Zoutkamp, Noordpolderzijk.