

Family of Flemish weavers at work. From the Book of Trades, Ypres. 14th century.

Cloth-Making in flanders

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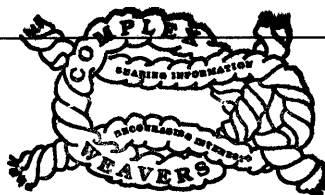
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Cloth-Making in Flanders

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Between the North Sea in the West, and the districts of Brabant and Hennegau in the East, bordering in the North on the province of Zeeland and in the South on Picardy and Artois lies Flanders, one of the most interesting countries of Europe. At one time it formed a political whole, but for a long time it has been split up into different parts, which belong to various countries. Since the Westphalian Treaty of 1648, which marked the end of the Thirty Years' War, the northern part with the cities of Hulst and Axel has belonged to Holland, and the southern part, embracing Lille, Douai, and Dunkirk has been French. The two provinces of East Flanders with Ghent and West Flanders with Bruges and Ypres have belonged to Belgium since 1830, having been previously Dutch, and prior to 1795, Austrian territory. In respect of language, Flanders is not a homogeneous territory. The Teutonic section of the population speaks Flemish, whilst the idiom of the Latin section is Walloon, a French dialect. Never-

theless Flanders is very often referred to as a homogeneous territory. Apart from the fact that these districts experienced their greatest periods as a whole, and therefore remain linked to each other in the memory of the world, their unity is of a nature much stronger than the ties knit and severed by history. It is based on the geographical situation and topography, as well as on the economic life of the provinces. Their intellectual, cultural, and artistic life in all its manifestations is the expression of this unity.

It is flat country, sweeping down to the sea. Its monotony is not broken by natural phenomena, but by the work of man, towns, and cities. Thickly clustered—Flanders has always been a land of towns—their golden domes, green roofs, and white, towering steeples, form the landmarks of Flanders. Neither nestling on hillsides, sheltered by valleys, nor screened by forests, they rise like lighthouses out of the sea. Roads lead to and from them, canals link them, dykes and locks

Whereas the painters of the Netherlands were usually fond of adding imaginary hills, rocks, and mountains to their native landscape, this more realistic painting shows a town in the Belgian plains, a large stretch of well-watered, level country, typical of Flanders and the Netherlands. Etching by F. Ertinger (1640–1710) after A. F. v. d. Meulen (1631/32 to 1690).





"The Fall of Icarus." The vast sea-bound plains of Flanders as seen by the painter Pieter Bruegel the Elder (1525-1569).

regulate the waters of their rivers. The first casual view reveals to the traveller that this landscape is the work of man.

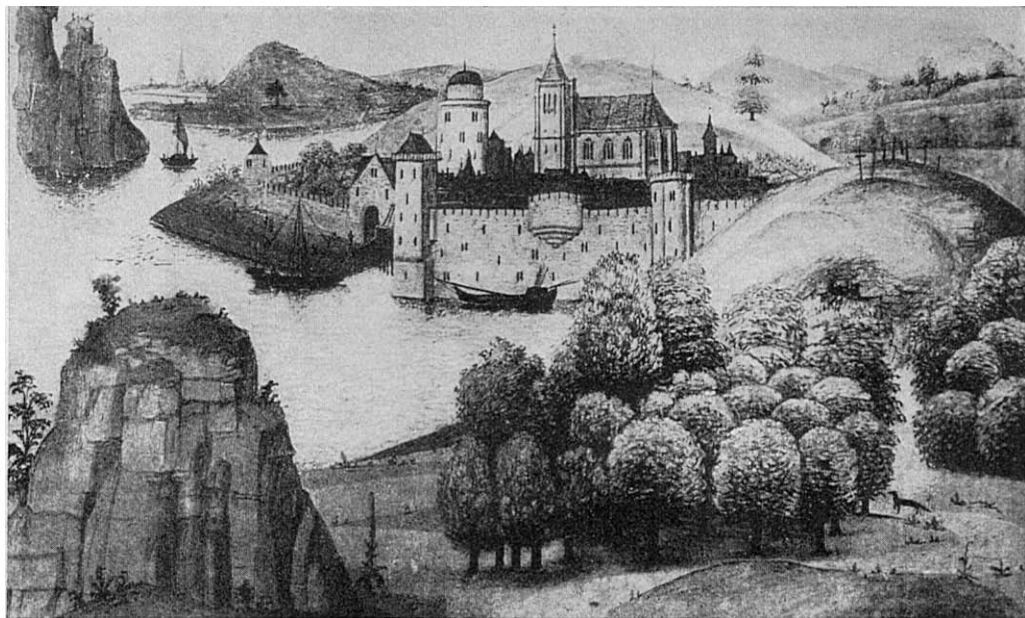
Acquaintance with its history confirms this impression. For the history of the country is to some extent the history of its creation. Sacred or secular legends often relate how a country came into being, and science interprets them by penetrating far into early history of the earth long before the coming of man. In Flanders, however, the process went on in historic times, before the astonished eyes of the rest of the world; a process by which a people literally made a part of their country, or "invented it", as Verhaeren, the great Flemish poet, describes it.

The low-lying country on the shores of the North Sea at one time knew no fixed boundary between the sea and land. The water encroached continuously on the land, forming marshes and lakes. Water was the ruling element; the waves that beat upon the coast, the marshes that covered the ground, the clouds hurrying across the sky, and the rain with its frequent heavy downpours. This was the land that Caesar knew, which he described with something like horror in his records of the Gallic Wars. And for the Romans it remained the end of the world, "extremi hominum" they called its inhabitants. In the early Middle

Ages, we hear of the "Wateringen", organisations formed for the common struggle against the ocean eternally threatening the very basis of life, the soil itself. We read of the "Watergrafen", the officials in charge of these labours. At first the work progressed but slowly; gradually, however, as Flanders became the centre of the European textile industry, there were both determination and material resources in abundance available to carry on the work; and in our own day skilled engineers have completed the task begun long ago by their ancestors with the primitive means at their disposal.

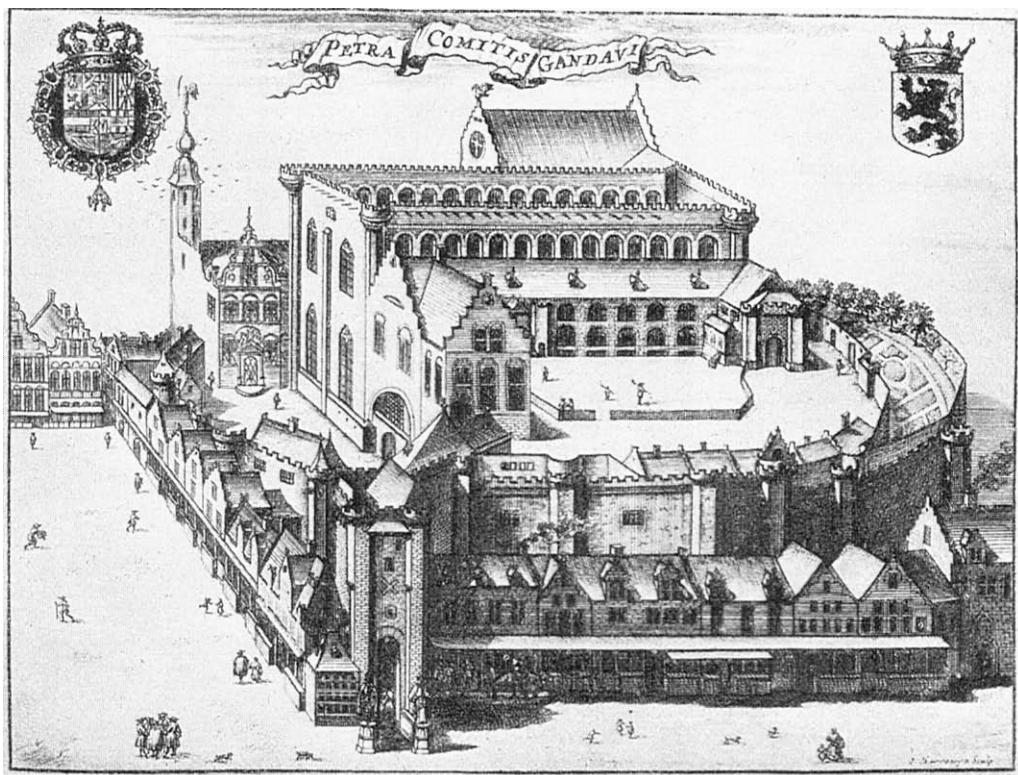
The country wrested from the sea with such infinite labour proved itself worthy of the effort. It was fertile soil, and possessed in a very great measure those qualities which were necessary for the development of the textile industry, the source of the wealth of Flanders.

All the natural wealth and brilliant possibilities of Flanders became apparent in the course of the history of the country. The question remains unanswered, what it was that induced men to dwell in this strange area which was neither land nor sea in those very distant days when all the world was open to those who were bold enough to venture forth. The answer may perhaps be sought in the



Castle and islands in Flanders rising out of the water. Miniature, ab. 1400. Brussels:

Medieval castle in Ghent, partly rebuilt. The walls are surrounded by the typical merchants' stalls. From "Flandria Illustrata sive descriptio comitatus Flandriae cum tabulis geographicis et iconibus urbium ecclesiarum coenobiorum arcium etc." By Antonius Sanderus. Hague 1732-1735. (First edition 1641-1642.)



theory that the Phoenicians visited Flanders in their swift ships, and laid the foundations of civilization there. As experienced colonizers they may have realised the advantageous situation of the country, which in some respects was not unlike that of their own. However that may be, the Morinians, Menapians, and Attrebates, whom Caesar found in the country, when he made it known to Rome and to history, were skilled in the art of weaving. Was this the heritage of Phoenicia? And was it the influence of that Oriental nation of merchants which made them even in that early state think of exports and supply the products of their looms to the Romans, as soon as they became acquainted with them? When a country produces more than it requires for its own use, and seeks markets beyond its own frontiers, that implies a certain experience and an advanced economic maturity. For Gallia Secunda, as Flanders then was called, a little-known marsh-land beyond the boundaries of the civilized world, the idea of export trade seems an anomaly, a foretaste of the future. For it was not until the end of the Roman Empire that condition really became ripe for export trade, in the newly arisen Regnum Francorum. This was especially due to the fact that in the new kingdom Flanders was no longer at the end of the world. On the contrary; situated on the coast, between Latins and Teutons, at the extreme end of a route leading from the West across the plains of Northern Europe to Russia, and connected by the three great rivers flowing into the North Sea with the Alps and a great part of France, Flanders was now the most important country in the North of Europe for the exchange of goods both material and cultural. It seems almost symbolic that about this time the name suddenly changed. Quite suddenly, without having frequently occurred, the name "Flanders" appears in documents of the 7th century.

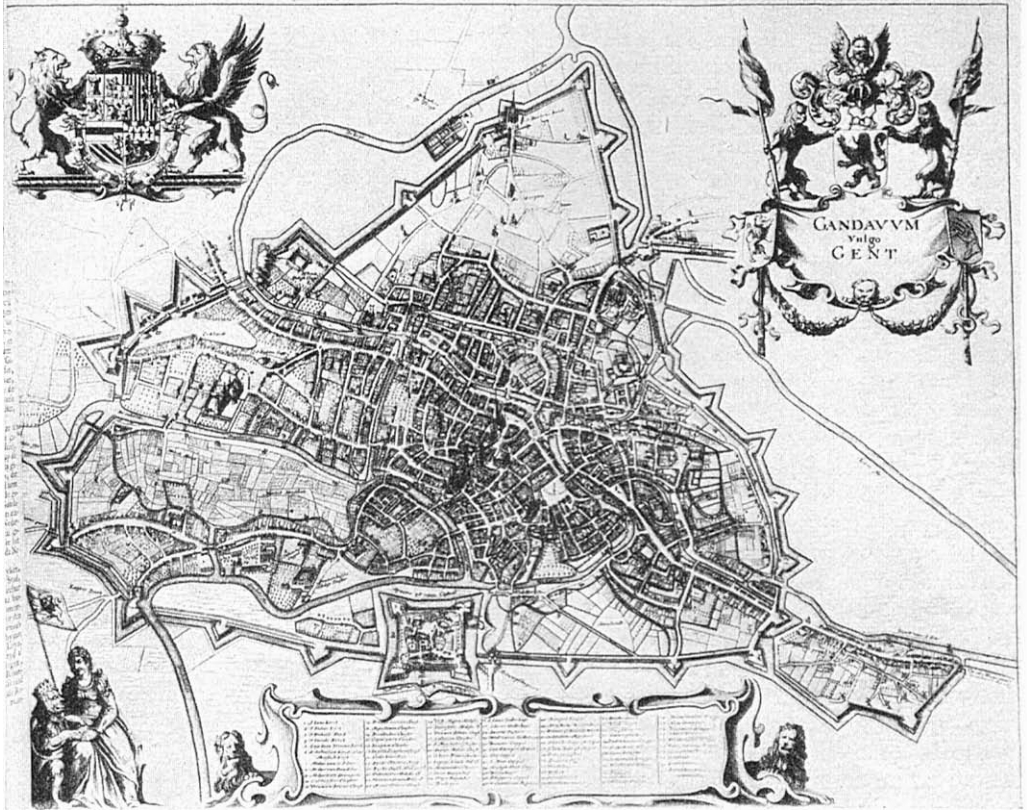
Flanders it remained from that time onward, and its inhabitants were named Flemings. The meaning of these names is not known. Two interpretations are: "The many Strangers", and "Land of Strangers". Neither of them are philologically tenable, but they are of interest in so far as they both refer to the number of strangers who came and went in the cities of Flanders. They came to sell wool and dyes, and to buy the finished textile goods, which from the 9th century on found their



"Angels making music", from the altar of the brothers van Eyck, Ghent. Completed 1432.

way from Flanders to every place where quality was esteemed: to Marseilles and Portugal, to Vienna, Poland, and even to Russia. The ports of Flanders were thronged with foreigners, and the air resounded with foreign tongues. In this respect Bruges can be compared only with Venice.

For the Flemings the strangers were like the sea which washed their shores; a blessing and a danger in one. They lived by them and at the same time resisted them, protecting themselves against them in their laws, until they were finally ruined by the rigid barriers they had erected. For when they raised ob-



A plan of Ghent. From "Flandria Illustrata sive descriptio comitatus Flandriae etc." Antonius Sanderus. Hague 1732-1735.

stacles in the way of foreigners and the innovations which came from abroad, restricting the freedom of international relations, foreign trade withdrew from their cities like the waves of the sea from the silted harbour of Bruges. Antwerp, flourishing and liberal minded, the "city of all nations", now attracted all the wealth. Life in Flanders grew still, streets, harbours, and squares became deserted. "Tout semble aller à pas logiques - Vers l'horizon où luit la mort" wrote Verhaeren of this period. Gradually Flanders became only the monument of its own glorious past.

But before that happened, before, as Verhaeren put it, "custom had so barricaded itself against the assault of the new, of the future" that the country became almost petrified, that is in the age between the 7th and the 16th centuries, Flanders enjoyed a unique position in Europe. In every sphere of life it pursued a development different from that of other countries, and attained to heights which filled the rest of the world with astonishment. Even Guicciardini, the 16th century Florentine

historian, was amazed at the education of the common people, even the peasants could read and write. As for music, the Florentine considered them its true masters, "it is native and completely natural to them". He admires not only the great masters who perfected the art, but the love of music and singing which prevailed throughout Flanders. The angels making music on van Eyck's famous painting, singing children and peasants portrayed by Flemish artists, show plainly that the painters had ample opportunity of watching musicians.

For beauty of architecture Ghent, Ypres, and Bruges, might be compared with many royal cities. The buildings were not palaces of kings and nobles, but, apart from churches they were guild-halls, and the houses of wealthy merchants. They are unmistakably Gothic in style, following the spirit of the age. At the same time they seem imbued by another spirit, not so light and graceful, not soaring upward with the single-heartedness usual in the Gothic style, but massive and great, with decorous dignity. That is the style

suited to this people which we know so well from the paintings of the period; robust, strong-willed men who delighted in the good things of the earth, in wealth and good living, and whose deep piety did not impel them to forsake the world but to a genial understanding and love of it. It is the architecture of the robust, realistic, and at the same time boldly imaginative, people of that country. The culture of Flanders was neither courtly nor eccle-

siastical, but that of wealthy municipality. Its creators and patrons were citizens. In this respect only Athens and Venice can be compared with the Flemish cities, which thanks to their own energy were independent republics. The power of these cities, their wealth, their fame, and their fate are bound up with the textile industry, of which they were the outstanding exponents throughout the Middle Ages.

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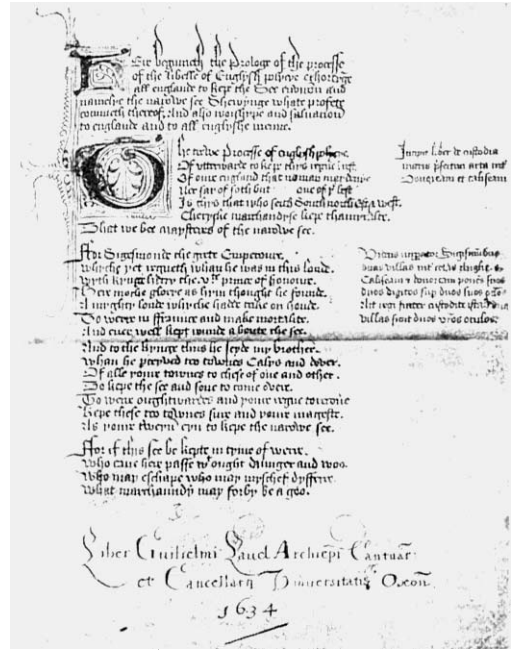
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Cities being built, cities being burnt, revolt, war, periods of prosperity and extravagance, times of decay and dire distress—the annals of Flanders are rich in all these. Its history is the most varied of any European country, and is the more involved through the extraordinary factors by which it has been formed; innumerable towns, each with its peculiarities, the sovereign with his personal aims and those of his dynasty, his vassals in their turn, each one pursuing his particular policy, the rural districts with their needs and problems, the surrounding countries with their repercussions on Flanders, the Church and the many religious movements of the Middle Ages. All these factors must be considered in a just estimation of the forces which made the country.

Nevertheless, there is in the history of Flanders, the complexity of which is frequently stressed by historians, a centre with

The Monument of Pieter de Coninck, who in the 13th century led the rising of the weavers against the patricians. Great Square, Bruges.



First page of the "Libelle of Englysh Polycye". This didactic poem was written about the year 1436. It mentions at several occasions the trade between England and Flanders and emphasizes the political dependance of Flanders from England. Bodleian Library, Oxford.

which many, sometimes perhaps all these factors, are bound up. That centre, from which every movement springs, and in which every movement ends, is the textile industry. "Save the cloth-trade", reads one appeal in a period of distress, "for that is the life of our city". That cry of despair is not an exaggeration. Cloth-weaving was indeed the life of these cities, just as it became the cause of their decline, and later the agent of their partial recovery.

The very origin of the Flemish cities is due to the textile industry. For unlike most other European towns, in France as well as in Italy, on the Rhine and on the Danube, they are not of Roman origin, and were not originally military or administrative stations of a great empire.

The Flemish towns were founded in the early Middle Ages. Following an ancient tradition, the people of the country manufactured textiles which were unsurpassed in all Europe, and which even in the 9th century were traded

all over the world. Merchants from northern Italy and France came sailing up the large navigable rivers of Flanders to buy the famous "Frisian cloaks" as the Flemish cloths were called. They too brought goods with them which found their way farther into Flanders. In bays, at the mouth of a river, or at a point where a river ceased to be navigable, and where goods had to be unloaded, junctions of international trade developed. Possibilities undreamt of elsewhere in Europe, which was at that time almost entirely agricultural, attracted adventurous spirits from far and wide. They came from every country and settled in Flanders. In this manner the oldest and greatest of the Flemish cities developed: Bruges, Ghent, Mechlin, Douai, Ypres. The rise of the other cities was similar. It is significant that throughout the Middle Ages the word for town was "poort", literally port, and poort was also the word for citizen.

Whatever the adventurers who congregated in these new towns might have been at home, here they were all free, and dependent solely on their work as artisans, watermen, porters, stevedores, merchants. Comradeship and equality, not superiority and subjection as elsewhere in the feudal world, were the principles governing life in these colonies. Thus the forms of administration and the legal organization in the cities differed widely from those of the rest of the country. Further-

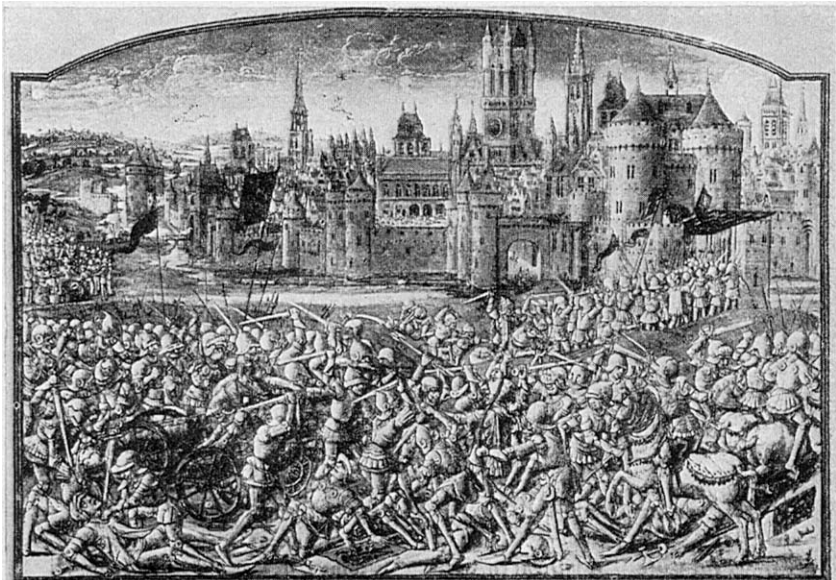
more, the existing economic system based on barter and taxes paid in kind proved too unwieldy for an industrial and trading community. In order to be able to live and follow their professions, the inhabitants of the new towns had to found new institutions, to build up new forms of life.

The more the industries of the cities developed, the stronger became their wish for a system of laws suited to their own needs. Their wishes were lent added weight by the fact that the crusades, which had expanded the industry and trade of the commercial cities, had at the same time impoverished the barons and princes. In return for material services and financial assistance, the towns succeeded in acquiring privilege on privilege, till finally, in the 11th and 12th centuries, they acquired the charters which made them independent republics—each town a little world in itself.

The wealth, power, and culture of the Flemish cities are among the most important factors in the history of medieval Europe. The struggles which they kept up against the ruling powers in preservation of their independence, are among the most important features of Flemish history.

Thus, in the 11th century the Flemish weavers took the side of the Pope against the bishops in the great struggle between the papacy and the emperors on the question of the investing of bishops. The driving motive

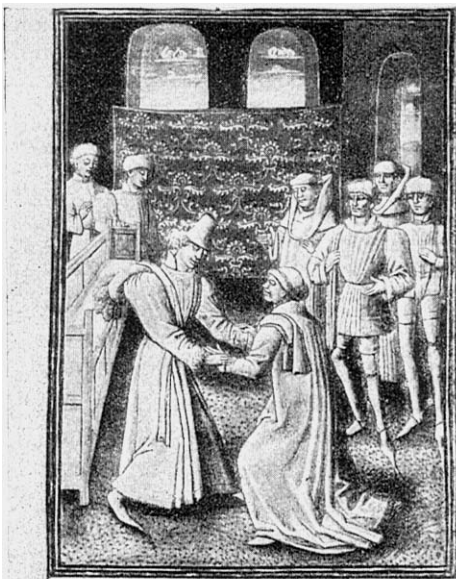
Victory of the army of Ghent under Philip van Artevelde before the gates of Bruges, in 1381. Miniature from the chronicle of the French historian Jean Froissart (1338 to 1405). 15th century Manuscript Breslau.



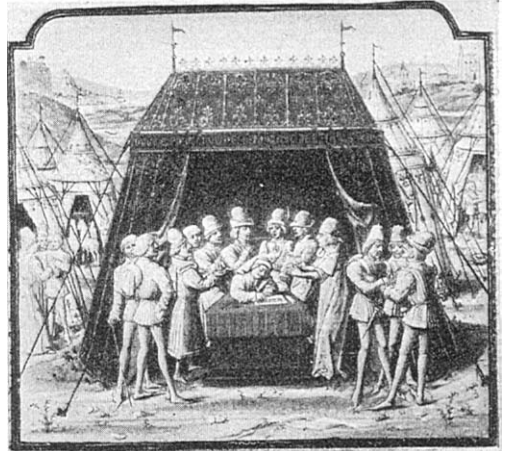
of the Flemings was their deep piety, the piety of men who live in perpetual danger, but a strong incentive lay in the fact that the bishops opposed the weaving cities in their struggle for independence. At any rate, the cloth-makers immediately set up a free municipal republic, whenever they succeeded in dislodging an insubordinate bishop from his castle. On the other hand, they preserved a strong allegiance to those princes who respected their privileges, and did not hesitate to take arms against the king of France, Louis VI (1108-1137), in order to avenge the murder of the Flemish count Charles the Good. It was the cloth-makers of the Flemish cities who found a new tenant for the murdered prince's throne, by summoning a member of a foreign dynasty, Dietrich of Alsace, instead of the candidate of Louis VI.

Even more momentous were the results of the foreign policy favoured by the cloth-workers. In the Hundred Years' War between France and England (1338-1453) they were on the English side, had even helped to bring about the struggle, and it was their active assistance which contributed to the

English ambassadors soliciting an alliance with the Duke of Flanders. From the Breslau manuscript of Froissart. 15th century.



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Dus sauez coment les parlemens furent tenus en la cite darras. Et com

Signing the peace treaty between England and France in 1360. From the Breslau Froissart. 15th century.

triumph of the English arms which was finally checked by Joan of Arc. The reason for their partisanship was that English wool, from which their best cloths, the most famous and most sought after in the world, were made, was a vital necessity to the weaving centres. And when at the end of the 15th century they equally whole-heartedly took sides with France in her war against the Emperor Maximilian I (1493-1519), the reasons for this partisanship were also to be sought in the needs of the wool trade. The emperor had not opposed the imports of the English weaving industry which had recently developed, and thus a dangerous competitor to the Flemish textile trade had grown up.

The iconoclastic revolt of 1556 which marked a turning-point in the entire history of the Netherlands, originated among the cloth-workers. With the religious fanaticism of the mob which for three days surged through the country burning and destroying, was linked the hate of the weavers; for the Spaniards, the upholders of the Catholic Church, against whom the hate and destruction of the rebels was directed, were considered to have encouraged cloth-weaving in

the rural areas, which had done great harm to the industry in the towns.

All these events were the more complicated by the social struggles which went on in the cities themselves, and which did not only determine the fate of Flanders, but had their repercussions abroad.

The reason for these struggles lay in the vast wealth amassed by the cloth-merchants, which ran counter to the principles of the weavers. For the idea of equality for all had always been strong in the weaving cities. The cloth-merchants, probably the wealthiest men in 13th century Europe, usurped all power in the cities and shamelessly exploited the weavers. The latter, in the eyes of the law free citizens and the equals of the merchants, regarded this as an intolerable injustice. Unrest was rife, and strikes repeatedly brought all work to a stand-still. Executions and banishment of weavers, fullers, and other cloth-workers were the answer to these movements. The weavers retaliated with fierce revolts in several cities, in Douai (1245), Bruges, and Ypres. The weavers of Bruges under the leadership of Pieter de Coninck, regarded today as a national hero in Belgium, wrought a massacre among the patricians, as the merchants called themselves, and their French allies, afterwards seizing control of the city. But after the battle of Cassel (1328) which Philip VI of France directed himself, the patricians were reinstated. Then followed



The future Emperor Charles V entering Bruges as a boy of 17, in 1515. Through his son, Philip II, Flanders became a territory of the Spanish Habsburgs. Miniature from a manuscript in the State Library, Vienna.

a reign of terror for the people. At this, Jacques van Artevelde, a patrician by birth, but tribune in Ghent, went to England, and placed at her disposal the entire robust strength of the people of Ghent. War between France and England followed. Simultaneously



The battle of Roosebroek in 1382, in which the army of Ghent was led by Philip van Artevelde. From the Breslau Froissart. 15th century.

the people of all the Flemish cities rose in sympathy with Ghent. The revolt even spread to Paris, for there, too, there was a rising of the poor under Etienne Marcel. "Vive Gand" was everywhere the cry.

Finally the French King succeeded in inflicting a defeat on the "horribles tisserands", who were led by Philip van Artevelde, a son of Jacques, in the battle of Roosebroke (1382). It was a defeat from which they never recovered, for meanwhile the source of all their

strength, the textile industry of their cities, had begun to decline.

That was the end of Flanders' importance. From an active factor in history it sank to a helpless object of foreign forces, the dowry of foreign princes, and the scene of their wars.

"La pluie à tomber là s'ennuie

Tout son de cloche y semble un glas—" wrote Verhaeren sadly of those sleepy towns whose wealth and brilliance once dazzled the world.

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The Social Organization of Cloth-Making

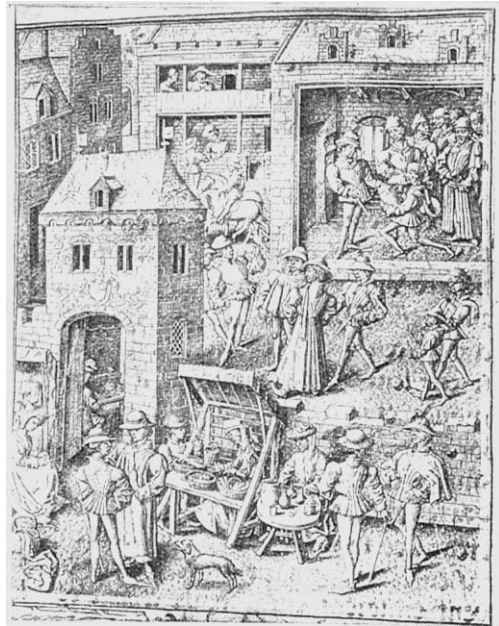
By A. L. Gutmann

Accounts of social conditions in the early period of the Flemish cities read like a description of the "Golden Age". These towns were settlements whose members were all free and independent, and who regarded the town as their common property, for the welfare of which they worked together. "Unus subveniat alteri tamquam fratri suo", "Let one man help another as his brother", was a rule of the town of Aire, and it might have applied equally to any of the other Flemish towns. There were differences of work, but not of rank.

This wonderful harmony ended with the rise of weaving brought about by the Crusades. From that time on the cities of Flanders were complex societies full of internal and external conflicts.

The citizens of the highest ranks no longer lived by the work of their hands, but let others work for them, much as did the nobility, with whom they frequently intermarried. They amassed enormous wealth, which they invested in houses, in property outside the town, or in rare works of art. They were the patrons of the arts, lived in splendid houses, and wore clothes and jewellery which excited envy even at the courts of princes. And at the other end of the social scale: hordes of starving and ragged workmen, who slunk about the streets, or huddled together in a square appointed for the purpose, waiting for someone to hire them, scarcely to be considered as citizens.

Nowhere except in Flanders were such conditions to be found at that time, but in Flanders everywhere. The reason for this is that the social organization of these towns was



Scene from a Flemish town. 1450. Miniature in grey and gold from a chronicle in the Royal Library, Brussels.

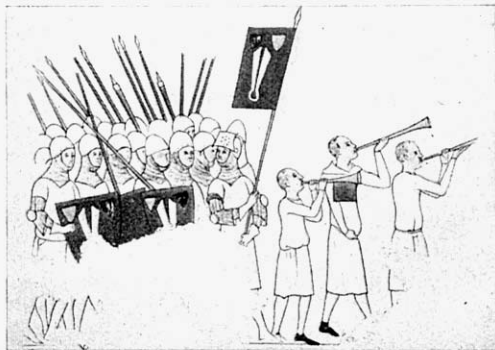
determined by the textile industry, and the latter, the first and greatest export industry of the Middle Ages, was more complicated in structure than any other.

Whereas normally the craftsman both owned the raw material and sold the finished article, these functions were divorced from each other in the Flemish industry. The artisan was an artisan and nothing else, he did not possess the means to buy the raw materials, especially the fine grades of wool imported from England. He was not allowed to sell the cloth under pain of severe punishment, and could not in any case have done so, as he neither had access to the cloth-halls of his native city nor to the great European markets.

The cloth-worker was only an employee. The work was allotted to him by a wealthy citizen who imported wool from abroad in large quantities, had it made into cloth, and who sold the finished article.

Thus it was inevitable that the artisan should be entirely dependent on the merchant. He worked only when and to the extent determined by the merchant, who paid him what he thought sufficient. For as the cloth-merchants had formed companies in every town, which

Trumpeter, standard-bearer, and men-at-arms. From a fresco in the Chapel of St. John, Ghent.



might be described as a kind of trusts, they were in a position to dictate terms without finding any resistance, the more so as all power in the city was vested with them. The sheriffs, who made and administered the laws and managed the business of the city, could only be drawn from the merchants' guilds, and never from those "ki a li ongle ble" (whose finger-nails were blue), that is from the ranks of the workers.

The merchants formed the governing class, the "Here", did service in the militia as cavalry, and claimed on all occasions special treatment. It would, however, be wrong to suppose that all workers were on the same level. Though they were all dependent on the merchants, there were degrees of dependence. There was not one but a number of crafts concerned with cloth-making, those of the spinners, weavers, croppers, fullers, dyers etc., each of which had different technical and material requirements.

First there were the wool-workers, who washed, combed, and sorted the wool. This was the easiest work, requiring no preparation and but little practice. Nor was any fixed apparatus or machinery required, so that the work could be done anywhere. It was generally performed by women, boys, strangers, or unemployed weavers. They were not organized in any way, a mass of people from among whom the manufacturer picked out as many



Banner of the fullers of Bruges. 1386.

as he required. They assembled at fixed places on certain days, were hired for a specified period, and worked under supervision for a wage determined at the discretion of their employer. They were not craftsmen, but casual labourers, "proletarians", not known elsewhere in Europe till a much later period.

At the other end of the scale were the dyers. Their trade required a specially equipped workshop, considerable expenses, and a long apprenticeship, as it comprised varied knowledge and accomplishment. And that was not



Members of different classes in the square of a Flemish town. A document is being read from the steps of the city hall. From a late medieval manuscript. Royal Library, Brussels.

all. A first-rate craftsman must possess taste and a natural sense of colour-values. Thus, the *personality of the dyer was of importance*, the more so as the charm of a cloth appeared to lie in its colour, so much so that the merchants bought undyed cloths and had them dyed according to their own taste by a skilled craftsman of their own choice. This gave them a certain independence with regard to the merchants. They worked at home, had private customers, and also had a voice in the determination of their wages. They were the *aristocrats among the cloth-workers*.

For even though all other cloth-workers, the weavers, fullers, and croppers were in a much better position than the wool-workers, they could not be compared with the dyers. Most of these craftsmen had their own workshops, employing labour engaged and trained by themselves. Their work was hard and responsible, thus giving them a certain standing, but their dependence on the merchants was also great, as they had no raw material of their own, and never saw the customers who purchased the fruits of their labour. The merchants strove by means of laws which they passed as sheriffs to increase this dependence. They restricted the number of looms, the hours of work and number of assistants, or forbade the craftsmen to have any other occupation. In short they strove by every means to prevent the cloth-makers from working their way out of their precarious position between poverty and affluence.

By means of a close organization the weavers sought, as did the fullers and croppers, to resist the pressure from above. They founded guilds and brotherhoods with an exemplary spirit of community. As the members of these organizations made up a large part of the population, they formed a power in the cities which for good or for evil had to be reckoned with.

Embracing as it did all economic and social orders from the great merchant at the head of



Portrait of the cloth-merchant Giovanni Arnolfini, Bruges. By Jan van Eyck (ab. 1390-1441). National Gallery, Berlin.

a widespread organization, the small craftsman in his workshop, down to the casual labourer, the influence of the cloth trade as a social factor went still farther.

The clerks, accountants, and other assistants of the merchants, the inspectors of work, the agents, the inn-keepers, who were charged by the city to minister to the wants of the foreign merchants who came to the city, all were in some way connected with the cloth trade. There was nothing in the cloth-cities which did not thus receive its real meaning and character. The province of Flanders itself, covered with innumerable of these bustling cities is like one of those fantastic landscapes, unreal and yet real, which the great artists of the declining Middle Ages loved to paint.

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The Distribution of the Flemish Textile Industry

By A. L. Gutmann

When cloth-weaving in Flanders is mentioned, one generally thinks of the large cities of Bruges, Ypres, and Ghent, which were, of course, the most famous centres of medieval industry. And if, besides these great cities, a number of other centres, large and small, are considered, where the industry was carried on on similar lines, it is often thought that that exhausts the subject.

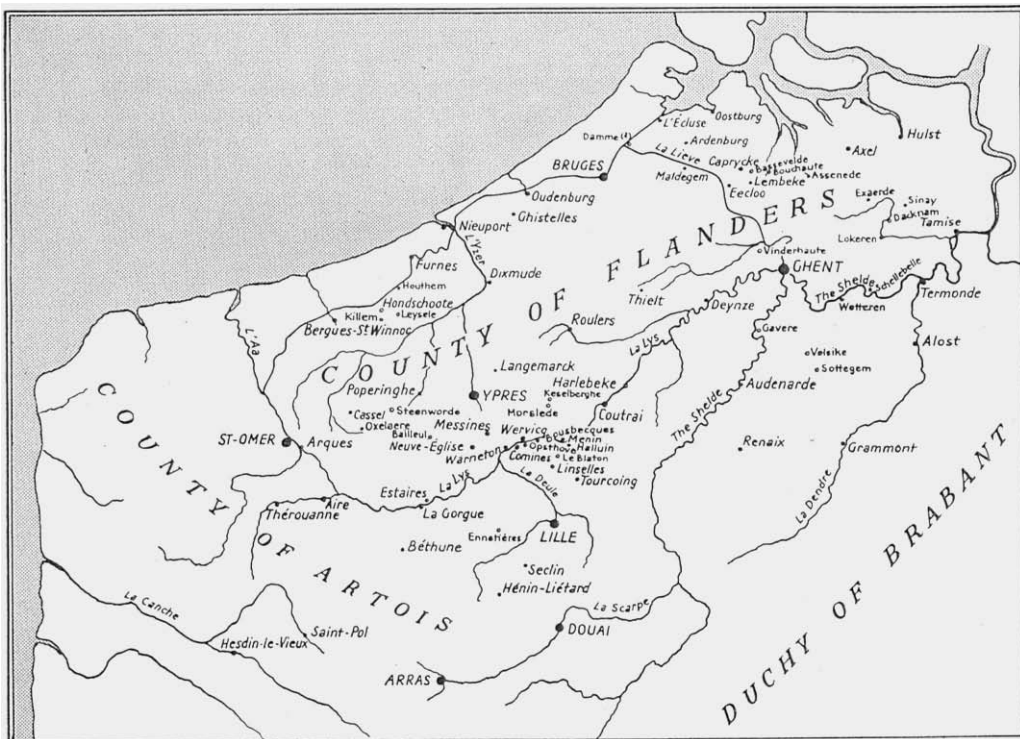
That is by no means the case. The textile industry of Flanders is a very intricate historical phenomenon, which cannot be summed up so easily. Not only did the industry develop in the course of time, as is but natural, but every stage in the development remained preserved. Thus there were always several types of cloth-weaving. One, adapted to the prevailing spirit of the time, was dominant and flourished, the others, living partly in the present, and partly in the past, existed in the shadow of the first. Not infrequently, a seemingly unimportant branch came to the

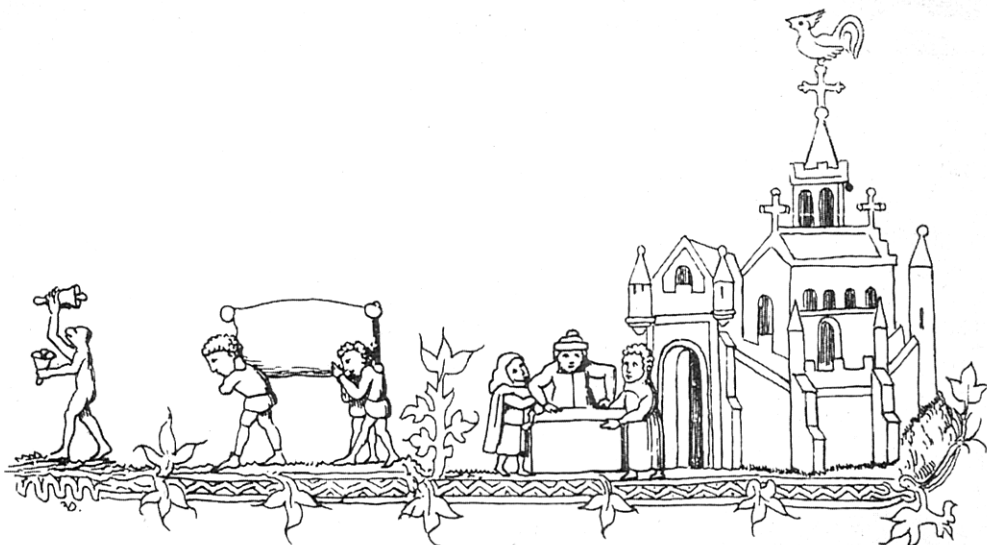
fore, and displaced the one leading at the time, until finally all lost their significance.

Weaving in the monasteries

The oldest and most primitive weaving establishments of Flanders were the monasteries. Just as in Tuscany, the other great weaving centre of Europe, there were monasteries famous for their textiles long before there was any evidence of the industry in Florence, some Flemish workshops founded by monks were famous before the rise of the cities, that is, before the 9th century. Among the most important were the monastery of St. Bertin, situated on the site of what later became the textile town of St. Omer, and the Abbey of St. Vaast, the forerunner of the famous city of Arras. They were the heirs to the weaving-technique of the ancients, and for a long time the only people who attempted to carry on weaving on a large scale. That is not surprising, for at that time only monasteries, abbeys,

Flanders before the 15th century. The towns marked on the map were at that time engaged in cloth-weaving. After Espinas and Pirenne.





The regulated Flemish cloth industry in the 14th century: Checking a bale of cloth; workmen removing the bale. Instead of a man, a monkey goes before, ringing a bell. From the 14th century trade-book of Ypres, destroyed during the Great War.

and bishops had the means at their disposal which were necessary to carry on weaving, and only in these places, under the protection of the Church, was there the quiet and security necessary for the development of a craft. The organization of these monkish workshops was patriarchal and independent. The raw material, produced from their own sheep, belonged to the monasteries, as did the workshops and the finished goods. The workmen were serfs.

Cloth-weaving in the towns

When, from the 11th century onwards, the new and free centres of industry began to develop, the bishops at first attempted to retard their progress, and then to copy their methods. Finally, they were obliged to give way to the new competitors, and to confine themselves to an industry working for a very limited area. Municipal cloth-weaving held undisputed predominance. Whereas for the monks the industry had been a factor of secondary importance, for the cities it was the basis of their livelihood, and the centre of their existence. The goods produced in the city bore its seal, and the city's good name depended on their quality. For that reason city inspectors examined every piece of cloth while it was being made, and regulated everything concerning the trade down to the last detail. Hours, place, and method of work,

number and training of workmen, their engagement and dismissal, the dealings with customers, the buying of the raw material and the sale of the finished cloth—all these matters were governed by strict rules, the infringement of which was severely punished. The craftsmen were free citizens of the town, they identified themselves with the community, and regarded its fame and wealth as a point of personal honour. The prevailing system of division and specialization of labour and the strict official control produced a standard of craftsmanship unsurpassed anywhere in Europe.

Weaving in the rural areas

It is not surprising that the towns were opposed to the cloth-weavers of the rural areas, who caused them severe competition. From the 14th century on the peasantry took to weaving, greatly to the detriment of agriculture. The country weavers copied the world-famous stuffs of the cities, and even their seals, without even remotely approaching the standard of quality of municipal weaving.

That was quite out of the question; not only was there no tradition of quality, there were neither regulations to govern nor inspectors to check the work, all the factors which raised and maintained the standard of quality in the cities were lacking.

Absolute freedom from restraint, with all its advantages and disadvantages characterized rural weaving. Everyone was admitted to the work. There was no question of obligation on oath to produce only work of first class quality. Specialization was not taken too seriously; frequently the same master was in charge of different processes.

The organized craftsmen of the cities did all they could to put down this unscrupulous competition. Armed expeditions were sent into the weaving districts, and all looms, raw materials, and finished goods destroyed. Above all, a kind of blockade was introduced to prevent the rural industry from procuring English wool. The peasants were shrewd enough to make a virtue of necessity. They concentrated on inferior Spanish wool, and produced light, cheap goods. And whilst the cities, weakened by social struggles and by English competition, began to decline, the rural weavers with

their second-rate goods began to conquer the world market. All that was produced in these districts found an easy market; and the quantities were large. Armentières, for instance, turned out 25000 lengths of cloth a year.

The towns, meanwhile, like the monasteries some centuries previously, had to remain content with a reduced production, working merely for a local market.

The great rise of rural weaving came to a sudden end. The religious persecutions of the 16th century drove many craftsmen from their homes. In 1567 Queen Elizabeth granted Flemish weavers the permission to found an industry in England similar to that of rural Flanders. This was a severe blow to the "small cloths", the last phase of Flemish weaving. The industry became more and more insignificant. It maintained a shadowy existence throughout the 17th century, finally disappearing in the 18th.

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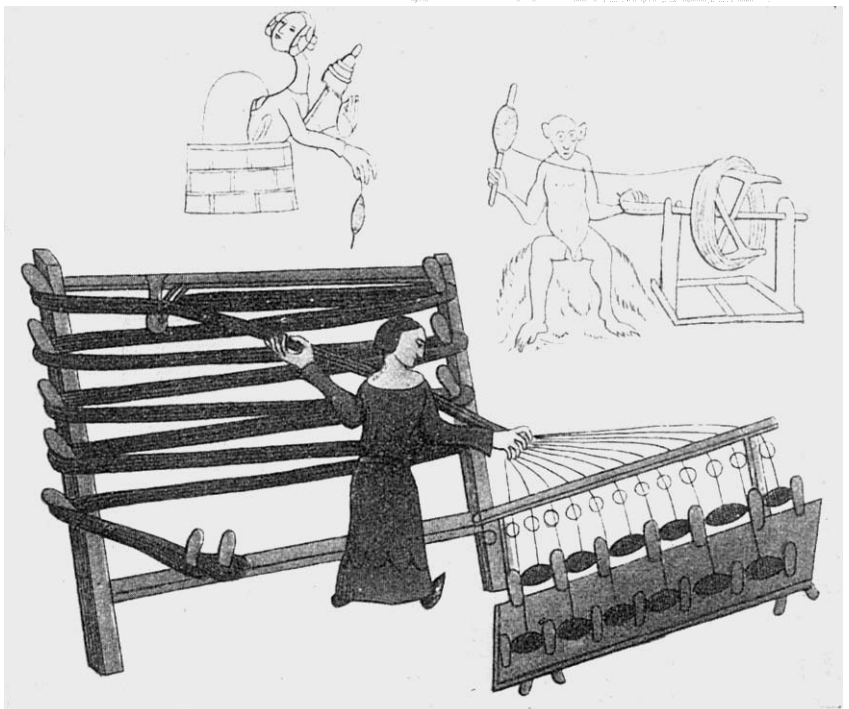
Technical Peculiarities of Flemish Cloth-Making and Dyeing

By A. L. Gutmann

The most surprising thing about the Flemish textile industry is that this first great export industry was in the main a luxury trade. Strange though this may seem nowadays, when export goods, cheap commodities, and mass-production have become almost synonymous, it is easily explained by the general economic conditions of the Middle Ages.

Materials for daily use were produced everywhere in that period of small, self-sufficing economic centres. There was no need to import them at great pains and considerable danger from distant countries. Only when luxury-articles were desired, no risk was too great. Anything colourful, brilliant, or unusual was the more desirable as it was a symbol of greatness and a means of increasing the owner's prestige. It is therefore not surprising that a country like Flanders, where gorgeous stuffs were produced, achieved world-wide renown, and developed an international trade that was unheard-of elsewhere. Even Charlemagne (764-814) regarded Flemish cloth as so valuable that he sent some as a present to Haroun-al-Rashid. The fact that Flanders enjoyed such

superiority for centuries is due in the main to geographical conditions. The soil, especially in the maritime districts with their frequent floods, was moist; in other parts it was dry and chalky. Both kinds, though for different reasons, were admirably suited for grazing sheep. The clayey soil also provided excellent fulling material, and dye-plants, madder, woad, and weld flourished in meadows well watered by numerous streams. Nor was there any lack of natural water reservoirs as required by the cloth industry and especially for dyeing. Thanks to these natural conditions, wool-weaving developed in Flanders at a very early date, and achieved a technical perfection which assured its predominance even when raw material from other countries was preferred to its own. For it soon became evident that English wool was much better, silkier, softer, and longer than that of Flanders itself, nor were the native dyes so good as those imported from abroad. England had at that time nothing better to do with her incomparable wool than to sell it to Flanders. It was not until Flemish weavers and fullers had intro-



Warping the thread. After the 14th century Flemish tradebook. The caricatures above are from the same manuscript.

duced their methods of dyeing and fulling into England that cloth was produced on English looms which could compete in the international markets. English wool and Flemish technique long remained the recognized formula for first-class cloth, whether made in Flanders from imported English wool or in England according to Flemish methods.

The secret of the Flemish methods of cloth-working which made the cloths of Flanders superior to any in the world, is unknown to us. Some years ago two indefatigable investigators of the history of Flemish weaving, Henri Pirenne and Georges Espinas systematically studied every available document, but in spite of the philological and technological apparatus with which they went to work on the documents, the problem remained unsolved. Just as the secrets of the superb Italian violins, and some details of the technique of bygone painters are lost to us, so it is with most of the methods of the Flemish cloth-workers, and particularly the dyers.

Though the available records do not suffice to give us a detailed technical knowledge, they leave no doubt as to one feature which may perhaps be described as distinctive: the extraordinary degree of specialization. The process of production was shared by well-nigh seventy different specialists, a figure which reminds one of American methods of today.

The very first steps were specialized. Native and English wool were kept separate, and each was sorted according to the province or even town of origin. The wool of live sheep was carefully separated from that of the dead carcase, that of old and young animals also being kept apart. It was strictly forbidden to mix any of these kinds. From the very beginning they were regarded as the basis for different kinds of cloth, and were treated the more carefully, the finer their quality. Inferior grades of wool were not used at all, a rule not even so strictly observed in the highly developed textile industry of Florence.

In every succeeding stage of the process questionable methods were rigorously banned, especially where good material was used. Thus great care was taken to use only combed wool, especially for the warp-threads, and if cloth of the finest quality was being made, the same rule was observed for the weft. Distaff-spinning was preferred to wheel-spinning, as it yielded a stronger, more firmly wound thread, albeit somewhat thinner.

*Standard-bearer
of the wool-shearers
of Ghent. 14th century.
From a fresco in the
Chapel of St. John,
Ghent.*

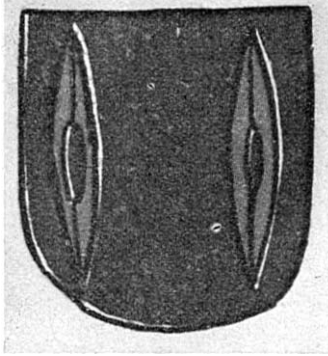


Of the actual weaving, although (or perhaps because) it was the basic part of cloth-weaving, nothing detailed is known. Mention is made in the regulations of the number of threads to be used for the various qualities, and also the length of the various pieces of cloth. The better the wool, the closer the threads and the longer the piece. The pieces varied in length from 9 to 56 yards and the number of threads from 1000-3000, 24 threads forming a knot. The technical reasons for these figures are not clear, and the records give no explanation. Weaving was learnt by practice, there was no need to codify it. On the contrary—the jealously guarded details of the Flemish textile craft could only be in danger of becoming common knowledge if put into writing.

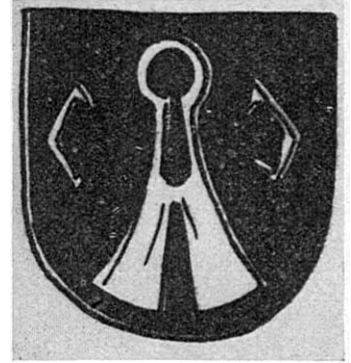
After the cloth had been passed by the official examiners it was taken over by the fullers. In contrast to other cloths of combed wool both then and now, Flemish cloth was always fullled so much as to give it a completely smooth surface, and to obliterate the tie.

Before the actual fulling the cloth was placed for some days in a tub containing loamy earth; this was to remove all fats and dirt which might adhere to it. The use of soap

*Late medieval
arms of the
Flemish
weavers.*



*Arms of the
wool-shearers
of Ghent.
15th century.*



or urine for the removal of fat, which was customary in many places, was forbidden in Flanders and in some cases even punishable by imprisonment. Fulling by stamping the cloth with the feet was preferred to the use of fulling-mills, which, though known since the 11th century, were never very widely used.

After being ungreased or scoured, the cloth was carefully rinsed, and while still damp was felted by rubbing between two cards. In cases of very fine cloth this process was repeated two or three times. The motion of rubbing was generally from top to bottom, only once or twice in the opposite direction in order to remove coarse threads. First blunt carding instruments were used; at each repetition they were exchanged for newer and sharper ones. The process was continued until the cloth showed the close velvety surface of which the Flemish weavers were so proud.

Then came the task of the croppers. The “ramscheerers” cropped the damp cloth; this was comparatively simple work. The cropping of the dry cloth, the “droscheerden” was confined to cloths of the best quality. If the material had not previously been dyed, either in the wool or thread, this was done between the first and second cropping.

The time for dyeing was not chosen without reason; it was governed by certain technical reasons. For cloths containing several colours, e.g. checked, pepper-and-salt, or web patterns the wool was dyed before weaving, as the pattern could only be produced by grouping the threads as required. Plain cloths—they were often the finest—were sometimes not dyed until after they had been sold. Commercial as well as technical considerations decided this; the best cloths were for very sophisticated customers who did not wish to buy a ready-made article, but preferred to choose

the colour of their clothing themselves. How important such shades of colour were to the trade is shown by names like “Appelblossom-laken”, or “Perkers-blossom-laken”, apple bloom and peach bloom cloth. These were not imaginative names, but generally accepted designations indicating the shade of certain Flemish cloths.

In Flanders as elsewhere dyeing consisted of two processes, which were so strictly separated that it was forbidden to carry them out in the same workshop. The first stage was that of cleansing the cloth and preparing it for the dye by means of a mordant. Alum, ashes, especially of conifers, or instead of ashes slaked lime, these were the mordants most frequently used in Flanders. The composition of the mordant varied with the quality of the material. The merchant frequently supplied the carefully dosed mordant himself, often supervising the process to make sure that it was carried out as he wished. The same bath must never be used twice, and it was forbidden to prepare more than one per day. After use the liquid was emptied out in front of the house, to preclude all doubt as to its fate.

For the actual dyeing but few dye-stuffs were used by the Flemish dyers, who were,



*Arms of the
Flemish dyers.
15th century.*

however, very cunning in mixing and blending them. The most important were: brazil-wood, madder, woad, and weld. It was considered very important not to mix native and imported madder, and to buy brazil-wood in whole pieces. The oldest dye produced in Flanders appears to have been madder. At any rate the so-called "Frisian cloaks", the first Flemish cloths, were blue. The dye was procured by fermentation in the vats, and was therefore known as "bleu de cuve". Unwoven wool, or cloth were dipped in vats containing woad, chalk, ashes, and bran, in what quantities we do not know. By means of small hooks such as are still used by plain-dyers, and are to be seen in the oldest picture of dyeing which we possess, the material was turned over in the water, apparently to prevent oxydation caused by contact with the air. Indigo was known, but it was only used for dyeing leather or wood and by painters. Apparently its effect on cloth was not sufficiently well known, and it was regarded as "mysterious".

The famous green of the fine Flemish textiles, which we admire so much in contemporary paintings was produced according to shade either from pure woad or by adding varying quantities of weld to woad, a procedure peculiar to Flanders. The Florentine dyers produced the same result by allowing weld to act on woad-blue. Contrary to general practice Flemish plain-dyers did not produce black by using first woad and redyeing with madder or weld; they used alder-roots instead. For that reason black-dyeing was also known as root-dyeing.

Red shades were produced by means of madder or a mixture of madder and brazil-wood. Sometimes especially fine cloth was dyed with kermes. Violet tones were produced by dyeing first with woad then with madder. In the 11th and 12th centuries the finest of the cloths woven in Flanders were dyed at Florence. Gradually, however, dyeing appears to have become technically the most highly-developed branch of the Flemish textile industry, and by the 13th century the partnership between Flanders and Florence was no longer necessary. By the end of the century Flanders was able to execute independently orders for the greatest and most sophisticated patrons. Splendid stuffs for the French court, the Dukes of Burgundy, the Countesses of Artois, for which no price was too high, were now made in the workshops of Flanders.



14th century Flemish fuller. From the trade-book of Ypres.

Their wealth of colours was greater than anything that their rivals could produce, just as the Flemish painters in the respect surpassed all others, even the Italian masters. Ten red, six blue, and three green shades, several kinds of black, grey, and brown, as well as innumerable mixtures, all these offered a great deal of variety in an age which loved rich and brilliant colours.

The technical superiority of Flemish painters and dyers may perhaps be ascribed to climate conditions. The many sheets of water which mirror and refract the colours, promote susceptibility to colours, and also demand good quality in paints and dyes, as the damp climate would otherwise speedily destroy them. Here as elsewhere it was the will to perfection which created the means of attaining it.

Viscose rayon yarns and fabrics
dye level and solid with

Rigan Colors

The noun “drapery” and the verb “to drape” both derived from the French word “drap”, cloth, indicate a certain tendency of style determined by the material. A dress may be close-fitting or loose, either emphasizing or masking the lines of the figure. Of these two functions the latter is most in accordance with the nature of cloth. Its texture will not permit it to fit closely, especially if it be the good, heavy cloth made in Flanders. But if it cannot, like more delicate fabrics, at the same time veil and enhance the lines of the figure, it has another decorative quality peculiar to itself. By draping the body in a complex of folds with their heights, depths, intersections, their effects of light and shade, it seems to impart to the wearer an additional significance. The body disappears in the folds of the enveloping robe, but the wearer assumes an aspect of dignity and majesty.

It would be idle to ask whether the highly-developed textile craft influenced medieval dress or vice versa. What can be established

is a strong influence and counter influence. As the social estates became more clearly defined the general fashion of short smock-like tunics became inadequate. For people of high social rank long voluminous robes—for men as well as women—seemed a much more appropriate dress. The men appeared more dignified, the women more graceful, and these qualities were heightened still further by the sober magnificence of the material. The textile industry of Flanders, whose cloths gave the most impressive folds, and which offered the finest dyes, formed ample incentive in the rich fashions of the day. The stuffs produced became increasingly fine in quality, and clothes accordingly more splendid and impressive until they reached that wealth of form and expression which we admire in those illustrations of costumes which have come down to us.

The nobler and wealthier the wearer, the richer was the fall of the draperies, the more magnificent the colours—that was the first

Differences of rank expressed by late medieval dress: Right: nobles and wealthy citizen; left: scholars and clergy. In the background women of various classes. From a 15th century manuscript. Royal Library, Brussels.





Flemish fashions in 1500. The heavy cloth outer garments are cut so as to reveal the under garments. Painting from the school of Gerard David (1460-1523). Museum of Bruges.

principle of dress. When, after endless study of the archives, the city of Bruges reproduced a medieval pageant in 1848, the Count of Flanders rode at the head of his retinue wearing a wide mantle of purple cloth. The knights accompanying him were clad in cloaks of gay colours, yellow, green, orange, dark blue, red. The sheriffs who received the count were dressed from head to foot in red. The clothing of the citizens was slightly more subdued, and varied in richness according to the rank of the wearer. How voluminous the dress of the period must have been may be guessed from the way in which Memling, who painted the history of St. Ursula for the Hospital of St. John in Bruges in 1486, represented the saint as sheltering ten nuns under her mantle. At that time the fashion for flowing draperies was on the wane, but the exaggerated width of the mantle allows of some conclusions as to the actual fashions.

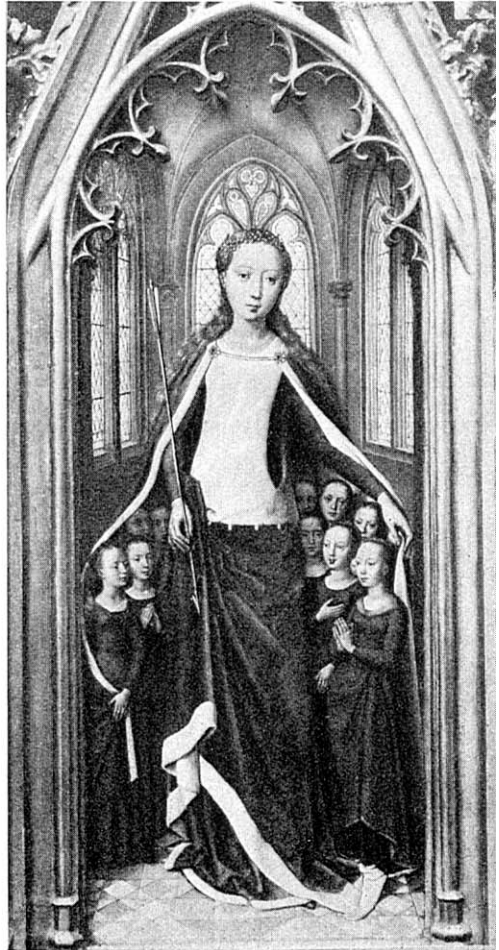
It is characteristic of fashions in general that they appear to exist only for one age, class or form of life. Take as an instance

women's fashions in England during the Victorian era: young women appeared not to exist at all. The fashions were such that they suited only middle-aged or elderly women.

The medieval preference for cloth, which was predominant from the 11th to the 14th century, gives the impression of being suited only to a mood of spiritual elation. When that mood, which was kept alive in Europe for two centuries by the Crusades, had passed the fashion also declined. Love of material success, of wealth and luxury, demanded expression. Velvet, Italian silks, taffeta, brocades worked in gold and silver, became fashionable, as well as linen and fine cambrics.

People took such delight in these materials that the outer garments were slashed to reveal

St. Ursula and the Virgins. By Hans Memling (1440 to 1494). Shrine of St. Ursula. Bruges 1486.



the silk or linen undergarments. The long flowing robes of an earlier period were retained only by those classes or professions whose ideals transcended the vagaries of the hour: scholars, lawyers, the clergy, and the fine arts. The first guilds of painters and sculptors in Flanders were founded in the 14th century, in 1337 in Ghent, and 1351 in Bruges.

The greatest Flemish masters, van Eyck, Memling, and others, worked at a time when cloth was no longer considered the most valuable dress material. Therefore, their portraits show velvets, brocades, and fine Flemish linen. Bishops and even saints are depicted as wearing these new materials. Only Christ and the Virgin are always painted as wearing robes of plain flowing cloth. The artists believed

that serenity and an infinitely earnest aspect could be expressed by draperies whose heavy fall gave the strongest plastic expression. The same may be said for the many figures of mourning from the tombs of the declining Middle Ages, which were wrought by Flemish and Dutch sculptors and their imitators; the full weight of human sorrow is expressed by the heavy folds of the cowl and the hood.

The Flemish artists did not work in the seclusions of monastic cells, but in contact with their fellow men, in the bustle of daily life. The dress and movements of the figures are not drawn from imagination, but from the life. That the Flemish dress as it is portrayed by the artists was so expressive, is due to the quality of Flemish textiles.

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Practical hints

An explanation of the great tensile strength of natural fibres

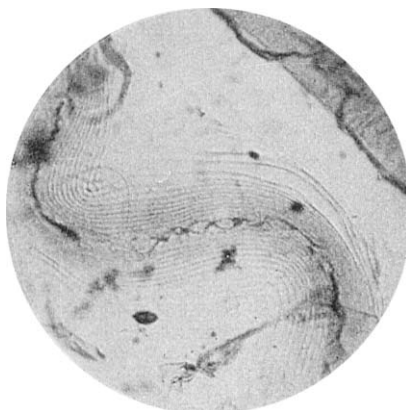
The extraordinarily high tensile strength of yarns made from natural fibres, particularly those of vegetable origin, is widely recognised. The following figures show the elongation of a few materials:

Lead wire . . .	2 km	Cotton	23 km
Wrought Iron .	5,5 km	Linen	24 km
Cast steel wire .	13–15 km	Jute.	20 km
		Hemp	30 km
		Wool	8– 9 km
		Real silk (raw) .	30–35 km
		Rayon	8–10 km

The explanation of the great strength of the yarns lies in their fine structure.

Experiments on cotton fibre have shown that its structure is not so simple as previously supposed. If the fibre is treated with a swelling reagent under specified conditions, and then examined under a microscope, the cell membrane is revealed as a system of layers which account for the great tensile strength.

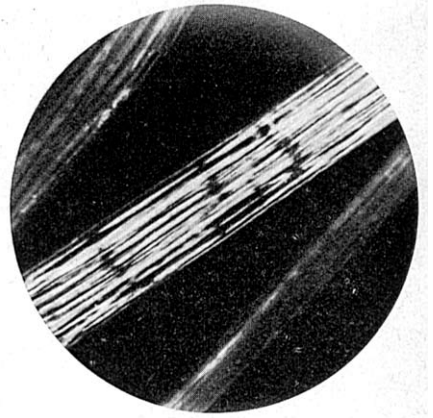
The following photo-micrograph shows the laminated structure.



The cotton fibre is evolved from a normal vegetable cell with all the biological functions of an epidermal cell: the formation of an extremely thin cell membrane enclosing the protoplasm and cell nucleus, then a thickening of the cell wall by layer formation and at the same time the formation of the familiar cuticular layer through the deposition of waxes, fats, coloring matter, and pectic substances in the outer layer of the cell wall. On ripening, the sap dries out and the fibre contracts, twisting itself spirally like a corkscrew. This rotation of the cell wall must also obviously be transmitted to the component layers. By this action we get a good sound fibre eminently suitable for spinning as, in the spinning process these twists inter-lock and impart great strength and elasticity to the yarn, which is absent in the case of bast fibre, flax, and hemp, particularly when one considers these in the retted state i. e. as bast cells.

The explanation of the strength of vegetable bast fibres undoubtedly lies also in the structural formation although this is quite different.

Whilst the cotton fibre consists of a single cell, the bast fibre is built up from a large number of single cells. These cells are visible in the accompanying diagram.



The single cells are held together by a special connecting link the central layer, the removal of which would cause the collapse of the fibre. Careless processing can actually cause this to happen.

This "wedge-like" structure likewise accounts for the high tensile strength and resistance to bending, since any applied strain is distributed over a large number of single elements.

R. H.

Historical Gleanings

The Settlement of Flemish Weavers in England

Research into the history of Flemish weavers' settlements in England is rendered somewhat difficult by the fact that the Germans in England, who for centuries dominated foreign trade, were at times also known as Flemings or Dutchmen.

The first authentic details concerning the settlement of Flemish weavers in England date from the reign of Henry I (1100-1135). We read of Flemish weavers whom William the Conqueror had settled at Carlisle, who were induced by the hostile attitude of the people there to move first to Wales and then, at the command of Henry I, to Ross. Descendants of these Flemings live in South Pembrokeshire to this day.

The transfer of the Flemish weavers from Carlisle to Ross was not the only measure taken by Henry in connection with the foundation of a Flemish colony in England. In various other parts of the country he made a home for weavers from Flanders.

In 1236 there were Flemings at Berwick on Tweed, on the Scotch border, who carried on cloth-weaving on a large scale. One of the earliest Flemish colonies was doubtless that of Worsted in Norfolk. The "worsted" thread, which derives its name from that town, was probably first spun by Flemings; it is first mentioned in an official document of the year 1315. The manufacture of worsted thread and cloth soon spread to other textile towns of Norfolk, especially to Norwich.

About the middle of the 13th century English cloth-weaving might have been described as flourishing, but the downfall of Simon de Monfort and his party brought about a setback.

For that reason Edward III, who endeavoured to promote the exports of the English cloth, had to begin by improving the standard of craftsmanship. The battle of Cassel (1328), which ended unfavourably for the Flemish towns proved an event favourable to this endeavour. A Flemish weaver named Kempe was persuaded to migrate to England together with his apprentices, assistants, and servants, sixty people in all,



Henry VII, the first monarch of the House of Tudor (1485-1509). After an unknown artist. National Portrait Gallery, London.

on the express understanding that he would ply his trade in England, and teach it to others. Kempe, who worked under the patronage of the king, settled at Kendal, where some of his descendants still live. Kempe was soon followed by hundreds of other Flemish craftsmen, in spite of the opposition offered by the native trades-people. Already in 1379 the foreign workmen were allotted meeting places of their own in

Leeds in 1745. Engraving by Samuel and Nathaniel Book. The textile industry of Leeds is said to go back to Flemish immigrants of the time of Edward III.



London. The scarcity of agricultural labour brought about by the Black Death led to an increase in the production of wool. Contemporaries complain that the sheep took the bread out of men's mouths. As a natural result, the export of wool to Flanders increased, and the Flemish weavers were so fully occupied at home that there was no reason for them to emigrate. The law forbidding the export of wool, passed by the Good Parliament in 1376, led to an increased influx of weavers from Flanders, but under Richard II and the House of Lancaster English cloth-making again suffered a check. For that reason Henry VII (1485-1509) induced a number of the best Flemish weavers to come to England in order to impart a fresh impetus to the English industry. The Flemish religious refugees of the 16th and 17th centuries found an asylum in England, but there was by that time a flourishing native textile industry, so that many of the weavers who sought refuge in England were obliged to turn to a different trade. Finally Flanders was compelled to cede the wool industry to England, where the abundance of raw material made up for an initial inferiority of craftsmanship. Nor must it be forgotten that the far-seeing policy of the English kings furthered this development, which Flanders, the rulers of which, in the latter stages of the struggle, were foreigners who took but little interest in the economic welfare of the country, was powerless to check.

H. G.

Flemish Cloth—Made in England

Towards the end of the 15th century the quantity of English cloth exported to Antwerp, to which town the English wool-staple was transferred from Bergen-op-Zoom in 1497, amounted to 20 000 lengths per year, or about $\frac{1}{3}$ of the total English cloth exports. Under the reign of Henry VIII (1509-1547) this figure was almost doubled. As a large proportion of English cloth was destined for Flanders, it became known under the general name of "Panni diffandra", Flemish cloth. A passage from William Thomas': "The Pilgrim A Dialogue on the Life and Actions of the King Henry the Eighth," 1546, refers to this fact: "Beside the abundant meat there groweth in England great quantity of wool, the finest of all the world, where of the kerseys and broad-cloths of London are made; and all the fine cloths, which called panni diffandra, are also English cloths wrong named by reason of the mart at Antwerp in Flanders, where these cloths are most commonly bought and sold."

W. N.

Coughing—a Breach of Business Ethics

The sale of goods in the cloth-halls of the Flemish cities was bound up with an involved and ceremonious ritual, which was governed by regulations down to the last detail. The hall and its environments were under the supervision of officers of the town. Access to the sale-room was accorded only to merchants and prospective buyers, the former having their places assigned to them. The only other people present were the authorized agents and officials. Nobody was allowed to

leave the hall, each man remaining at his place for the duration of the selling-hours. Beginning and end of the sale were announced by officials, as was the time when goods might be exhibited on the stalls. Every detail was carefully laid down. For instance, the city seal on the cloth was to be visible, but not the merchant's mark. The sale was to be determined by the quality of the goods alone, and not by the personal influence of the merchant. For the same reason the latter was forbidden to stand beside the counter where his goods were exhibited, to engage anyone in conversation, or even to sneeze or cough, as that might attract the attention of a prospective buyer.

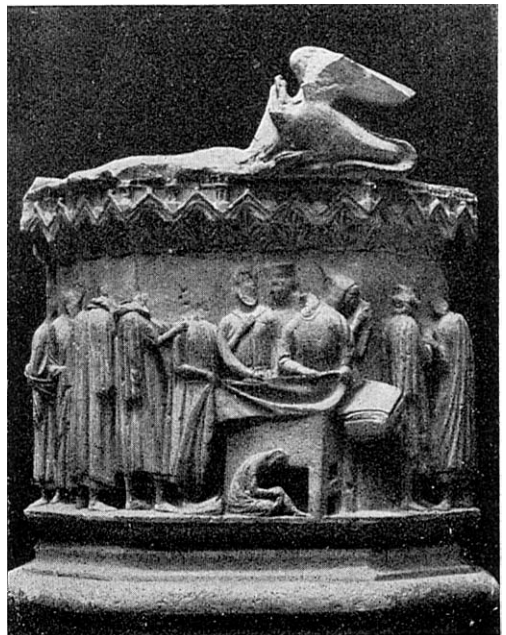
The transaction of business consisted of two distinct parts: the "conversation" about the goods, and the negotiations as to price and conditions of sale. After the sale the cloth was scrutinized by the examiner for the last time, and measured and weighed with the official instruments placed in the hall. If errors afterwards appeared, the vendor was held responsible. If the purchaser did not pay punctually, not only he but his creditor was open to punishment, if he did not report the fact to the authorities at once. By neglecting to report the matter he was considered to have committed an offence against the moral code of the city.

A. L. G.

The Cloth-makers' Relief of Reims

The severe symbolism of the early Middle Ages was past. The Gothic period brought new life. Just as the realistic and natural "Mystery" play developed out of the liturgy, and as its scene was transferred from the twilight of the church to the open square in front of

The so-called "cloth-makers" relief from the Judgment Porch of Reims Cathedral. 13th century.





Continuation of the cloth-makers' relief.

it, where episodes of human life were unfolded before the spectators, art too, which served the same didactic purpose, expressed itself in freer, more lively forms. The parables of Vice and Virtue, Punishment and Reward, are no longer rigid symbols. Already on entering the church the faithful were encouraged to follow the path of good and virtue by the didactic, anecdotal sculptures of the porches.

A characteristic example of this new art is the relief with the cloth-workers' legend on the basis of the pillars of the Porch of the Day of Judgment of Reims cathedral. The cloth merchant is seen serving customers; on the counter before him is the unfolded end of a bale of cloth. The next scene shows the arrest of the dishonest merchant, who has defrauded his customers; one step farther, and he is seen waiting to receive judgment at the hands of the Virgin Mary. A. L. G.

Fairs and Flemish Cloth

As long as trade moved along the channels of high-road and river, the fairs were the real centres of trade. Foreign merchants bought Flemish cloth chiefly at the fairs of Thourout, Messines, Lille, Ypres, and Douai, whilst the merchants of northern Flanders disposed of their goods at the fairs in the Rhine provinces; the cloth of the South of Flanders found a market at the fairs of Champagne. At a later period, when Brabant controlled the roads to Germany, the markets of Champagne gained a lead which they held until the end of the 13th century. Every year the cloth-workers of Flanders journeyed to Champagne guided by an "eswardeur", there to dispose of their goods in exchange for the produce of Burgundy, Provence, and Italy. The trade assumed such proportions that special officials, the "clercs de Champagne", had to be appointed in the Flemish cities, in order to supervise the system of payments. Towards the end of the 13th century, the importance of the fairs began to decline as that of the oversea trade increased. Foreign merchants sailed to the port of Bruges and made their way from there to the various centres of production, if they could not satisfy their needs at Bruges itself. At

the time of Guido of Dampierre (1225-1305) the manufacturing towns protested against the very existence of the fairs, which they regarded as unnecessary competition. W. N.

The Position of Women in the Flemish Cloth-Cities

It would seem to have been especially fortunate for a woman to have been born in Flanders in the Middle Ages. Though in this middle-class country women were not exalted as they were in courtly and knightly circles, they had more rights than was usual in those days. The old Flemish law which decreed that a man who struck his wife should pay a heavy fine to the court and an even larger sum in damages to his wife, was at that time most unusual in Europe.

The legal position of women was equalled by a certain economic emancipation. Women merchants are frequently mentioned, especially in St. Omer and Lille, and we hear of a woman who in 1271 imported large quantities of wool from England. Some branches of the cloth-working trade were carried off almost entirely by women, especially the washing, combing, and sorting of the raw material, also spinning. We also hear of women weavers, even of entire workshops in charge of women. Where restrictions on women's professional activities were imposed, they were based on considerations of health. In some places fulling and cropping were forbidden for women, both being strenuous trades requiring great physical strength. Some documents mention female apprentices, and for female journeymen the French part of Flanders had a special name: mesquines.

What general effect on the industry this large share of female labour had, it is not easy to say. At any rate, one institution of which Flanders is justly proud, may be traced to the initiative of a woman: in the 13th century Countess Jeanne of Flanders introduced compulsory and free education: the first elementary school in Europe. A. L. G.

Commercial Treaties between Tudor England and Flanders

The trade agreements between England and Flanders differed from similar agreements of the period inasmuch as they did not only concern commercial relations, but also matters of a political nature, or relating to international law. This fact is due to the peculiar situation of Flanders between England and France, two countries at that time frequently at war with each other. The economic interests which bound Flanders to England often induced the former country to take sides with England against France, though the king of France was at the same time overlord of Flanders.

The principal agreement, the Intercursus Magnus, of 1496, established the principle of mutual assistance against piracy; warships of the one country were allowed to use the harbours of the other. No goods might be introduced into the territory of either party, which originated in a country at war with that party. Merchants and sailors were allowed to bear arms and to

arm their ships. These political items were admitted into most of the subsequent agreements.

In 1506, Henry VII succeeded in securing an agreement with Philip the Fair, to whose territory Flanders belonged, an agreement which, had it been ratified, would have been the end of the Flemish cloth trade. According to it, the sale of English cloth in Flanders was to be admitted on a large scale; English merchants were to be allowed to have their cloths refined and finished in Flanders, and to retail them in that country. In the treaty the Flemings were only accorded the right of taking samples from the wool-sacks in the staple-port of Calais. The agreement also enumerates the different kinds of wool traded by the English at that time. They were distinguished according to their place of origin: Lempster, Marche, Cotteswold, Berkshire, in venis Cotteswold, Lindesey, Kesten, Rutland, Holand, Lowe Lindesey, Northholand, Norfolk, Kent, Lindesey Marche. As most of these grades were subdivided into *bonae* (good) and *mediocres* (medium) qualities, there were no fewer than twenty-nine kinds of wool in all. Philip died before the ratification of the treaty, which was popularly known as *Intercursus Malus*, so it never became valid. In 1507, it was replaced by a brief agreement which made no provision for a preferred treatment of English wool. W. N.

A Loan of the Fuggers to Henry VIII in the Shape of Flemish Cloth

The change in the economic relations between England and Flanders in the course of a century is best illustrated by the conditions of a loan granted by the Fuggers, the Augsburg merchants to Henry VIII in 1544. The loan amounted to £ 40 000, of which £ 10 000 were to be paid in Flemish cloth. At this time already, it was necessary to resort to such means in order to force Flemish cloth on to the English markets. A hundred years earlier, Flemish cloths, especially the finer grades, had held almost a monopoly in England, and the author of the Middle English poem "The Libelle of Englysh Polycye", which dates from the middle of the 15th century, makes no secret of the fact that Flemish cloth was better than English.

Henry's agent, Stephan Vaughan (died 1549), who arranged the loan with the Fuggers, emphasized the necessity of selling the cloth in London instead of at Antwerp, as otherwise the Fuggers would hear that it was being sold below its market value. He suggested various ways of disposing of the cloth, e. g. that it should be used for the purposes of the army and navy.

The difficulties which opposed the sale of a large quantity of foreign cloth in England will be readily understood if one remembers that at the time of the loan the Merchant Adventurers alone were exporting 122 000 lengths of cloth per year. H. G.

Weight and Measure as a Test of the Quality of Cloth

The different kinds of Flemish cloth were distinguished by quoting their length, breadth, and weight. The width was quoted as the number of threads in the



Announcing of weights and measures in the 14th century, by the sheriffs of a Flemish city. From the trade-book of Ypres.



warp, usually 1000–3000. The length was quoted in yards, the pieces varying between 11 and 70, the usual lengths being between 22 and 45 yards. The better the cloth, the heavier it was. In some cases the weight of the warp was quoted, as that was most important in determining the quality. In the course of manufacture these figures were repeatedly checked. Fluctuations, e.g. shrinkage through fulling and stretching, were expected to remain within well-defined limits. If the quality was good, these fluctuations approximately neutralized each other at the end of the process. The importance of measurements in determining the quality and kind of the cloth explains the fact that high-grade cloths were known in some parts of Flanders as "draps de muison", measured cloths. A. L. G.

The „Testament” of a Merchant

One of the most extraordinary documents preserved from the Great Age of Flemish weaving is the so-called "testament" of John Boyne Broke, a 13th century cloth merchant. It contains not legacies or bequests, but a list of charges raised against him after death.

Boyne Broke was a citizen and dignitary of Douai. His father and grandfather before him, also cloth-makers, had been among the richest and most respected members of the community. He himself had by degrees made himself master of nearly the whole city by becoming the creditor of a large proportion of the population. A house-owner on a vast scale, most of the industrial quarter of Douai was his property, and he rented houses and workshops, often complete with looms, to the people who worked for him, enticing them by the promise to guarantee so much work that they could always pay the rent.

The work he gave them did little more than cover the rents, so that they were in constant want of the money to procure raw materials, tools, food, and other necessities. Boyne Broke, who owned farms, gardens, dye plantations, and wool-magazines, supplied everything—for work. In this way his employees became hopelessly dependent on him, being reduced to abject slavery, the more so as he contrived by false accounts, false weights and measures, and other practices to increase the burden of their debt. On principle this system, known as the “truck” system, was forbidden in Flanders. But Boyne Broke was able to silence the unfortunate people whom he exploited by threats and intimidation. If they showed fight, unemployment was the result.

What then was the reason for the charges brought against him after death? What redress could they expect from the suit against a dead man?

The records give a surprising answer to this question. When the court sat in judgment on Boyne Broke, they were using their best endeavours to serve him; for by redressing the wrong he had done they thought to lighten the burden of his sins, and to help him in the struggle for salvation. Regarded from this angle the indictment of a dead tyrant assumes an entirely different aspect. It was scarcely an indictment, an act of vengeance, or a part of an economic struggle, but rather a pious act of charity. A. L. G.

Sentence of Death for Dealing in Flemish Cloth?

The trial of Johann Wittenborg, Mayor of Lübeck, which ended in 1363 with the execution of the accused, cannot be completely reconstructed from the records. The chief reason for the sentence was probably the unfavourable result of the war waged in 1362 by the Hanseatic League under Wittenborg against Denmark. As, however, no offence in his conduct of the war could be proved against Wittenborg, there would have been no reason for a death sentence, were it not for the fact that a real crime was brought to light when Wittenborg's books were seized. In 1358 the Hanse had declared a boycott against Flanders, and had transferred its branch from Bruges to Dortrecht. All dealings in Flemish cloth were strictly forbidden, and infringements of this law were severely punished. As is shown by Wittenborg's ledger, which was published in 1901 by Carl Mollwo, he had carried on an extensive illicit trade in Flemish cloths. According to Mollwo, it was the discovery of these transactions which led to

the severe sentence passed on Wittenborg, though the judgement was probably influenced by factions among the citizens of Lübeck. W. N.

The Size of the Flemish Weaving Cities

It seems strange that the cloth cities of Flanders, of whose size and importance we hear so much, were in reality no larger than the modern small provincial town. Bruges for instance, the seat of a famous company of wool-merchants, who dethroned kings when it suited their policy to do so, one of the wealthiest cities of Europe and an artistic centre of the first rank, besides being one of the most important ports of the period, numbered scarcely 40 000 souls. Ghent, until the reign of Charles V the most populous town, had only about 50 000 inhabitants. A just impression of these figures can, however, only be formed, if the population of other centres is considered. At that time Nuremberg had only 20 000, Basle and Frankfort 8000, and Freiburg in Switzerland 5200 inhabitants. In the light of these figures, the population of the Flemish cities was indeed large. Moreover, the very fact that they were comparatively small, is one reason for the intensity of the life there. A. L. G.

London Street Names which recall the Immigration of Flemish Cloth-workers

After the Massacre of St. Bartholomew (1572) a number of Huguenot weavers came to England and settled behind St. Botolph's Churchyard, Bishopsgate. In his “Survey of London”, published in 1598, John Stow mentions a quarter “called Petty France, of Frenchmen dwelling there”. Shakespeare is said to have lived from 1598 to 1604 in the house of a Huguenot named Mountjoy in Cripplegate.

When, in 1585, the town of Antwerp was plundered by Spanish troops, a large number of people from the Low Countries fled to England. It is estimated that one third of the total number of merchants and tradesmen of Antwerp left the city. A colony of textile workers grew up at Sandwich, whilst others came to London. In 1629, Jan van Stryp, a silk-throwster of Brabant, founded the corporation of silk-workers in Spitalfields; Strype Street, which was called after him, still exists in London. After the repeal of the Edict of Nantes (1685) a new influx of immigrants commenced. Whilst the watch and instrument-makers settled at Seven Dials, Long Acre, and Clerkwel, the textile-workers for the most part congregated in the region of Spitalfields, Norton Folgate, and Bethnal Green. The following names commemorate the immigration of that period: Flower Street, Fournier Street, Blossom Street, Rose Alley, and Fleur de Lys Street. W. N.

The Plundering of the Steel Yard as the Result of an Anglo-Flemish Trade Conflict

On succeeding to the throne, Henry VII, the first of the Tudors (1485–1509), made a determined effort to restore the prosperity of English trade, which had suffered very much during the Wars of the Roses, and to secure for English merchants new privileges abroad.

It was not long before a serious conflict with the Netherlands arose, which led to an interruption of commercial relations between the two countries, that lasted for two years. Margaret, the widow of Charles the Bold, Duke of Burgundy, was a member of the House of York, and therefore supported Perkin Warbeck, who had risen in rebellion against Henry. By way of reprisal the latter forbade all trade with the Low Countries in 1493, and banished all Flemings from English soil; shortly after, in 1494, Philip the Fair of Burgundy forbade all imports of English cloths. The dispute, which did great harm to both parties, lasted for two years. The decline in trade led to the unemployment of English workmen, whilst the members of the German Hanse still continued to import Flemish goods into England, and to introduce those of England into Flanders, thus securing control of almost the entire trade. This state of affairs caused great resentment among the English tradespeople, which found vent in the plundering of the Steel Yard, the London office of the Hanse. In Hall's chronicle the situation preceding this event is described as follows: "The restraint made by the king sore greved and hindered the merchants, beyng adventurers. For they by force of this commaundement had no occupyng to beare their charges and supporte their contynuaunce and credyte. And yet one thinge sore nipped their hartes; for the Easterlynges which were at libertie, brought into the realme such wares, as they were wont or accustomed to do, and so served their customers throughe out the whole realme. By reason wherof the masters, beyng destitute of sale and commutacion, neither retheyned so many covenaut servauntes and apprentices, as they before were accustomed and in especiall mercers, haberdasshers and clotheworkers, nor yet gave to their servants so great stipende and salarie, as before that restreynte they used to do."

For the Flemings the suspension of commercial relations was even more disastrous. They were unable to procure English wool, or to fish in English waters, and were harried at sea by the English in every possible way. For that reason they were at great pains to secure a settlement, which was finally reached in 1496, in an agreement (intercursus) which was acclaimed so wholeheartedly by both parties, that it became known as Intercursus Magnus. This agreement was the foundation of all subsequent commercial treaties between England and the Low Countries. W. N.

Flemish Cloth at the Courts of Princes

The quality of Flemish cloths caused them to be exported to the Far East, where they were exhibited in the bazaars, together with the damasks, brocades, and gold or silver-wrought cloths of the Orient. Among the presents sent by the King of Aragon to the Sultan of Babylon in 1322, there were costly stuffs from Douai. Even princes who were at war with Flanders could not do without that country's fine textiles for their courts. Thus Philip the Fair of France (1285 to 1314) who had declared an unconditional boycott against Flanders, was obliged to secure Flemish cloths through smugglers. W. N.

Disputed Succession in England prevents the Dyeing of English Wool in Flanders

The rise of the cloth industry in Flanders was accompanied by a parallel development of dyeing. The Flemish dyers enjoyed an international reputation, and cloth woven in England was frequently sent to Flanders for this final stage of the process of manufacture.

In order to strengthen his position, Henry VII was quick to make use of the fact that English weaving brought rich profits to the Flemish dyers. It was thought at the court of Burgundy that Henry would not be able to maintain his position on the throne of England. Margaret, the widow of Charles the Bold, a sister of Edward IV of the House of York, in 1487 lent her support to a warlike expedition of the self-styled son of George, Duke of Clarence, by which he hoped to secure the throne for himself. Late in 1486, Henry had already forbidden the export of English wool to Flanders as a measure of retaliation against Margaret's intrigues. Not until the collapse of the expedition of her so-called nephew, whose real name was Lambert Simnel, was the measure repealed. H. G.

The Extent of the English Cloth-Industry in the 17th century

The English cloth industry was inaugurated and promoted by Edward III and Henry VII. Whereas in 1529, the Flemish town of Courtrai was obliged to purchase wool at the public expense, and to distribute it free of charge among the impoverished weavers, and in 1544 the weavers' guild at Bruges was obliged to sell its silver emblems to pay for repairs of the guild-hall and chapel, the production of woollen goods in England, thanks to the abundance of raw materials, rapidly increased in volume.

Thomas Fuller's "Church History of Britain" (1655) contains some valuable information concerning the distribution of the wool industry in England during the early part of the 17th century:

East: Norfolk: Norwich Fustians – Suffolk: Sudbury Bayes – Essex: Colchester Bayes and Serges – Kent: Kentish Broad-cloths.

West: Devonshire: Kirses – Gloucestershire: Cloth – Worcestershire: Cloth – Wales: Welsh Friezes.

North: Westmoreland: Kendal Cloth – Lancashire: Manchester Cotton – Yorkshire: Halifax Cloths.

South: Somersetshire: Tounton Serges – Hampshire: Cloth – Berkshire: Cloth – Sussex: Cloth.

Fuller also mentions the counties of Northamptonshire, Lincolnshire, and Cambridge, remarking at the same time that, although they produced the most wool, their industry was negligible. W. N.

The Flemish Cloth-Makers' Apprenticeship

with some local exceptions, lasted: one or two years for fullers, two years for dyers, three for stretchers, four or five years for weavers. That the training was very careful is indicated by the fact that most experts and historians of the trade are of the opinion that the quality of Flemish cloths was equal to the finest products of modern industry. A. L. G.

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Scientific Notes

Tadpoles' Nests

"Tadpole Nurseries" is a name which has been given to the peculiar crater-like nests which the Brazilian frog *hyla faber* builds for its spawn. By repeated diving the frog brings up mud from the depths, with which it builds a circular wall not unlike the crater of an extinct volcano. The inner surface of the wall is then carefully smoothed with the animal's broad feet. As soon as the nest is ready the eggs are laid. The tadpoles which develop out of the eggs have feather-like gills by which they hang to the surface of the water until they leave the nursery as young frogs.

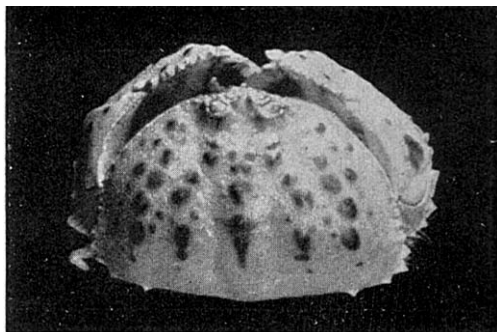
As well as these craters there are other forms of frogs' nests in the tropics, as conditions there are not so favourable as in more temperate latitudes, thus making a certain care for the young necessary. Several species of South American frogs build foam nests on the water to protect their brood: *Leptodactylus ocellatus* excretes an albuminous substance before laying the eggs. This is beaten to a foam, forming a nest which floats on the water, and in which the eggs are deposited. The nest may be 10–12 inches in diameter and about 2 inches in height. When the tadpoles emerge, the nest dissolves. It serves as food for the young tadpoles when it is no longer necessary as a protection, probably because of the algal weeds which attach themselves to it. K.

The Lobster Casts its Shell

only once a year on reaching maturity. The actual process lasts about twenty minutes, and 24 hours pass before the new shell is hardened. Young lobsters shed several times a year; eight times in the first year, five in the second, four in the third, etc. When the lobster reaches maturity—in the fifth, or according to some authors in the ninth year—it has by no means stopped growing. It is then about seven inches long, and may grow to twice that length. As the male can only grow once a year, when he sheds his shell, and as a length of twenty inches is in no way rare, a long life and a long period of growth must be inferred. For *homarus americanus* an age of fifty years has been proved. The mature female lobster only casts her shell every two years. That is due to the fact that the eggs mature very slowly, and that the young are carried for a full year. That explains the frequently considerable difference in size between the male and female. K.

The Cocoa-Nut Crab

The cocoa-nut crab (*calappa granulata* L.) is a native of the tropical seas, especially of the Atlantic and Pacific coasts, though its northern outposts are occasionally



The cocoa-nut crab (calappa granulata L.) seen from above. The nippers are placed opposite the large, pouch-shaped cephalothorax. Photo: A. Gerber, Basle.

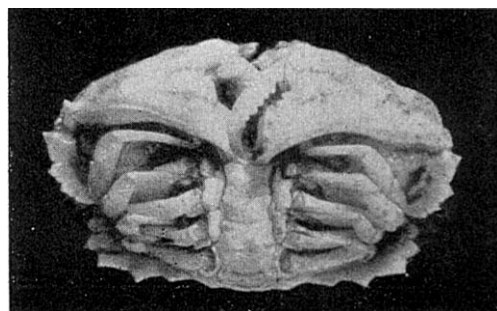
to be found in the Mediterranean. The animal shows a remarkable adaptation of its nippers to the necessities of breathing through gills in its sandy surroundings.

The indolent animal often lies buried in the sand with only its eyes, feelers, and claws protruding. In such sandy environment a pollution of its breathing-water by particles of sand, etc., is most likely. This is prevented by the animal holding its large flat comb-like claws before the rounded cephalothorax. The strong teeth at the edges of the claws form an effective filter together with the hairy fringe of the fore part of the body. This keeps back grains of sand, which would otherwise be drawn into the bronchial orifices.

The water emitted from the gills makes its way through a tube formed by the first pair of jaw-feet.

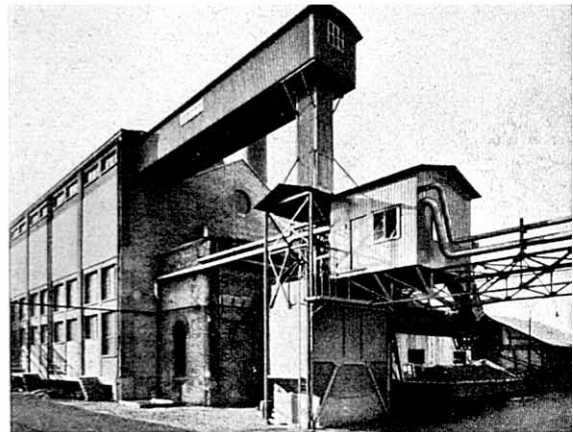
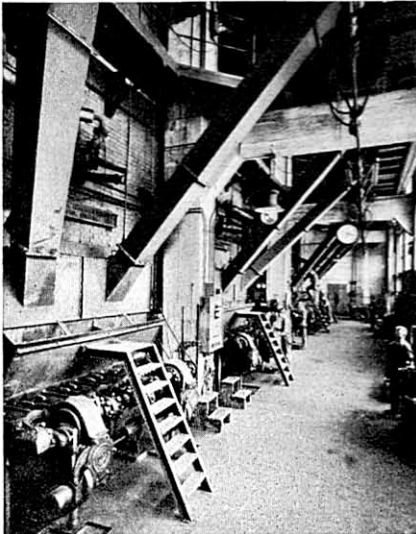
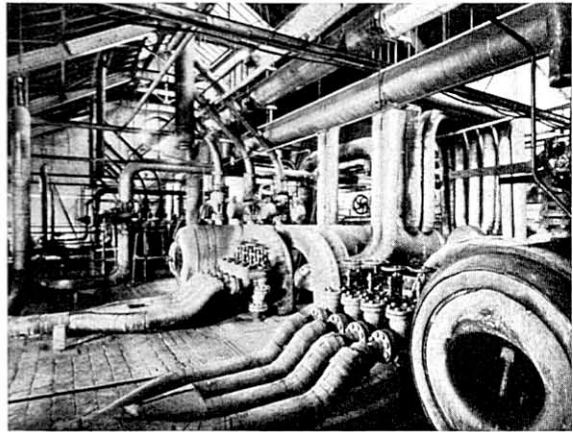
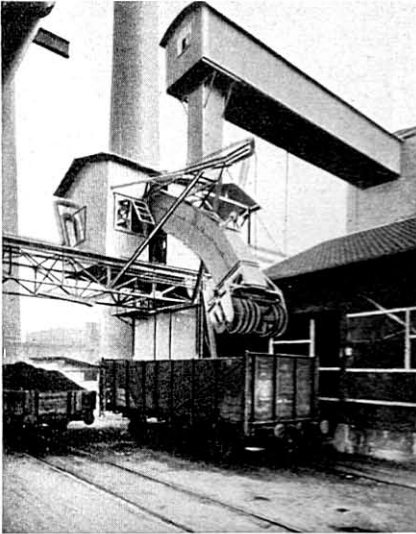
By means of this arrangement the cocoa-nut crab ensures respiration undisturbed by pollution of its breathing-water, even when it has almost completely buried itself. A. G.

The same animal from below; note the broad nippers. Photo: A. Gerber, Basle.



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Top left: Plant for automatic transferring of coal from the railway trucks to the bunkers by means of Conveyors. Capacity: 40 tons per hour. **Bottom left:** firing-gallery of the main steam-generating plant. **Top right:** Conveyor-system above the eight sixty-ton bunkers. **Right centre:** Top of boilers with condensers, safety-valves, feed-water and steam ducts. **Bottom right:** General view of main steam-generating plant.

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