THE CHEESE INDUSTRY OF FRANCHE-CÔTE: THE IMPACT OF MODERNIZATION IN A TRADITIONAL FRENCH DAIRY REGION

A thesis submitted in partial satisfaction of the requirements for the degree of Master of Arts in Geography

by

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May, 1973
The thesis of Christiane Michele Mainzer is approved:

California State University, Northridge
May, 1973
DEDICATION

To my parents
ACKNOWLEDGEMENTS

I would like to acknowledge the help of my Thesis Committee, with special thanks to Dr. Gordon Lewthwaite, who so vigilantly guided and encouraged me. I am also indebted to my friends in France who made my work possible, particularly Mr. Roger Beuque for his kind assistance.
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ABSTRACT

THE CHEESE INDUSTRY OF FRANCHE-COMTE: THE IMPACT OF MODERNIZATION IN A TRADITIONAL FRENCH DAIRY REGION

by

Christiane Michele Mainzer

Master of Arts in Geography

May, 1973

The manufacture of cheese has provided an economic livelihood within many rural sectors of France for several centuries. One of the most typical examples of this agricultural activity is the ancient tradition of gruyère-making that had developed in the Jura mountains. Today gruyère is gaining an important position in the French dairy industry. Concurrently, however, a dilemma has arisen, resulting in the opposition of traditional cheese-making with modern technology. While the cheese chalets, with their rustic copper vats, have maintained the unique quality of the Comté gruyère product, their efficiency in terms of output has been seriously questioned by many dairy industrialists.

In order to meet this challenge, the dairy industry
of Franche-Comté is apparently initiating a major project of reorganization. Unfortunately, while the basis of a great effort for consolidation has been clearly defined, its full realization has not yet taken place. For the franc-comtois cheese maker is well aware that each step taken toward modernization must be weighed against the probability of losing the unusual character of the Comté product.
INTRODUCTION
THE APPLICATION OF MECHANIZATION IN A TRADITIONAL DAIRY REGION

Franche-Comté, a province of eastern France flanked by the Jura mountains, is well known for the production of gruyère cheese. Indeed, Comté gruyère manufacture is wholly confined to this specific area of the world and is historically woven into the rural tradition of the Juras, deeply rooted in regional pride (Map VII).

From the economic angle, cheese-making in this mountainous province has long seemed to offer the best means of preserving and selling a surplus of otherwise perishable milk, but a strong historical impetus is also involved: cheese-making in general and gruyère-making in particular are linked with the perseverance of the traditional artisan. Throughout the centuries utilization of the copper vat, a symbol of the true craftsman's technique, has kept alive the ancient art of gruyère-making in Franche-Comté.

In this region, richly endowed with natural resources such as salt, wood and an abundance of potential pasture-land, the production of cheese historically developed as a vital commodity in the feudal system and thus hastened the growth of trade within medieval eastern France. Traditionally the cheese dairy or "chalet" was located within the village, and like the church, the school and the town hall, it became the economic and social focus of much peasant life. Today, however, the situation appears quite complex, for the
franc-comtois cheese maker is caught between this continuing attachment to tradition and the adoption of modern methods of producing Comté.

Recently, and most especially since the adoption of the gruyère charter of 1970, the Comté industry has been undergoing many structural changes, not least of which are those involving the enlargement and relocation of cheese dairies. Franche-Comté, a region which includes the departments of Doubs, Jura and Haute-Saône, is particularly affected, and in concert with the French government, most of the provincial agricultural agencies have been stressing new programs for the modernization of equipment, the redesigning of the cheese factory, and the concentration of production in units capable of realizing the economies of scale. Following this pattern, factories will be consolidated according to the local intensity of milk production.

It is this effort to realize the economies of scale that is the underlying factor in the overall plan to modernize the dairies of Franche-Comté. Larger-sized factories can expand their radius and increase the volume of milk they collect, and thus expand both their own and the regional production of cheese. For example, the seventeen dairies found in the immediate area around Pierrefontaine-les-Varans in Doubs, as shown in Map I, could well be consolidated into two plants, each processing 125 thousand hectoliters annually (Map II). This area, indeed, is the center of the most intensive milk production in the province, with an output of
Map I: Location and Size of Cheese Dairies in Doubs and Jura, 1969. This map illustrates the present distribution of cheese factories in Doubs and Jura as well as the size of each dairy. This general pattern reflects a concentration of very small dairies in southern Jura and in southwestern Doubs—the mountainous region of Franche-Comté. The larger factories are found in the high plateau area of Doubs and near the urban centers such as Besançon (the location and size of dairies in Haute-Saône are not included in this map because this study is focused primarily on the Comté industry in the province). Other products are Morbier, Cancoillotte, Bleu du Jura and fresh dairy produce manufactured in the region.

Map II: Modernization Plan, Consolidation of Cheese Factories. The modernization plan provides for a consolidation of small factories in the more important milk sheds of Doubs and Jura. Some industrial size dairies, in order to meet consumers' needs, have already been re-located in proximity to urban markets and favorable transport routes. But, according to the gruyère charter of 1970 a greater number of enlarged dairies will be oriented toward their raw material, milk.

Data Source: Monnot, L'économie laitière franc-comtoise, géographie.

(Note: The location and size of dairies of Haute-Saône are not included in the maps because this study is focused primarily on the Comté industry in the province.)
MODERNIZATION PLAN:
CONSOLIDATION OF CHEESE FACTORIES

- in thousand hectoliters
  - 20
  - 40
  - 80
  - 160
  - 200
  - 225
more than 270 liters per square kilometer. The restructuring of dairy factories would, it is believed, not only improve the utilization of this resource, but reduce the differential between costs of production and prices realized in the market place.

There are already some large-scale dairies which manufacture fresh products and are naturally oriented toward and located near, the urban markets. But cheese factories require fresh milk, and are oriented to their raw material rather than their market: the plan, in consequence, stresses proximity to dairy farms. Remote from potential markets though they may appear, the relocated cheese plants will hopefully be placed to ease the transportation of milk to the factories.

The gruyère charter of 1970 is thus directed to this essential aspect: the dairy factories of Franche-Comté, it is hoped, will be enlarged and consolidated, but (as the charter insists) without destroying the original character of Comté gruyère. Nevertheless, it is postulated that the re-organization of small dairies will reduce operation costs, enabling the gruyère market to maintain a more uniform price for Comté. Furthermore, as things now stand, the very small cheese dairies are unable to sell their produce successfully in the domestic market, and are not apt to take advantage of modern technology.

The "multiple stainless steel vat" is an essential ingredient in the modernization process, providing a more
hygienic and homogeneous product. As the gruyère charter phrases it, Comté of superior quality requires:

1) the best quality milk from the farm, 2) the best care in handling the milk from the producer, and 3) the best method of immediate milk delivery to the cheese factory.\textsuperscript{4}

Yet this requires conditions which are hard to secure.

Therefore, this paper is an attempt to present the interaction of modernization with a traditional cheese industry in a traditional cheese region. The modernization plan and its impact upon the pattern of location is examined primarily in the department of Doubs, where most of the observations of different types of dairies were conducted and interviews held with the relevant authorities during the summer of 1971.
REFERENCES

1. The word "chalet", taken from the French, refers to a traditional dairy or cheese "workshop".


3. Ibid., map 1.

CHAPTER 1

THE TRADITIONAL FRAMEWORK: THE BEGINNING OF COMTE PRODUCTION AND DAIRY COOPERATIVES IN THE JURAS

In terms of relative advantage, the physical conditions of Franche-Comté have always favored concentration on dairying. Historically and economically these marginal lands, where slopes and a shorter growing season handicap cereal cropping, were given over to dairying, based as it is on the more tolerant fodder crops and pasture. The expanding dairy economy of the province and the evolution and location of the gruyère industry in the region must be viewed against their physical background. The factories, of course, have been situated primarily in close proximity to their source of supply, the dairy farms. The latter varied in number and productivity with mountain, plateau and plain: Franche-Comté's three physical zones set something of the pattern of milk production (Map III).

It was on the lower flanks of the Jura mountains, which extend 250 kilometers (150 miles) along the Franco-Swiss border, that the first cheese cooperatives developed during the twelfth and thirteenth centuries, though the mountains themselves had little to offer to the industry. Geomorphologically they are composed mostly of limestone, folded or left horizontal when the formation of the Massif Central and the Alps caused the folding and buckling of the "Jurassic" plain.¹ The resultant mountains formed an arc extending into what is now the northwest corner of Switzerland, with
Map III

FRANCHE-COMTE

PHYSICAL REGIONS

- Plain
- Plateau
- Low Mountains
- High Mountains

DENSITY OF MILK SHEDS

liters per sq. kilometers
- more than 270
- 180-270
- 90-180
- less than 90

Data Source: C. Mannot, L'économie laitière franc-comtoise, géographie.
the steepest slopes along the border, where the peaks sometimes exceed 1,525 meters. Streams incised and eroded the limestone blocks within a trellis-like drainage pattern, and glaciation scoured the region and further reduced the direct utility of the uplands. But, though little potential agricultural land exists, dairying was to benefit from the opening up of longitudinal valleys and the presence of mountain pastures (Figure 1). Cheese-making also profited indirectly from the natural resources of the Jura region: the heavily wooded slopes of the mountains, and the salt beds that were forced by folding from much lower depths to the surface (the salt deposits around Salins-les-Bains were evidence of this action).

The physical conditions that existed during the early history of cheese-making still prevail in the Juras. In general, the agricultural utility of the mountains is further restricted by the typically harsh, long winters. Snow covers the ground for about four months of the year even on the lower slopes around 1,200 meters and lasts for as much as six months at elevations above 1,600 meters. In the high isolated mountain villages cheese production slackens during the winter months. Admittedly the precipitation is relatively high, for the monthly average rarely dips below 90 mm, though spring and autumn are somewhat drier seasons. But ample precipitation is scarcely an advantage, for spring comes late—usually in May—to this section of Franche-Comté, and remains for only a short period. Besides, the mountain
Land utilization in Franche-Comté can generally be divided as follows: 50 per cent in "prairies" or pastureland, 35 per cent in forests, 11 per cent in cereals and plant cultivation, and 1 per cent uncultivated. (from Henri Chatras, "L'agriculture franc-comtois a ses chances et sa place dans l'agriculture du marché commun," in L'Agriculture en Franche-Comté, p. 8)

Data Source: L. Monnot, Le lait en Franche-Comté production—transformation—commercialisation, p. 8a.
soils are very poor and immature: they are azonal with a very low acid content, and more than 25 per cent of the Jura soils are skeletal. 8

Thus the potential for cultivation and production has always been strictly limited in the mountains. Even today dairy herds are relatively few and far between, and only 90 liters of milk are produced per square kilometer 9 (Map III). The small remote villages of the high Jura have very few connecting routes to the plateau that spreads out below them, and such transport lines as do exist are concentrated mainly along the Doubs River which has carved its own gorge in the mountains, and in several portions of the range where the pattern of folding and erosion has opened up a natural gap or "cluse" between two synclinal valleys. 10 And, after all, in the mountains, farming is hardly competitive with alternative activities.

The southwest area of Doubs near Pontarlier, in particular, has recently witnessed the introduction of winter sports, and the construction of recreational facilities has brought competition rather than assistance to the farmers: the peaceful landscape with grazing dairy herds is in retreat. Since 1968 the total number of milk cows has declined considerably even as tourism has become a lively trade (Table 1).

Nevertheless the mountain served as a cradle for the infant industry in medieval times, and the cooperatives which evolved in the Juras spread slowly towards the lower plateau
during the seventeenth century, bringing a further physical region into the orbit of the industry. The plateau extends into the departments of Jura and Doubs, actually reaching as far as the northeastern part of the latter in the Belfort Gap area. The plateau varies in elevation between 500 and 900 meters and is dissected by several meandering streams, but the physical structure is most favorable for pastures and dairying, and, in certain areas at least, is disadvantageous for crop cultivation. The horizontal limestone strata and weak undulations offer apparently suitable terrain for crops, but they are traversed by sudden folds and are often faulted with north facing scarps. Karst topography with underground caverns, grottos and re-emergent streams, such as the Doubs (near its source), the Loue and the Lison, are in evidence, and drainage reduces the availability of surface water. Indirectly the cheese industry profited immensely as a result of these characteristic karst formations: the limestone caves were used extensively as cheese "aging" cellars during the early days of gruyère-making.

However, not all sections of the plateau are favorable for dairying. Drainage becomes very poor in certain flatter portions of the high Jura plateau as, for instance in the Levier region: there the bog soils are undesirable and can support neither crops nor pastureland. In other areas downfaulting has resulted in almost enclosed valleys such as the Loue with an escarpment that can be seen on the horizon from many miles around. The valley itself is too
steep and narrow for any extensive agriculture and only on the flat areas above the rugged cliffs can dairy cows be found grazing in large numbers.

The climate of this sector is ideal for animal grazing, for the winters are less rigorous than those of the mountains, and precipitation occurs primarily in summer. The plateau region receives more than 1,200 mm of precipitation annually. But here pasture and fodder crops rather than grains are farmed. During the winter snow lies for about thirty days and late spring frosts preclude early planting of crops. The freezing period, particularly around Besançon, has an average of 74 days in length, while fog, which contributes additional moisture to pastures, is more common in the level area.

The plateau area of Jura and a small portion of the adjacent northwest corner of Haute-Savoie, where most of the crops raised are for fodder, therefore, forms a zone where dairy production intensifies: instead of the 90 liters characteristic in the mountains, some 180 to 270 liters of milk are produced per square kilometer (Map III). In this region cereal crops are replaced by alfalfa, pasture and other types of fodder (Figure 1) that are generally grown in Franche-Comté such as clover, the leguminous sainfoin and beetroot. And since summer rainfall is plentiful, the fodder crops may be harvested twice. The first cutting is usually taken at the end of June, and the second in late August, after which the dairy cows are normally permitted to
graze freely on the mown fields.

However, it is in the department of Doubs that the higher plateau area supports the greatest number of dairy cows in the whole region (Map IV). Here milk production exceeds 270 liters per square kilometer, and agricultural activity is focused exclusively on dairying. It is an area less rugged than the mountain section of the Juras and rich pasturelands dominate the landscape. The number of cheese plants is also greater in this zone of concentrated dairying, as shown in Map I. To the north of this region the Doubs River, at its lowest elevation, creates an almost natural boundary between the dairy belt that occupies the plateau and the cereal fields that center on the plain.

Nevertheless, the cheese industry spread from the plateau to the plain, and by 1850 the cooperatives were established on the lowland. This broader region, which links the Belfort Gap with the Rhône basin, is located primarily south of the Vosges in the department of Haute-Saône and in the adjacent parts of northern Doubs and Jura. Admittedly this is an area where other agricultural elements are strongly competitive with dairying. Physically it is characterized by a slightly undulating terrain and a few low lying hills at an elevation between 250 and 500 meters (above sea level) with an alluvial plain composed mostly of clay, limestone and sandy material. Cereal crops such as wheat, oats, rye and barley here compete with the raising of dairy cows, as Figure 2 indicates. The plain is a zone with
DISTRIBUTION OF DAIRY COWS IN DOUBS AND JURA BY CANTONS

1970

1 DOT EQUALS 100 COWS
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<td>Pierrefontaine-les-Varans*</td>
<td>8,000</td>
<td>8,626</td>
</tr>
<tr>
<td>Mâchê*</td>
<td>6,600</td>
<td>8,101</td>
</tr>
<tr>
<td>Vercel</td>
<td>6,850</td>
<td>7,641</td>
</tr>
<tr>
<td>Levier</td>
<td>6,150</td>
<td>6,214</td>
</tr>
<tr>
<td>Le Russey*</td>
<td>5,110</td>
<td>5,862</td>
</tr>
<tr>
<td>Pontarlier*</td>
<td>5,880</td>
<td>5,821</td>
</tr>
<tr>
<td>Montbenoit</td>
<td>5,450</td>
<td>5,557</td>
</tr>
<tr>
<td>Ornans</td>
<td>4,750</td>
<td>5,033</td>
</tr>
<tr>
<td>Audeux</td>
<td>5,590</td>
<td>4,724</td>
</tr>
<tr>
<td>Quingey</td>
<td>4,470</td>
<td>4,545</td>
</tr>
<tr>
<td>Clerval</td>
<td>4,290</td>
<td>4,524</td>
</tr>
<tr>
<td>Amancey</td>
<td>4,000</td>
<td>4,517</td>
</tr>
<tr>
<td>Baume-les-Dames</td>
<td>4,300</td>
<td>4,409</td>
</tr>
<tr>
<td>Saint-Hippolyte</td>
<td>3,830</td>
<td>4,337</td>
</tr>
<tr>
<td>Morteau*</td>
<td>4,410</td>
<td>4,044</td>
</tr>
<tr>
<td>Roulans</td>
<td>3,420</td>
<td>3,682</td>
</tr>
<tr>
<td>Mouthe*</td>
<td>3,740</td>
<td>3,579</td>
</tr>
<tr>
<td>Rougemont</td>
<td>n.d.</td>
<td>3,364</td>
</tr>
<tr>
<td>Marchaux</td>
<td>n.d.</td>
<td>2,919</td>
</tr>
<tr>
<td>L'Isle-sur-le Doubs</td>
<td>2,800</td>
<td>2,851</td>
</tr>
<tr>
<td>Pont de Roide</td>
<td>2,560</td>
<td>2,628</td>
</tr>
<tr>
<td>Boussières</td>
<td>2,090</td>
<td>2,126</td>
</tr>
<tr>
<td>Besançon Sud</td>
<td>n.d.</td>
<td>1,901</td>
</tr>
<tr>
<td>Herimçoncourt</td>
<td>1,590</td>
<td>1,606</td>
</tr>
<tr>
<td>Montbéliard</td>
<td>n.d.</td>
<td>1,545</td>
</tr>
<tr>
<td>Audincourt</td>
<td>n.d.</td>
<td>1,169</td>
</tr>
<tr>
<td>Besançon Nord</td>
<td>n.d.</td>
<td>198</td>
</tr>
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</table>

*Birthplace of Montbéliard race

Each canton in the department of Doubs shows an increase in the number of dairy cows during the period 1968-1970, except for the southwest corner of the department (Mouthe-Pontarlier area). Recently, this region has become more tourist oriented and has expanded its recreational facilities in the Juras. The largest number of cows is found in the high plateau area of Doubs (Pierrefontaine-les-Varans), where more than 270 liters of milk are produced per square kilometer. Sources: L. Monnot, Le lait en Franche-Comté, production-transformation-commercialisation, Masters thesis (Besançon: La Faculté des Lettres et Sciences Humaines, 1969), p. 13b (for 1968 figures), and Chambre d'Agriculture, Besançon (for 1970 figures).
Table 1 Continued

NUMBER OF DAIRY COWS IN JURA BY CANTONS

<table>
<thead>
<tr>
<th>Canton</th>
<th>1970</th>
</tr>
</thead>
<tbody>
<tr>
<td>Poligny</td>
<td>5,642</td>
</tr>
<tr>
<td>Noyzeroy</td>
<td>5,321</td>
</tr>
<tr>
<td>Champagnole</td>
<td>4,694</td>
</tr>
<tr>
<td>Salins-les-Bains</td>
<td>4,402</td>
</tr>
<tr>
<td>Orgelet</td>
<td>3,403</td>
</tr>
<tr>
<td>Andelot</td>
<td>3,133</td>
</tr>
<tr>
<td>Champagnole</td>
<td>2,813</td>
</tr>
<tr>
<td>Bletterans</td>
<td>2,625</td>
</tr>
<tr>
<td>Voiteur</td>
<td>2,618</td>
</tr>
<tr>
<td>Conlige</td>
<td>2,657</td>
</tr>
<tr>
<td>St. Laurent</td>
<td>2,520</td>
</tr>
<tr>
<td>St. Julien</td>
<td>2,382</td>
</tr>
<tr>
<td>Montmiray le Château</td>
<td>2,358</td>
</tr>
<tr>
<td>Beaufort</td>
<td>2,347</td>
</tr>
<tr>
<td>St. Amour</td>
<td>2,332</td>
</tr>
<tr>
<td>Lons-le-Saunier</td>
<td>2,303</td>
</tr>
<tr>
<td>Rochefort</td>
<td>2,193</td>
</tr>
<tr>
<td>Chaussin</td>
<td>2,100</td>
</tr>
<tr>
<td>Gendrey</td>
<td>2,013</td>
</tr>
<tr>
<td>Sellières</td>
<td>1,840</td>
</tr>
<tr>
<td>Chaumergy</td>
<td>1,762</td>
</tr>
<tr>
<td>Arbois</td>
<td>1,740</td>
</tr>
<tr>
<td>Les Planches</td>
<td>1,660</td>
</tr>
<tr>
<td>Dampierre</td>
<td>1,606</td>
</tr>
<tr>
<td>Chemin</td>
<td>1,542</td>
</tr>
<tr>
<td>Morez</td>
<td>1,425</td>
</tr>
<tr>
<td>Montbarrey</td>
<td>1,393</td>
</tr>
<tr>
<td>Dole</td>
<td>1,363</td>
</tr>
<tr>
<td>Villiers Farlay</td>
<td>1,288</td>
</tr>
<tr>
<td>St. Claude</td>
<td>1,127</td>
</tr>
<tr>
<td>Les Bouchoux</td>
<td>1,033</td>
</tr>
<tr>
<td>Moirans</td>
<td>580</td>
</tr>
</tbody>
</table>

CEREAL CROPS GROWN IN DOUBS

- **BARLEY**: 10,000 hectares or 24,700 acres
- **OATS**: 7,000 hectares or 17,300 acres
- **WHEAT**: 5,500 hectares or 13,600 acres
- **CORN**: 800 hectares or 2,000 acres
- **RYE**: 200 hectares or 500 acres

only average milk output, about 90 to 180 liters being produced per square kilometer.24

Dairy production and cheese manufacture become less intense in this broad lowland which tends to have a considerable amount of cropping: most of Franche-Comté's cereal crops are grown in the plain. Barley and wheat are the major crops produced and the planting of corn (maize) has increased recently in this region with its shorter growing season. The area of cereal concentration extends from the Doubs River to the southern fringe of the Vosges mountains in northern Haute-Saône, with the greatest intensity in the northeast corner of the department of Jura: the Dole area has 40 to 50 per cent of its potential agricultural land in cereals.25 In this same area buckwheat, potatoes and fodder for milk cows make up the balance of the crops grown. Small local grain mills, serving primarily regional markets, process a large quantity of the cereals for dairy livestock feed.

Generally speaking the plain is more densely settled than the mountain or plateau, and the major urban centers and transport lines of Franche-Comté are located primarily in the lowland, therefore a readier market is available for the gruyère industry in this sector. Intensive fruit and vegetable growing,26 although utilizing less surface area than do the pastures, become almost as significant as milk production in the plain. Cherries, yellow plums, apples and nuts are grown in very small orchards between the pastures,
while truck gardens are well developed around Besançon, Audincourt and Montbéliard, the larger cities of the low-land area.

On the whole, the dairy economy of Franche-Comté is not sustained by milk alone: the Montbéliard, a hardy dairy breed utilized in the province, yields a substantial amount of meat as a by-product. Figure 3 indicates that 29 percent of agricultural production in Franche-Comté consists of meat products. Small local slaughterhouses process meat and several refrigerated packing warehouses have been constructed for regional market purposes. The Chambre d'Agriculture of the department of Doubs is forming an organization which is interested in the increase of local meat produced for commercial consumption. Recently the pork industry has become more relevant to cheese-making: the residual whey from the milk processing is fed to the pigs. Therefore dairying and the cheese industry in Franche-Comté receive some economic support from meat production.

Thus, the natural resources have given Franche-Comté something of its character as a dairy region, the only cheese specialty area in France that produces Comté. The physical context of the mountain slopes and uplands, ideal for pasture, the abundance of beech and oak for building cheese cellars, the presence of salt for curing and limestone caves for storage, and the amount of moisture available- all of these factors, indeed, have combined into a permissive setting for the establishment of a cheese industry in a region that pro-
VALUE OF AGRICULTURAL PRODUCTION BY CATEGORY OF PRODUCTS
1967

FRANCHE-COMTE

- MILK 51%
- BEEF PRODUCTS - Beef & Veal 10%
- OTHER MEAT PRODUCTS - Lamb, Pork & Horsemeat 15%
- OTHER CROPS - Industrial Beets, Potatoes, Fruits, Vegetables & Wood 3%

FRANCE

- CEREALS 24%
- OTHER CROPS - Industrial Beets, Potatoes, Fruits, Vegetables & Wood 20%
- CEREALS 75%

<table>
<thead>
<tr>
<th>Products</th>
<th>Franche-Comté %</th>
<th>France %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Milk</td>
<td>51.4</td>
<td>19.6</td>
</tr>
<tr>
<td>Beef</td>
<td>12.3</td>
<td>13.4</td>
</tr>
<tr>
<td>Veal</td>
<td>8.4</td>
<td>6.2</td>
</tr>
<tr>
<td>Lamb and Goatsmeat</td>
<td>0.9</td>
<td>2.2</td>
</tr>
<tr>
<td>Pork</td>
<td>6.7</td>
<td>11.8</td>
</tr>
<tr>
<td>Horsemeat</td>
<td>0.7</td>
<td>0.6</td>
</tr>
<tr>
<td>TOTAL LARGE ANIMAL PRODUCTION</td>
<td>29.0</td>
<td>34.2</td>
</tr>
<tr>
<td>Poultry and Rabbits</td>
<td>6.5</td>
<td>6.6</td>
</tr>
<tr>
<td>Other</td>
<td>0.1</td>
<td>3.1</td>
</tr>
<tr>
<td>TOTAL ANIMAL PRODUCTION</td>
<td>87.0</td>
<td>63.5</td>
</tr>
<tr>
<td>Cereals</td>
<td>2.8</td>
<td>11.2</td>
</tr>
<tr>
<td>Industrial Beets</td>
<td>0.2</td>
<td>1.6</td>
</tr>
<tr>
<td>Potatoes</td>
<td>1.6</td>
<td>2.5</td>
</tr>
<tr>
<td>Fruits and Vegetables</td>
<td>1.0</td>
<td>9.6</td>
</tr>
<tr>
<td>Wine</td>
<td>0.9</td>
<td>7.6</td>
</tr>
<tr>
<td>Wood and it By-Products</td>
<td>6.5</td>
<td>2.5</td>
</tr>
<tr>
<td>TOTAL CROP PRODUCTION</td>
<td>13.0</td>
<td>36.5</td>
</tr>
<tr>
<td>TOTAL AGRICULTURAL PRODUCTION</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Franche-Comté's primary agricultural product is milk, whereas on the national level, cereal and vegetable crops lead farm production. Dairying and animal production make up almost the entire agricultural economy of Franche-Comté.

duce more milk than it can consume.

The Juras, where some of the richest natural pasture-land of France abounds and dairying has a long history, witnessed the birth of the Comté gruyère, a cheese of unique character. Originally the native franc-comtois had conceived the idea of producing Comté as the best means of preserving and utilizing the great quantities of milk that were locally available, but not locally marketable. For, of all milk products, cheese was the easiest to transport.27

According to the testimony of several archivists, Comté gruyère dates back at least to the thirteenth century, and may be classified as one of the oldest types of cheese processed in France. In a letter dated December 1273, describing the commune of Déservillers, Hugues of Châlon refers to a type of cheese made by the "fruitiers" or cheese makers of the region.28 Indeed, the locality of Déservillers, situated some 20 miles south of Besançon in the high plateau area of Doubs, is claimed as the site of the oldest chalet or fruitière in the region (Map V). In another account of the area it is recalled that Philippe le Hardi, Duke of Burgundy, during his travels through the department of Jura in 1366, tasted "a cheese of large form" that had been manufactured at Poligny.29

It appears that the cheese acquired some commercial significance at a fairly early date. During the Middle Ages the serfs used it as a means of payment to lords and monasteries in exchange for their rights to the land. In
this fashion,

The lords of Châlon who resided at Salins and in Nozeroy, all the lesser lords of Mirebel, Frontenay, Foucherons and the abbeys of Baume-les-Messieurs, Saint Claude and Montbenoit, received in payment the cheese produced by the countrymen of their lands. 30

In local markets the peasants also bartered cheese for their basic necessities, while cheese makers traded their product for the wood from the "gruyers". 31 These officials, established during Charlemagne's reign, had been in charge of the forests since the ninth century, and because wood was essential for the heating process in Comté-making and the construction of shelves in the fermenting caves, the cheese producers had many dealings with the "gruyers".

However, the gruyère of Franche-Comté did not acquire that title until the eighteenth century. So far as is known, the word "gruyère" did not appear in the records until the census of 1712, when a certain Joseph Bartaud assessed the property of a Rembert Loriget, "Moyennant deux quintaux de Gruyère et un quintal de sera". 32 Moreover, its distinctiveness had not gone unrecognized. Before the term "gruyère" became widespread throughout the province, the herdsmen had called their finished product "vachelins" or "vacherins" 33 to distinguish it from the small goat's milk cheeses that were also made in the region, and vacherins was also mentioned in the "acts" of the Abbey of Beaune in the seventeenth century and in the "acts" of the Abbey of Montbenoit, dated 1751. 34 The reputation of the vacherins was sufficiently widespread that during the period of Spanish domi-
nation of Franche-Comté in the 1530's, Cardinal Granvelle, Viceroy of Naples, used to send for his favorite cheese all the way from his native Franche-Comté.\textsuperscript{35}

However, in the early phase, gruyère production was rather limited and primitive. In the fourteenth century it was the custom for the cheese maker to go from house to house carrying his rustic implements which included a copper cauldron, a wooden beater used to slice the curd, and several large stones for cheese-pressing: fuel was usually supplied to the dairyman by the client. Production of gruyère was not then conducted on a large scale, a fact which enabled the cheese maker to travel easily from village to village.

Lucien Febvre, in his \textit{Histoire de la Franche-Comté}, writes that the "Jurassiens" had not only to produce the round gruyère cheese, but also find a way to exchange it. Thus they were compelled to create markets and initiate trade wherever practicable: consequently commercial expeditions would leave every year, during the season of the first snows, in little convoys of fifteen to twenty carriages, taking their barrels of cheese with them.\textsuperscript{36} This group of merchants descended into the lowlands with their wood and cheese products much in demand among the lowlanders.

Thus wood became an associated product during the early period of cheese-making, and large-scale exploitation of the Jura forest was strong evidence of this. At higher elevations two types of conifers that persist, even today, in this region are the fir trees and the pines. The fir trees grow
on the less steep slopes while the latter are found at higher elevations in the mountains. But, because of the resinous nature of these conifers, the cheese maker did not select pine wood for the construction of cheese cellars: the conifers were used for fuel. Instead, it was the superior quality of the beech and oak that was preferred in the traditional gruyère industry.

The natural vegetation—characteristically mixed-deciduous forests in the plateau area—has been since altered by agricultural use of the land, but stands of beech were once dominant on the plateau to an elevation of 700 meters; these groves were usually mixed with oaks (chênes rouvres) and yoke elm, similar in pattern to the vegetation of the neighboring plains of Lorraine and Burgundy. But, under the pressure of cutting, pastures gradually replaced the forest with its relatively rich undergrowth. The demand for wood has always been very high in the deforested area of the plain, and therefore, lumbering has provided a basis for a subsistence economy from the Middle Ages to the present: it has furnished valuable materials for fuel and the construction of shelves for the cheese caves. Traditionally the forests, like the communal pasture or meadow, were considered public land.

The production of salt was also bound up with gruyère cheese production, since large quantities were required in the curing process: during the maturation period the rind of the cheese needs to be sprinkled liberally with salt to
accelerate the aging process. As it happens, most of the famous salt mines of the Juras have been located near Salins-les-Bains and the hills of Montmorot40 (Map V), and even the Romans, during their occupation of Gaul, extracted large quantities of salt from the Jura. At Salins, in the 1830's, 140,000 quintaux of salt was mined annually from "drying basins" and salt beds,41 but today salt is secured mainly at Poligny.42 The salt was taken from small pool basins and the water was evaporated by a heating over wood fires.43 Therefore salt, wood and cheese production formed something of an economic trilogy in Franche-Comté, and in medieval times the dairyman consistently exchanged his cheese for the salt and wood which were vital to continued production. Nor was the salt used only by the cheese maker: the farmer also traded some of his milk to acquire salt for his dairy herd.

Moreover, the Jura cheese industry fostered the development of the oldest cooperatives in France, and possibly in all of Europe. Cheese required a fair quantity of milk, and very few individual farmers had herds large enough to produce even a single cheese daily, especially as the average wheel of Comté gruyère utilized about 600 liters of milk. It was only when they grouped themselves together and formed an association that the farmers could secure a sufficient quantity of milk for cheese manufacture, and their incentive to cooperation was strong. The earliest cooperatives, called "fruitières", commenced operations some time during
the Middle Ages in the north-central Jura chain. If the records give valid data, it was in 1264 that the oldest cooperative began the production of what was to become its traditional large size cheese, and the location was the town of Levier in the high plateau of the Juras.

As has already been mentioned, during the earlier phase of the development of gruyère production, the cheesemaker had to go from farm to farm to manufacture his product, there was no permanent locale for production. But the cooperatives, once organized, brought cheese manufacturing under a single roof, and the fruitière functioned as a mutual milk-lending organization. In this system the quantity of milk brought by each member was measured and a rudimentary account was kept on a piece of flat wood which was marked by the appropriate number of dents. Within the organization it was decreed that whoever produced the most milk could keep the cheese and the cream, but he would also have to provide the necessary fuel.

But even the cooperative system failed to provide enough milk for year round operation. The volume of milk dipped to a minimum during the period of calving (from November to April), and in the winter months cheese-trading was at a virtual standstill. But as soon as the dairy herds had returned to the lush green pastures in May, cheese-making again became a flourishing activity.

As the centuries passed, cheese dairies multiplied, and by the mid 1850's there were 1,250 in Jura and Doubs.
Though the cooperatives had existed since the thirteenth century, it was not until the late nineteenth century that the cheese associations began to look for a tighter control of quality and a wider application of advanced technology in the dairy industry. In 1884, an agricultural syndicate composed of farmers was created in the Poligny district, an area which had been most successful in the quantity of Comté produced and in the organization of cooperatives. This syndicate was interested in making improvements both in bovine breeding and in the techniques involved in producing Comté gruyère. Farmers, sensing the potential for development, optimistically joined the cooperatives already organized with the hope of promoting a much wider market for their product, and, as the result of renewed interest in marketing, the national dairy school at Poligny was founded in 1890, primarily for the purpose of training students in the various technical aspects of dairying. The syndicate joined with the cooperatives to seek help from the government in the way of subsidies to be paid (through the General Council of Jura) to all cheese factories that would modernize their equipment.

It was in 1890 also that the Syndicate of Frutières of Jura joined together in a type of union "to defend the common interests of all gruyère producers," and encourage the inspection of "chalets" or cheese dairies. About one hundred cooperatives agreed to pay one franc per 100 kilos of cheese to cover the expenses of inspecting the working conditions. But this kind of operation lasted for only a
short period of time, apparently because it was deemed too onerous to ensure the proper supervision of all the dairies which were involved.

Somewhat later, probably in 1897, this same organization sent a commission to Switzerland to inspect cheese factory installations, and in its report it compared the cheese industries in Switzerland and Franche-Comté, with a significant emphasis on the advance made by the Swiss toward better hygienic standards. The national dairy school at Poligny duly stressed the findings of this report and asked cheese makers not to accept work with a cooperative which refused to modernize its facilities.

Once well established, the cooperatives sought to move into marketing on their own account, and they started selling their cheese to special finishers or cheese refiners. This innovation became evident in the traditional dairying region of Franche-Comté during the late 1800s. For the most part they sold their cheese while it was still "green"—too immature for consumption, or at least before it was properly aged. Two large industrial refiners known as the GRAF Company at Dole and BEL at Lons-le-Saunier gradually developed as a result, because they bought the cheese while it was still "green" and brought it to maturity. They successfully marketed gruyère on a large-scale in the early 1900s and their experience became the framework for the subsequent creation of the Cooperative Union of Refiners, such as the one in Besançon after World War II.
Once the cooperatives had created, during the nineteenth century, a market for their cheese, they tried to establish a fixed price for their product. This system was difficult to operate: fluctuations were inevitable because occasional years of extremely bad weather could cause a poor crop of fodder and the threat of flukes in the fields. In addition, the wars of the late nineteenth century brought further irregularities into the price structure. But even more significant was the competition with Swiss gruyère which intensified at a time when French production was rising: an increase of four million kilos was experienced between 1882 and 1892 on the markets of France. To worsen the matter, French transport companies tended to favor their neighbor's gruyères. At the turn of the century consumer preference for the Swiss product was still very strong, guided by a long established popularity rooted in its reputation for hygienic standards and confidence in an advanced technology that had never been disrupted by war. Thus, a good deal of business was involved, and special rates were allotted the Swiss imports. But what seemed anomalous to French producers was the fact that such a freight-rate structure placed their own product at a disadvantage, and this despite their relative proximity to the market. For instance,

During the 1880's Swiss Emmental, transported by way of Lons-le-Saunier to Marseille, was charged 45 francs per ton freight, while, on the other hand, the French Comté sent from Lons-le-Saunier to the same destination, cost 55.5 francs per ton; a cost difference of 10.5 francs for a distance of less than 200 kilometers.
Or, as the Jura Chamber of Commerce put it,

Five tons of Swiss gruyère sent from Verrières, a border town of Switzerland, to St. Nazaire had cost 42 francs per ton, and Comté that was shipped from Pontarlier to Paris was 42.30 francs per ton, or almost the identical price for twice the distance.64

The tariff system during the nineteenth century was so constructed that transportation and tariffs for Swiss imported Emmental were in practice the same as shipping costs for the French gruyère, and given this situation, the threat of Swiss cheese competition definitely affected the Comté gruyère market in France.

However, in its major elements, rivalry between the Swiss and the French gruyère industry had existed since production of this cheese had begun. Both sides laid claim to be the originators. As previously mentioned, during the Middle Ages, French gruyère had been called "vacherins", or "gruyers" from the officials involved in the local wood industry. Nevertheless the Swiss also claim to be the rightful heirs to the gruyère industry, pointing to the fact that there is a cheese producing town called Gruyère in their canton of Fribourg.65 This argument about the place of origin has never been settled: to the present day both parties stand firm in their claims. But in point of fact, the making of gruyère cheese antedates the formulation of definite political boundaries between Switzerland and France, and the claims seem a little pointless. Nowadays, it is true, the techniques employed in producing gruyère in the two countries may vary slightly, but the industry of both nations developed
from a common ancestral tradition. Suffice to conclude that the point of origin was somewhere near the present Franco-Swiss border in the Jura mountains, and that the Comté gruyère of today has evolved directly from the medieval product.
REFERENCES


2. About 5,000 feet. The highest peak is Crêt de la Neige, 5,812 feet. Ibid., p. 196.


4. About 4,000 feet. All metric measures that appear in the text have been changed into the English system by the author. Vidal de la Blache, p. 340.

5. About 5,200 feet. Ibid.

6. About 3.5 inches.


11. Ibid.

12. From 1,600 to 2,900 feet. Vidal de la Blache, p. 198.


14. Historically cherry orchards were planted on the valley floor and on the less steep slopes.


17. For example the section around Besançon receives 33 days of fog a year. Ibid., p. 242.

18. Monnot, map 1.


22. About 800 to 1,600 feet.

23. Monnot, map 5.

24. From 24 to 68 U.S. gallons. Ibid., map 1.


26. Fruits and vegetables make up one per cent of the total farm produce in Franche-Comté as shown in Figure 3.


29. Ibid., p. 1.

30. Translated by the author. Ibid., p. 2.

31. The word "gruyers" comes from the old French and refers to the officials who were in charge of the forests or "grueries". Ibid.

32. Translated: In exchange for some land, about 440 pounds of cheese and 220 pounds of some type of grain were used as payment. Ibid.

33. This term was first mentioned in 1469 in a book by J. Claudet, called Diccoride, which was about the Comtoise region. Ibid.

34. Ibid.

35. Ibid.


38. Ibid.

39. Today 35 per cent of the forested areas in Franche-Comté are private, 65 per cent are communal (village-owned) or state-owned. Henri de Montrichard, "Réflexions sur la forêt comtoise," in L'Agriculture en Franche-Comté (Paris: Centre d'Etude des Relations Extérieures, n.d.), p. 29.


41. One quintal equals about 200 pounds. Febvre, p. 266.

42. Guide Michelin, Jura, p. 15.

43. Ibid.

44. C.I.G.C., p. 6.

45. Chapuis, p. 115.


47. Ibid., p. 7.

48. Ibid.

49. Ibid., p. 5.

50. Ibid. p. 4.

51. Ibid., p. 8.

52. Ibid.

53. Ibid., p. 9.

54. Ibid.

55. Ibid.

56. Note: there may have been a misprint in the original text which gives the year as being 1887, but the Syndicat of Fruitières of Jura was not founded until 1890. Ibid.

57. Ibid., p. 5.

58. Ibid.

59. A common parasite of sheep and cattle. Ibid.

60. Ibid.

61. The word "Emmenthal" with the added "h" is used in lab-
eling the Swiss gruyère product, while the French spelling of their cheese excludes the "h". The difference in spelling will be employed throughout the text to distinguish the French product from that of the Swiss.

62. Ibid., p. 6.
63. Translated by the author. Ibid.
64. Translated by the author. Ibid.
CHAPTER 2
LOCALIZATION OF DAIRY PRODUCTS: THE CHEESE SPECIALTY AREAS OF FRANCHE-COMTE

The unfolding of a cheese specialty industry, Comté in this instance, within the physical context of the Jura mountains has occurred in one of the major dairy regions of France. In the country as a whole, dairying is significant and recent years have confirmed this activity: on a national basis the volume of milk nearly doubled between 1950 and 1968 when it reached 295 million hectoliters.\(^1\) Northwestern France and Lorraine share with Franche-Comté the distinction that at least 30 per cent of the agricultural production in terms of value is derived from milk.\(^2\) In Franche-Comté dairy products provide over half the total farm income, a striking contrast with the situation in France as a whole where milk provides somewhat less than one fifth of the total agricultural value, as shown in Figure 3.\(^3\)

Present day France has inherited a number of cheese producing regions with some very strong local traditions. Almost every province claims its particular cheese: camembert maintains its prestigious position in Normandy, and brie, in the Paris Basin, is one of the nation's favorite cheeses. Auvergne, the mountainous area of eastern France, and Lorraine have also developed some well defined cheese specialties,\(^4\) as is indicated in Map VI. Butter production, on the other hand, tends to be concentrated in Normandy, Charente and Brittany.
SOURCE REGIONS FOR CHEESE SPECIALTIES IN FRANCE

This map of France indicates the location of traditional cheese specialty areas (underlined names). Many cheeses are now made far from their point of origin.

Data Source: Annuaire national du lait 1970
Among these various local specialties, gruyère cheese is basically a product of eastern France, a region including Franche-Comté, Lorraine, the Vosges, and the French Alps (Map VI). Franche-Comté alone produces somewhat more than 40 per cent of the total gruyère made in France, and the region as a whole produces 88 per cent of it.

It is primarily the production of Comté gruyère that distinguished the dairy zone of Franche-Comté as a cheese specialty region, and Comté holds a relatively important position in the French dairy industry as a whole. Almost three-quarters of the milk processed in the province is made into cheeses, mainly Comté and Emmental; and 90 per cent of the total tonnage of Comté cheese comes from the departments of Jura and Doubs. Thus the manufacture of this special gruyère is concentrated within the central and southern portions of the province.

In essence, Comté cheese is a type of gruyère made from unpasteurized milk and is classified among the semi-hard cheeses, along with Emmental, Beaufort and Cantal. In general appearance and processing Comté gruyère closely resembles Emmental gruyère, but the latter, unlike Comté, requires full pasteurization. One wheel of Comté weighs from 30 to 55 kilos (65 to 120 lbs); it is relatively smaller in height and diameter than the Emmental which weighs from 60 to 130 kilos (130 to 280 lbs). The proportion of fat material also differs, for it is relatively higher in Comté. Moreover, the "eyes" or openings within the Comté are the
"GRUYERE" PRODUCING AREAS IN FRANCE

Map VII

Data Source: M. Metzger's "Le marché des gruyères," (Poligny: Ecole Nationale d'Industrie Laitière, 1971)
size of a small pea or cherry, while those of the Emmental are about the size of a walnut. The bodies of these cheeses are similar in color, but the rind of Emmental is darker brown. Whereas the area of production for Comté is geographically restricted to near the point of origin, Emmental production is dispersed throughout a number of dairy areas of France, as well as in other countries including Switzerland, West Germany and the United States. Furthermore, Comté is an ancient product in Franche-Comté, but Emmental was first introduced from the canton of Bern in Switzerland into the department of Haute-Saône during the 1920's, and it did not reach the department of Doubs until the post World War II period.

Although the techniques for making both types of gruyère are basically the same, there are differences in the maturing process for Emmental and Comté. During the aging period Comté is periodically saturated and rubbed with salt in the fermenting caves, but Emmental simply undergoes a preliminary salt bath and is regularly rubbed to give it its smooth texture, but without the further addition of salt. As a result of this different processing, Emmental is more completely skimmed and the curd is not as dry as that of Comté. The temperature for curding also differs during the processes of manufacturing the two gruyères, and pressing has to be more intense for the larger size Emmental.

In addition to Comté cheese, Franche-Comté specializes in the manufacture of Morbier and Cancoillotte. Morbier is
a type of "St. Paulin", made in the mountainous regions of southern Jura and Doubs during the winter months, when milk production is at its lowest. Consequently it is relatively small, narrow and weighs on the average about 12 kilos (26 lbs). It is considered a semi-hard round cheese. The unique characteristic of Morbier is the blue colored mold present within the product, a mold obtained by the incorporation of soot or ashes which create a horizontal layer in the middle of the cheese.

The production of Cancoillotte, by contrast, is centered mostly in the department of Haute-Saône (1,200 metric tons annually) and in the northern part of Doubs, the area around Baume-les-Dames. A soft viscous cheese, of the consistency of yellow paste, and made entirely from skimmed milk, Cancoillotte is produced by adding "metton", a fermented whey which has had 30 per cent of its casein removed: butter and sometimes white wine are added during the process. The cheese has to remain in a very soft state and is marketed in small molded containers such as are used for cream.

About 3.6 per cent of the milk processed is made into butter, some 10,000 metric tons in Franche-Comté. It is important only in some of the dairies of Haute-Saône, and in the province, as a whole, it is primarily a by-product from the dairy plants making Comté and Emmental, and in a comparatively small volume which offers little competition with the produce of northwestern France. The local butter is usually distributed to regional rather than national
markets and is sold as pasteurized or unpasteurized (farm style) butter according to the tastes of the consumer.
REFERENCES


2. Ibid., p. 104.

3. About 51 per cent of Franche-Comté's total agricultural production is in milk as indicated in Table 2.


7. Ibid., p. 11.


9. Ibid.

10. In America Emmental is often called "Swiss cheese".


12. Ibid.


14. Ibid.


CHAPTER 3

TRADITIONAL AND MODERN: THE METHODS OF CHEESE-MAKING

There seems to be a sharp divergence of opinion among the cheese makers about some important factors involved in the production of a good quality Comté cheese, and various arguments on technical matters have created something of a dichotomy between the traditional artisan and the industrial dairyman (Table 3). Both sides stress the importance of the qualities of milk, but the well established chalet attaches more significance to the type of bovine breed chosen than does the industrialist. Modern factory specialists tend to pay particular attention to hygienic standards, especially the degree of coagulation in the milk as determined by objective laboratory analysis. The traditional cheese maker, by contrast, emphasizes the alleged importance of the type of fodder used and of rich natural pastures as the best livestock feed. The industrial dairyman, on the other hand, contends that the crucial factor in producing Comté is not the breed or the fodder but the manner in which the milk is treated once it arrives at the plant.

Whether or not the breed is significant in objective fact, it has certainly been important in local opinion. Almost 80 per cent of the cows raised in Franche-Comté belong to the Montbéliard race. Selected for milk output, this breed originated from the Swiss Simmental, one of the largest dual-purpose, milk-and-beef breeds of Europe. In appear-
### Table 3

**THE DICHOTOMY OF THE TRADITIONAL AND MODERN CHEESE DAIRY**

The general size of farms in Franche-Comté is small (24 hectares or 59 acres, Chatras, p. 8.).

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Modern</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>A) Farm</strong></td>
<td><strong>A) Farm</strong></td>
</tr>
<tr>
<td>2. Importance of pastures and hay (in winter). Prohibition of silage especially corn material and any plants belonging to the beet family.</td>
<td>2. Type of fodder used not considered crucial to cheese production.</td>
</tr>
<tr>
<td>3. Interested in quality of milk.</td>
<td>3. Interested in quality of milk.</td>
</tr>
<tr>
<td><strong>B) Factory</strong></td>
<td><strong>B) Factory</strong></td>
</tr>
<tr>
<td>1. Milk collection, milk is brought by farmer twice daily to small dairy in large cans.</td>
<td>1. Factories equipped with tank trucks (5,000 to 10,000 liter capacity) collect milk from farms and several villages.</td>
</tr>
<tr>
<td>2. Small number of workers employed (usually cheese maker and one other worker).</td>
<td>2. Factory employs more workers.</td>
</tr>
<tr>
<td>3. Small volume of milk, small quantity of Comté produced. One copper vat (600 to 800 liters) can produce only one wheel of Comté at a time. Process of cheese making must be repeated several times.</td>
<td>3. Larger volume of milk, more wheels of Comté produced. One stainless steel vat (holds 4,000 liters) can produce 8 wheels at a time. Reduces production time.</td>
</tr>
</tbody>
</table>
Table 3 Continued

<table>
<thead>
<tr>
<th>Traditional</th>
<th>Modern</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Rennet from calves' stomach used in curding process.</td>
<td>6. Utilization of industrial rennet in curding process.</td>
</tr>
<tr>
<td>7. Method of pressing, heavy wooden presses. Cheese has to be turned over periodically.</td>
<td>7. Method of pressing, air compression reduces amount of time of pressing.</td>
</tr>
<tr>
<td>8. By-products: farm (unpasteurized) butter and cream are produced.</td>
<td>8. By-products: pasteurized butter and cream. Whey is fed to supplementary swine industry. More efficient use of by-products.</td>
</tr>
<tr>
<td>9. Small dairy is village oriented, has a restricted production.</td>
<td>9. Factory is not limited in the matter of milk production, much larger radius, extending to other villages.</td>
</tr>
</tbody>
</table>

The description of sample cheese factories discussed in this chapter is based on field observations and interviews with Mr. Curty, cheese maker at the traditional chalet in Tarcenay, and Mr. Hanriot, cheese maker of the modern factory in Epenoy, during the months of July and August, 1971.
Once the pure Montbéliard is characterized by a white face and large reddish-brown patches on the coat, with white extremities. However, more economic significance attaches to the fact that "this cow has a better milk-type udder and the milk yield is higher, though the fleshing characteristics are not as good as those of the Simmental." Its choice is thus symptomatic of the bias toward dairy production, though stress is also laid on the usual health of the Montbéliard herd and its good resistance to such diseases as tuberculosis and brucellosis.

Thus the organization of the Montbéliard Herdbook Association in 1889 in the department of Doubs was linked with the improvement in dairy breeds. Historically the introduction of the Montbéliard race has altered the composition of the dairy herd, bringing about a sharp increase in the number of milk cows of high yield and, concomitantly, a decline in the numbers used as work animals.

Though 80 per cent are Montbéliard some ten per cent of the cows in the Jura region belong to the "Pie rouge de l'Est" group or Eastern red-spotted cow. This race was also bred from the Swiss Simmental, and "has more of a dairy conformation" than this ancestor "but is similar in external characteristics, including the typical coloring of tan patches on white." Admittedly, the Pie rouge does not give so high a yield of milk as does the Montbéliard, but it nevertheless forms a significant component of the dairy stock in Franche-Comté.
The Syndicate of Livestock Raising was one of the first professional organizations created in the Jura region, with the buying and upkeep of the best bulls for milk cow breeding as its main objective. Next to its role in livestock selection the Syndicate is also concerned with "Contrôle laitier"—the control by the dairies of the quantity of milk produced by each cow during the morning and evening milking.

Some cheese manufacturers and research technicians of the national dairy school feel that the type of herd employed for milk production (in this case, the Montbéliard) is of a little consequence for the manufacture of Comte cheese. Whether or not that be true, there is little doubt that the utilization of a breed that yields a high volume of milk and is well adapted to mountain pastures appears to be most advantageous, and, after all, the qualities of the milk are critical factors in manufacturing gruyère. In this respect, the Montbéliard meets the criteria perfectly: it is rich in fat and protein needed for successful coagulation during the curding process.

Animal nourishment is equal in significance to herd breeding as a factor in qualifying milk for gruyère production. Traditionally, and even today, dairy cows utilize the pastures in summer, and the herd is left in the meadows as long as possible, usually late autumn. But during the winter months, when they are supplied with fodder, milk output is reduced, (Figure 4). The natural pastures can be grazed for only about six months at most, and sometimes the period is
Table 4

DAIRY CATTLE NUMBERS FOR FRANCHE-COMTÉ 1966

<table>
<thead>
<tr>
<th></th>
<th>All Cattle*</th>
<th>Milk Cows</th>
</tr>
</thead>
<tbody>
<tr>
<td>Doubs</td>
<td>238,300</td>
<td>107,400</td>
</tr>
<tr>
<td>Jura</td>
<td>186,900</td>
<td>92,000</td>
</tr>
<tr>
<td>Haute-Sâone</td>
<td>192,600</td>
<td>97,500</td>
</tr>
<tr>
<td>Belfort</td>
<td>21,800</td>
<td>10,200</td>
</tr>
<tr>
<td>France</td>
<td>20,500,000</td>
<td>7,500,000</td>
</tr>
</tbody>
</table>

*All cattle includes non-producing dairy cows: bulls, young males and females.

The cattle of Franche-Comté are composed primarily of dairy herds although, more recently, beef production has become an economic activity complementary to dairying in the province.

This graph presents the pattern of annual milk production. The period of calving accounts for the low output during the months of November to April. The peak period reflects the time of greatest utilization of the natural pasture by the dairy herds. The difference in volume of milk produced between the two years was caused by an unusually wet season in 1968.

much shorter, especially on the higher cooler slopes of the Juras. During the winter, when natural grazing is not available, each cow consumes about 15 kilos of stored hay daily. As the result of such seasonal changes in livestock feed, the Comté produced in summer is more yellow in appearance, while cheese made in winter is almost white—a less favored color. Furthermore, the winter milk is often more difficult to ferment than the summer milk because of this change in diet. In addition there is the difficulty of conserving fodder for winter when a quantity sufficient only for an average herd of fourteen to twenty cows is available. Indeed, limited availability and seasonality of pasture may, in the past, have prevented much of an increase in the herd on the average farm. Even today, harvesting fodder has its hazards. For best results, it must be done at a time when the nutritional value is at its peak or when the growth is neither too green nor too ripe. Silage fodder which is stored while still green, and which has replaced traditional haymaking in some other regions of France, is not utilized in Franche-Comté. Some authorities are convinced that this type of feed has an indirect but detrimental effect upon the making of cheese. The milk of silage-fed cows allegedly contains fermentations which tend to swell and eventually burst the wheels of gruyère during the aging process. Dehydrated fodder is used instead, although that involves some danger from the lack of rumination. So, to offset this deficiency, coarse
feed is given along with the dehydrated material. The dairy farmers are aware of the need for wholesome fodder for their cows, and as a consequence any plants from the beet family—which tend to impart an odor to the milk—are strictly prohibited.\(^\text{15}\) The Department of Agriculture strongly regulates the use of silage, especially corn silage which contains an anaerobic fermentation.\(^\text{16}\)

The problems of milk quality are accentuated by the use of unpasteurized milk. For the milk used in producing Comté contains many useful microbes as well as those detrimental to cheese production. Sterilization of milk, which is done by heating to 115°C for fifteen minutes, inevitably kills all the organisms present\(^\text{17}\) and typically produces a cooked taste, but the resultant milk can be stored unopened for as long as a month: pasteurized milk remains fresh for a much shorter period of time. However, neither sterilized nor pasteurized milk can produce a Comté of good quality for the living ferments are lacking, and as a consequence the "aging" process cannot take place. A very bland tasting, whitish-looking cheese results, for the milk has lost its fermenting qualities. But raw milk contains both the lactic and propionic bacteria which give it a very rich microbiotic content\(^\text{18}\) and are relevant to the aging process of Comté. Therefore the quality of milk, its fat composition and its hygienic condition are crucial to the production of Comté.

The Chambre d' Agriculture has also organized a close check on livestock raisers to encourage the production of the best
quality of milk and on cheese makers to use a richer and more hygienic milk for Comté manufacture. 19

To assure the standardization of a milk supply with the best qualities for gruyère manufacture, a sample milk testing program has been activated in Franche-Comté. Generally the test, based on two samples, analyses the contents and qualities to determine acidity, lactocoagulation, lacto-fermentation, "white side", and the fatty and nitrogenous components. 20 In 1970 the Chambre of Agriculture added an agricultural analysis laboratory to the existing ones in the province, locating it at Besançon which has become the main research center for all of Franche-Comté in terms of the chemical analysis of milk. Besides bacteriological and chemical analysis, the laboratory tests samples for bovine brucellosis. 21

The National Dairy School at Mamirolle, seven miles southeast of Besançon, also conducts laboratory tests, dispatching about 180 tubes of lactic ferment each week, and analyzing 2,350 samples of rennet and milk by-products from 215 cheese dairies. 22

Thus much scientific effort has been dedicated to the determination of conditions affecting the quality of milk for cheese, but most observers in Franche-Comté still think of Comté as an artisan's product. Although the modernization plan called for by many cheese industrialists would drastically shift the balance from art to science, the small traditional chalets still exist alongside the modern factories
in the region. The traditional dairy at Tarcenay and the
modern factory at Epenoy exemplify the opposing poles which
are presented, in somewhat idealized and dichotomous fashion,
in Table 3.

In a sense, these are twin factories: located in
the department of Doubs, both are cooperatively-owned and
produce Comté exclusively with butter as a by-product.23
These two dairies utilize the original "chalet" structure
for cheese-making, but therein the similarities end.

The cheese dairy at Tarcenay (10 miles southeast of
Besançon) is located close to one of the main highways con-
necting the urban center of Besançon with the Swiss border.
The village of Tarcenay, nearly surrounded by clusters of
mixed-deciduous woods, is located in the lower plateau region,
an area where milk production is adequate, that is from 180
to 270 liters per square kilometer, at an altitude of more
than 1,600 feet (500 meters).

By contrast, the cheese factory of Epenoy is situ-
ated in the high plateau, an area of scattered conifer
forests and vast open meadows at an elevation of greater
than 2,400 feet (730 meters). It collects milk from the
most concentrated dairy zone in Doubs where more than 270
liters are produced per square kilometer (Map III).

The farmers faithfully bring their milk twice daily
to the cheese factory at Tarcenay and at Epenoy. Usually
milk from the more distant farms is picked up by tank trucks;
this system is used especially by the dairy at Epenoy which
handles a large volume of milk. Once at the factory, the milk is weighed and listed in an accounting book. Although the milk is delivered in the morning and early evening, Comté is made only once a day. At the beginning of the day, the morning's milk and the previous night's collection are added together, and this mixed milk is put into a separator which can skim the milk at a rate of 4,500 liters per hour. Because it remained standing overnight, the evening milk, has already been partially skimmed, and also has had a chance to begin the development of its natural microflora. Skimming is essential to Comté production, for this cheese otherwise becomes very sweaty and runny and turns rancid quickly. On the other hand, if too much skimming takes place, the result is a curdled cheese wheel with very little taste.

For the actual heating process the skimmed milk is put into large vats. At Tarcenay the method is still traditional, although the use of wood and coal for fuel has been replaced by electrical steam heating. Five copper vats, each holding 600 liters of milk, are used for the curding process, each vat holding only enough for a single Comte gruyere (Figure 5). The factory at Epenoy, by contrast, uses two large vats of stainless steel, each holding 4,000 liters, and each containing enough milk for eight wheels of Comté. The contrast has occasioned much debate among the cheese makers. Those in favor of the modern techniques point out that stainless steel vats do not oxidize, are easier to clean, and above all, that they can hold a greater quantity
Figure 5. The traditional copper vat is still utilized in the dairy at Tarconay. The vat can only process enough milk for one wheel of Comtè at a time. Photograph taken by the author.
of milk, and therefore enable more gruyère to be produced at one time. However, those who favor the traditional copper vats affirm that the little bit of oxidized copper that remains in the milk after it is heated in the vat is significant: it allegedly adds flavor, creates a better curd, and, indeed, enhances the very taste of Comté. Not only that, but the copper vat, they claim, heats much more rapidly than stainless steel.

Once curding has taken place in the vats, the coagulated milk is sliced into small cubes the size of a wheat-grain by an instrument (traditionally lyre-shaped) fitted with thin slicing wires and called a "tranche-caillé". But tradition and modernity are again at odds: at Epenoy an automatic curd slicer is used and at Tarcenay the curd is sliced by hand.

Further differences become apparent during the pressing process. In the dairy at Tarcenay the curd is gathered in a linen cloth and then placed in the metal mold for the pressing. Heavy wooden presses are screwed down upon the cheese (Figure 6). However, in newer factories like Epenoy, air compression is used and this process takes only five hours, a mere fourth of the time needed for the older method (Figure 7). Furthermore the wheels of cheese do not have to be turned over every two hours as they are in the traditional method. In both the traditional and modern factory, before the cheese is brought to the pressing room, each wheel is marked with a Comté sticker, a green oval-shaped label made
Figure 6. The heavy wooden presses at Tarcenay require that the cheese be turned over every couple of hours and the wheels of cheese must remain in the presses for almost 20 hours.
Photograph taken by the author.

Figure 7. Air compression along with stainless steel webbed molds speeds up the pressing time for Comté at the cheese factory at Epenoy.
Photograph taken by the author.
of chlorophyll and casein and easily pressed into the soft curd\(^{33}\) to signify the regional patent.

After pressing, the young white cheese which has taken on its final form and appearance is ready for the "aging" process. At this point the cheese is cooled in the cellar at a temperature of about 10°C (50°F) for one night before salting begins.\(^{34}\) Thereafter each wheel is dipped in a salt bath and put in a warmer cellar where it is salted with large grams—twice daily for the first three days and once a day during the following twelve days:\(^{35}\) after each salting the rind is rubbed with a linen cloth to further the penetration of saltiness.\(^{36}\) After two weeks the cheese is ready for the fermenting caves, where enzyme action and the maturation process start to take place within the gruyère wheel. Most cooperative and privately-owned cheese factories will seldom keep their cheese beyond two months, for space is limited by the continuous addition of new wheels of Comtè.

Thus the dairies pass on their produce to cheese refiners with "finishing" caves or cellars. There the Comtè is occasionally turned over and salted. The fermenting caves utilize only wooden planks for their very long shelves which store the heavy wheels of cheese in vertical stacks of nine, and usually oak boards are favored, for they are thought to play an important part in the fermenting process (Figure 8). The better quality Comtè s are aged for approximately nine months. And it is those who control the finishing caves that determine the distribution of Comtè to domestic markets.
Figure 8. The wheels of Comté are allowed to age for six months in the aging caves, such as this one in Poligny, a privately-owned cheese finishing cave. The rinds of cheese are periodically salted and laid to rest on large oak planks. Photograph taken by the author.
Thus the finishing caves form an important link in
the chain, and three main cheese refining cooperative unions
have been established in Franche-Comté.

There are two cooperative union finishing caves in
Haute-Saône: the one at Jussey and the other at Séveux,
both receiving exclusively Emmental from 60 cheese
dairies. The cooperative finishing caves at Poligny
serve about 30 factories in Jura. But the most signifi-
cant cooperative (as far as volume of cheese aged is
concerned) is the Cooperative Union of Fruitières of
Franche-Comté in Besançon, created in 1938. This large
refiner collects gruyère from more than 200 cooperative
dairies located in Doubs and the northern section of
Jura.37

Along with the cooperative cheese refiners there are about
two dozen smaller, privately-owned finishing caves which
serve more than 600 Comté dairies in Franche-Comté (Map VIII).

The factory at Epenoy typifies much of the modern
system. About 600 wheels of Comté are produced monthly,38
and these are kept for two months before they are sent from
Epenoy to the large union cooperative finishing caves in
Besançon (often called JURADOU).39 It is up to the latter
organization to select the market and determine the price,
therefore in this transaction the cheese factory at Epenoy
is not guaranteed a fixed profit: the market is too much
subject to change as it responds to fluctuations in milk
prices, transportation costs, and other contingencies.40 It
is not until all the produce has been sold that the cheese
maker can realize his profits.41 This single example seems
to be the case with most of the cheese dairies that have be-
come industrial in scale. Nevertheless the system seems to
be advantageous: the cooperative at Epenoy continues to
Privately owned cheese cellars are more numerous than cooperative ones. The finishing caves which decide on the marketing of Comte are located primarily in Franche-Comté.
expand production, collecting more milk from as many farms as possible.

Yet, despite the differences in types of vats and methods of pressing, the overall process of manufacturing Comté remains basically the same, with or without traditional or modern methods.

The differences in means of transportation and mode of by-product disposal are more clear-cut. Normally, milk that is brought to the cheese factory is transported in large cans by the local milk producers, but in the case of a large-scale cheese dairy cooperative drawing its milk from distant farms, refrigerated tank trucks pick up the farmer's milk. An automatic measuring gauge registers each contribution as the raw milk is pumped in the tank, and large-scale delivery is involved: each truck can carry from 5,000 to 10,000 liters in a single haul. And when it comes to the finished product, the wheels of Comté are delivered to domestic markets and important urban centers within the country by a fleet of refrigerated trucks which receive the Comté from the finishing caves, whether these be cooperative or privately-owned.

Moreover, the modern cheese factory is much more efficient than the traditional in the matter of handling the by-products of cheese manufacturing. In up-to-date factories pasteurized butter and cream are produced, and the residual whey is fed to the pigs. Therefore, the raising of herds of swine has become a new and valuable supplement to cheese-making.
So, though Franche-Comté's pork production represents only 6.7 per cent of the province's total agricultural output in terms of value (Figure 3), more pig farms have recently been located with reference to gruyère cheese factories. The residual whey is no longer left to sour but is pasteurized before it is fed to the pigs.

An example of this association occurs three miles east of Pontarlier where the cooperative of Bannans operates a swine industry linked with its cheese production. This cooperative, newly formed from the consolidation of several milk producers and thirteen small traditional dairies, began production in 1968, and proceeded to construct a brand new factory equipped with the latest machinery and utilizing 25,000 liters of milk a day for the production of Emmental cheese. About 1,000 pigs, grouped in four buildings with 250 in each, receive their daily whey from the cheese factory. In the same location a purification system has also been installed, an innovation which treats the residual water from cheese manufacture as well as wastes from the pigpen in the most effective and modern way. This type of "supplementary" economic activity, however, is only in the experimental stage. It is hardly expanding on a broad scale through the region, for it can work well only with cheese factories that utilize a large volume of milk, and few local dairies can match the capacity of Bannans.
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1. The average cow in Franche-Comté produces 3,500 kilos of milk a year. Charles Monnot and G. Roucou, L'économie laitière franc-comtoise (Besançon: Service Interdéparte-


3. The Montbéliard cow is native of the town of the same name.

4. Rouse, p. 144.

5. Eugène Voisinet, "L'élevage en Franche-Comté," in L'Agri-
culture en Franche-Comté (Paris: Centre d'Etude des 
Relations Extérieures), p. 18.


7. Seventy per cent of the cows in Franche-Comté are pres-
ently artificially inseminated. Voisinet, p. 18.

8. Ibid., p. 19.

9. Ibid., p. 18.

10. Jean Boichard, "La modernisation agricole sur les pla-
teaux du Jura," Revue de géographie de Lyon, Vol. XXXV 

11. L. Monnot, Le lait en Franche-Comté, production- trans-
formation- commercialisation, unpublished Masters thesis 
(Besançon: La Faculté des Lettres et Sciences Humaines, 

12. Ibid., p. 22.

13. Ibid.

14. Ibid.

15. C.I.G.C., "Historique," (Poligny: Comité Interprofes-

lait selon la qualité," Réalités franc-comtoises, No. 135 

17. Personal interview with teacher at National Dairy School, 
18. L. Monnot, p. 36.
22. The quality of butter is also analyzed and tests are conducted on the amount of fat content, 82 grams of fatty material per 100 grams of butter. Anon., "L'enseignement agricole ENIL de Mamirolle," Réalités franc-comtoises, No. 135 (May, 1971), p. 333.
23. In 1971 the dairy at Tarcenay processed 1,460,000 kilos of milk, while the factory at Epenoy had an output of 2,649,000 kilos. Based on a list of cooperatives producing Comté for the department of Doubs for 1971, published by Chambre d'Agriculture, Besançon, 1972.
25. Ibid.
26. L. Monnot, p. 29.
27. Ibid.
30. L. Monnot, p. 29.
32. Air compression used in pressing cheese varies from 150 to 250 kilos progressively. Personal observation at Epenoy, August, 1971.
33. Ibid.
34. Ibid.
35. Monnot and Roucou, p. 10.


39. Ibid.

40. Ibid.

41. Ibid.

42. Monnot and Roucou, p. 79.


44. Ibid., p. 718.

45. Ibid.
CHAPTER 4
ORGANIZING THE INDUSTRY: A QUESTION OF SCALE

At first glance, the matter of ownership of cheese dairies may seem irrelevant to the separate theme of modernization of factories. But indirectly, whether the dairy is cooperative or privately-owned, there must be some interaction among the proprietors in planning the consolidation of the traditional chalets. In certain cases, the cooperatives may be at a greater disadvantage: for instance the organization of the cooperative could be retarded or handicapped by the opposition of some of its shareholders to the installation of modern equipment in their chalet. In Franche-Comté, on the whole, the cooperatives outnumber the private enterprises and are dominant in smaller-size factories (Figure 9). Almost three-quarters of those dairies in the province which have an input of less than 15,000 hectoliters annually are cooperatively-owned, but the ratio of private to cooperative factories increases as size increases. It is part of the modernization plan (and most likely the crucial factor so far as consolidation is concerned) to convince a rural population still involved in their traditional cooperatives that it is to their benefit to replace their local chalets by large-scale factories.

Generally speaking the dairy industry of Franche-Comté involves three related enterprises: milk farms, cheese dairies and finishing caves. These three basic units operat
SIZE OF COOPERATIVE AND PRIVATELY-OWNED DAIRIES IN
FRANCHE-COMTE 1968

number of factories
140
100
60
20

size (based on volume of milk processed in hectoliters)

- COOPERATIVE
- PRIVATELY-OWNED

Data Source: Monnot, L'économie laitière franc-comtoise.

Figure 9
under two distinct patterns of ownership, private and cooperative. In the production of Comté both systems use identical techniques and installations, and the finished product, whether private or cooperative in origin, will be sold in the same gruyère market. Milk producers themselves may belong to cooperatives or they may remain as independent contractors to the cheese factory. It must also be taken into consideration that not all of the milk is destined for the dairy plant: about 13 per cent of the total produced in Franche-Comté is consumed at the farm.

After the milk is collected from the farm, it can be marketed in several ways, as shown in Figure 10. If the milk producer belongs to a cooperative the milk is either transported daily to the cooperative cheese dairy, or it may be sold to a cooperative milk contractor who delivers the raw product to the privately-owned dairy. The unassociated or independent dairy farmers sell their milk directly to private industrial cheese factories. Cooperative cheese dairies may deliver their unfinished cheese to the union cooperative finishing caves or sell to privately-owned concerns: about 20 per cent of the cooperatives in Doubs send their products to private industrial refiners.¹ The union cooperative cheese cellars did not come into existence until 30 years ago.² Some industrial dairies which have developed from the private sector and have been able to expand into large-scale manufacturing collect their own milk, produce and age their own cheese, and, therefore, become direct
STRUCTURE OF COOPERATIVE AND PRIVATELY-OWNED DAIRIES
IN FRANCHE-COMTE

cooperative sector
- grouped milk producers

private sector
- independent milk producers

manufacturing cooperatives

milk market cooperatives

cooperative cheese factories
- of industrial scale

cooperative chalets with hired cheese makers

privately-owned chalets, cheese maker has entrepreneurship

privately-owned cheese factories
- of industrial scale

milk is collected

milk is collected

fresh dairy products
- cheese, butter, and cream

butter, cream, and cheese

cheese

unions cooperative finishing caves

privately-owned finishing caves

sell cheese

sell cheese

sell cheese

sell cheese

butter, cream, and cheese

butter, cream, and cheese

butter, cream, and cheese

butter, cream, and cheese

Market

Source: Monnot, L'Économie laitière franc-comtoise, p. 18.
agents in the gruyère market: an example, perhaps the only local example, of this type of structure is the "Petite Enterprise" near the town of Pontarlier in the high plateau area of Doubs.³

During the nineteenth century the industrial dairy evolved simultaneously with technical improvements and an increase in the volume of milk production. Consequently the industrial cheese factory is based primarily on a large collection of milk, sometimes involving several milk contractors. One advantage that comes with the enlargement of the industrial cheese factory is an increase in milk processing which permits the manufacture of diversified products such as Emmental and fresh dairy produce. At the same time marginal costs in cheese-making are reduced with the expansion of production.

Within this economic structure (inclusive of cooperative and privately-owned cheese dairies) the upkeep and overhead of the cheese factory or chalet is significant. Whether the chalet is constructed by cooperative or private capital, there are three basic ways of apportioning responsibilities:

1) the milk producers could own the building and the equipment and then enter into a contract with a cheese maker to produce Comté; 2) the milk producers could finance the construction of the dairy and the equipment needed and then rent or lease the factory to a dairy manufacturer, also selling him their milk by contract; or 3) the dairymen may own the building and machinery and buy milk by contract from the milk producers.⁴

In the case of most cooperatives which buy their own
chalet or building, each share owner (i.e. each member of the association), contributes to the upkeep of the factory. Only one-third of the sum necessary for the installation is required by the cooperatives.\(^5\) The rest of the money may be loaned by the Agricultural Credit Bank (Crédit Agricole). State subsidies have also been created to help some of the cheese factories modernize their equipment.\(^6\)

The salary of the cheese maker is based primarily on sales made by the cooperative, including the marketing of butter and whey.\(^7\) However, there is a fixed minimum wage for the dairyman who has a contract with the cooperatives.\(^8\) The number of workers employed by the factory and the level of salaries paid them is based on a percentage of the total volume of milk handled.\(^9\) The cooperative is also responsible for the allocation of salaries to its employees along with any insurance or other workmen's benefits.

The critical factor in the plan for the re-organizing of cheese dairies, whether in the private or the cooperative sector, is the dimension of the factory. For the economies which accrue to large-scale manufacturing are considerable, and, in the view of many, small size dairies should be eliminated by consolidation. But in the province of Franche-Comté there are still many little factories operating, especially in the department of Jura. Although Jura has more cheese dairies producing Comté than do the other two departments—there are about 300 dairies in Jura and 250 in Doubs\(^10\)—in terms of size the factories in Jura
are quite small and their output is in inverse relationship to their number. Most of them produce, on an average, about 8,500 hectoliters annually (Table 5). The majority of these small dairies are dispersed over the mountainous area of Jura. The highest tonnage of Comté production, however, comes from Doubs, where the largest quantity of milk is available. On the other hand, in Haute-Sâone there are fewer factories, but the volume of milk handled in each one is high, and it is mostly butter, fresh dairy products and Emmental that are processed.

Figures 11 through 14, which chart the total number of factories according to size,\(^1\) show the pattern in terms of the volume of milk processed by dairies in Franche-Comté. The separation of the three departments of the province enables a further point to be elucidated. Not only do the dairies vary in size and the nature of the cheese they manufacture, but the different physical contexts of Doubs, Jura and Haute-Sâone are unmistakably significant to dairying.

The department of Doubs is basically composed of plateau and plain as shown in Map III. It is within the high plateau of the Jura mountains, made up mostly of faulted limestone blocks, that the highest producing milk sheds, 270 liters per square kilometer, is located. This same area, situated in the center of Doubs, has the greatest concentration in the whole department of those Comté cheese dairies which have an average output. By contrast, the department of Jura is mostly mountainous with some flatter lowlands in
<table>
<thead>
<tr>
<th>Landform Regions In</th>
<th>JURA</th>
<th>DOUBS</th>
<th>HAUTE-SAONE</th>
<th>BELFORT</th>
<th>FRANCHE-COMTE</th>
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</thead>
<tbody>
<tr>
<td>Percentage of:</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>45%</td>
<td>15%</td>
<td>12%</td>
<td>45%</td>
<td>25%</td>
</tr>
<tr>
<td>plateau</td>
<td>20%</td>
<td>60%</td>
<td>6%</td>
<td>0</td>
<td>29%</td>
</tr>
<tr>
<td>plain</td>
<td>35%</td>
<td>25%</td>
<td>82%</td>
<td>55%</td>
<td>46%</td>
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<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Comte</td>
<td>257</td>
<td>181</td>
<td>0</td>
<td>0</td>
<td>438</td>
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<tr>
<td>Emmental</td>
<td>10</td>
<td>137</td>
<td>114</td>
<td>5</td>
<td>266</td>
</tr>
<tr>
<td>Other Products*</td>
<td>24</td>
<td>0</td>
<td>11</td>
<td>6</td>
<td>41</td>
</tr>
<tr>
<td>Total No. of Factories:</td>
<td>291</td>
<td>322</td>
<td>125</td>
<td>11</td>
<td>749</td>
</tr>
</tbody>
</table>

| Total Volume of Factories  |      |       |             |         |              |
| In Thousands of hectoliters: | 2,505 | 3,666 | 2,405 | 245 | 8,821 |

| Average Size Factory       |      |       |             |         |              |
| (thousands of hectoliters):| 8.6  | 11.4  | 19.2        | 22.2    | 11.7         |

| Volume of Cheese Produced  |      |       |             |         |              |
| In Metric Tons             |      |       |             |         |              |
| Comte                      | 16,000 | 13,500 | 0          | 0       | 29,500       |
| Emmental                   | 1,000  | 12,500 | 15,500     | 500     | 29,500       |

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<th></th>
<th></th>
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<td>191</td>
<td>254</td>
<td>73</td>
<td>4</td>
<td>522</td>
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<tr>
<td>private</td>
<td>131</td>
<td>37</td>
<td>52</td>
<td>7</td>
<td>227</td>
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</table>

*Others: butter, Bleu de Jura, Cancoillotte, and Morbler

Data source: Mannot and Roucau, L'Economie laitière franc-comtoise.
the northern sector. The cheese dairies are primarily situated in scattered areas throughout the mountains and have a rather small production output. The dairies of Haute-Saône are located in the extensive plain region of the department. There are fewer cheese factories than in Doubs and Jura, but these plants are industrial in size and are close to urban markets and major transport routes in the lowlands.

As Figure 11 indicates, factories in the department of Doubs are divisible primarily into those making Comté and those making Emmental. Almost 60 per cent of the factories are cooperatively-owned, and it is these plants that produce three-quarters of the Comté made in the department.¹² Most Comté comes from factories which are smaller than average, receiving only from 6,250 to 12,500 hectoliters of milk; virtually no Comté is made in factories supplied with over 20,000 hectoliters. Emmental, by contrast, is made in the larger (and usually privately-owned) plants: in fact, those that receive over 40,000 hectoliters make nothing but Emmental. However, there are two dairies of industrial scale (one private, the other cooperative) which do make gruyère, but they also provide fresh dairy products such as milk, cream and yogurt for the city of Besançon.¹³ Three other plants of average output also furnish milk products for the urban area of Montbéliard-Sochaux. But on the whole the average cheese chalet, whether it makes Comté or Emmental, utilizes only about 11,000 hectoliters of milk annually in Doubs (Table 5).
TOTAL NUMBER OF DAIRIES IN DOUBS ACCORDING TO MILK PROCESSED 1968

It is the high plateau sector of Doubs that produces the most Comté, in average size dairies. Emmental is equally important in volume, but is made mostly in the larger-size factories.

Data Source: Monnot, L'Économie laitière franc-comtoise, p. 21.

Figure 11
Jura has the largest number of dairies producing Comté in the province, but a high percentage of these factories are small in size and are scattered throughout the mountainous area of the southern portion of the department. Comté is not made in factories exceeding an input of 25,000 hectoliters.

Data Source: Monnot, L'Economie laitière franc-comtoise, p. 28.

Figure 12
Haute-Saône has fewer cheese dairies than Doubs or Jura, but most of them are fairly large-sized, and are located in the flatter lowlands, close to urban markets and major transport routes. The making of Comté is completely absent from cheese dairies in this department while Emmental is the major manufacture.
TOTAL NUMBER OF DAIRIES IN FRANCHE-COMTE ACCORDING TO MILK PROCESSED 1968

Most of the dairies in Franche-Comté are very small in size, and a greater percentage of Comté manufacture comes from the small chalets.

Data Source: Monnot, L'économie laitière franc-comtoise

Figure 14
In the department of Jura more than 90 per cent of the cheese produced is Comté and it is mostly made in cooperatively-owned factories. There are also specially designated dairy factories manufacturing fresh milk products for the larger towns in the department, such as Dole, Lons-le-Saunier, Salins-les-Bains, and Champagnole: three of these factories each handle more than 30,000 hectoliters annually. In this region butter is produced merely as a by-product in the manufacture of Comté. The volume of milk treated in dairies in Jura (Figure 12) definitely shows that numerous small size factories predominate. In the "smallest" size category half of the output come from the "other" specialty cheeses like Bleu du Jura, Morbier, and other minor products. These dairy products are seasonal in production, and they do not demand so much milk. Morbier, and Bleu du Jura are not as large in size as Comté: 24 factories out of 290 handle "other" specialty cheese products in Jura. It is clear, then, that no Comté is produced in industrial scale dairies which process more than 40,000 hectoliters. Generally the small dairies producing Comté receive a low supply of milk.

In Haute-Saône, the dairy industry is based primarily on the production of Emmental (Figure 13). Butter and Cancoillotte are also important in the larger-scale factories. Here the average size dairy processes about 20,000 hectoliters of Emmental annually which is much higher than that in Doubs or Jura.

Figure 14, which represents the total volume of milk
produced annually for Franche-Comté, shows that most factories handle 12,500-20,000 hectoliters. This volume reflects the fact that the greatest amount of milk is processed in fairly large dairies. But closer examination of the volume of each of the various products indicates that again a greater proportion of Comté is produced in the smaller dairies, while Emmental and butter are manufactured in larger plants.

This factor of low output and the consequent failure of the Comté industry to take advantage of potential economies of scale and modern technology underlay both the formulation of the Gruyère Charter of February 1970, and the continued stress by the Comité Interprofessionnel du Gruyère de Comté (C.I.G.C.) on the plan for reorganization of dairies. The charter affirmed that the average dairy making Emmental should handle 30,000 liters of milk daily, while a factory making Comté should process 20,000 liters. As of now, the situation in the department of Doubs falls far short of this goal. Out of 300 cheese plants, only five have achieved the level of production urged upon them by the Charter, namely the privately-owned plants at Clerval, Noironte and Vercel, along with the two cooperative factories at Bannans, and the Union Cooperative at Besançon. All five of these, however, are Emmental producers: not one dairy making Comté fulfills the criteria outlined in the Gruyère Charter. The modern factories that produce Comté handle from 8,000 to 10,000 liters of milk daily, and only 26 out of the 300 cheese
factories in the department of Doubs have installed the latest equipment, such as the large stainless steel multiple vats.

There seems to be no particular pattern of localization evident, as yet, in the process of modernization: in Doubs the plants that have acquired new facilities are dispersed throughout the department, as Map X indicates. However, there are some hints of a pattern implicit in the fact that remodeled (as distinct from new) dairies are largely concentrated in the area where milk production is most intense and more than 270 liters per square kilometer are yielded, especially in the high plateau region of central Doubs. Outside of this area there are a few industrial size factories which produce Emmental, these being located along the main highways that move their raw materials and also near major cities or potential markets. But in general even modernized plants still seem to locate close to their suppliers, namely the dairy farms.

In spite of an incipient tendency towards the expansion of supply areas and modernization, the changes have usually come within the existing framework, and very few additions have been made to the previously existing buildings. It is not so much new erections on new sites as the transformation of older cheese factories which characterizes adaption to new trends. In fact, only two plants have been recently constructed, those at Bannans and Clerval.

The cheese factory at Bannans, however, does repre-
DISTRIBUTION OF COMTE DAIRIES IN DOUBS

- Dairy producing Comté

Data source: list of dairies producing Comté, published by the Comité Interprofessionnel du Gruyère de Comté, Poligny, 1968.
LOCATION OF MODERNIZED DAIRIES IN DOUBS 1972

Factories Producing Comté ●
Factories Producing Emmenthal ▲
Newly Constructed Factories ○
Major Cities ○
Main Highways —

Data Source: Chambre d'Agriculture, Besançon

Map X
sent an excellent example of modernization as prescribed by the Gruyère Charter of 1970. The actual construction of the new plant, just outside the village of Bannans some eleven miles from the Swiss border, was successfully completed in 1968. The factory is situated on a relatively flat area in the high plateau region of southern Doubs, to the east of Pontarlier, a district with a generally poor drainage where a few ponds and marshes dot the landscape. Some of the former chalets replaced by this new plant were located in the more mountainous portion of Doubs and in the narrow synclinal valleys that restricted their supply areas. As a result of this consolidation, eleven cheese dairies were replaced by the one Bannans plant which processes 6,200,000 liters of milk annually collected from 140 milk producers. It has all the latest equipment, a supplementary swine herd, a waste purifying station, two milk tank trucks and 24 refrigerated milk tanks which can hold from 400 to 1,200 liters—a far cry from the scatter of little cheese chalets that was eliminated by competition (Figure 15).

Only by close examination of profits gained and costs involved in the processing of milk for Comté, can the rationale behind consolidation of dairies be realized. As Table 6 indicates, the greatest proportion of gross receipts is made from the production of cheese (over 80 per cent in some cases) and is generally characteristic of Comté factories in Doubs and Jura. For the most part, revenues surge ahead with the manufacture of by-products, such as butter
SCHEMATIC: THE CONSOLIDATION OF CHALETS FOR THE NEW BANNANS PLANT

1,410,000
1,200,000
630,000
340,000
410,000

- Former dairies that have been consolidated with new plant at Bannons
- New cheese factory at Bannons
- Number of milk producers associated with each dairy
- Volume of milk produced annually at former dairies

Data Source: Exemple d'application de la Charte des aigles: la fromagerie à Bannons

Figure 15
and cream as the volume of milk handled increases.

The reduction of labor costs in large-scale factories seems to have the most significant advantage for increasing a dairy's input. The percentage of production costs spent on salaries and social benefits drops markedly with the increase in volume of milk. On the other hand, transport and overhead costs may grow slightly in larger plants, but these expenses represent only a small proportion of the overall financial burden. However, the transport cost may not be an accurate measure because, although there is no apparent expense in the smaller dairies, the time and cost factors of the farmer bringing his milk to the chalet are not considered. Thus, despite the uneven pattern of cost reduction among factories of various scale, the larger dairy plants are able to maintain somewhat of a decrease in labor expenses which may become crucial as the volume of input expands.
<table>
<thead>
<tr>
<th>Size</th>
<th>Total Revenues</th>
<th>Cheese</th>
<th>Butter &amp; Cream</th>
<th>Milk</th>
<th>Whey</th>
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<tr>
<td><strong>DOUBS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15,960 hl.</td>
<td>58.24 Fr</td>
<td>46.99</td>
<td>10.25</td>
<td>.40</td>
<td>.60</td>
</tr>
<tr>
<td></td>
<td></td>
<td>80.5%*</td>
<td>17.5%</td>
<td>.9%</td>
<td>1.1%</td>
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<td>58.39 Fr</td>
<td>47.72</td>
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<td>.80</td>
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<td>82.0%</td>
<td>16.5%</td>
<td>.1%</td>
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<tr>
<td>7,500 hl.</td>
<td>56.16 Fr</td>
<td>45.44</td>
<td>10.15</td>
<td>.25</td>
<td>.32</td>
</tr>
<tr>
<td></td>
<td></td>
<td>81.0%</td>
<td>18.0%</td>
<td>.4%</td>
<td>.6%</td>
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<tr>
<td>4,600 hl.</td>
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<td>48.14</td>
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<td>.43</td>
<td>.89</td>
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<td>16.0%</td>
<td>.9%</td>
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<td><strong>JURA</strong></td>
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<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>9,570 hl.</td>
<td>59.16 Fr</td>
<td>48.27</td>
<td>9.42</td>
<td>.93</td>
<td>.54</td>
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<td>15.9%</td>
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<td>2.8%</td>
<td>.4%</td>
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*percentage of total revenues

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<td>7,500 hl.</td>
<td>4.57</td>
<td>1.08</td>
<td>.56</td>
<td>.06</td>
<td>1.12</td>
</tr>
<tr>
<td></td>
<td>62.0%</td>
<td>14.5%</td>
<td>7.0%</td>
<td>1.5%</td>
<td>15%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4,600 hl.</td>
<td>4.68</td>
<td>1.21</td>
<td>.32</td>
<td>—</td>
<td>1.34</td>
</tr>
<tr>
<td></td>
<td>62.0%</td>
<td>16.0%</td>
<td>4.0%</td>
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<td>18.0%</td>
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</tr>
<tr>
<td>JURA</td>
<td>9,570 hl.</td>
<td>4.40</td>
<td>1.63</td>
<td>.56</td>
<td>.34</td>
<td>1.95</td>
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<tr>
<td></td>
<td>49.5%</td>
<td>18.5%</td>
<td>6.5%</td>
<td>3.5%</td>
<td>22%</td>
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<tr>
<td></td>
<td>7,500 hl.</td>
<td>4.62</td>
<td>2.04</td>
<td>.47</td>
<td>.15</td>
<td>2.09</td>
</tr>
<tr>
<td></td>
<td>50.0%</td>
<td>22.0%</td>
<td>5.0%</td>
<td>1.0%</td>
<td>22.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>6,600 hl.</td>
<td>4.71</td>
<td>2.23</td>
<td>.47</td>
<td>.23</td>
<td>1.54</td>
</tr>
<tr>
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<td>51.0%</td>
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<td>3.5%</td>
<td>16.5%</td>
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<tr>
<td></td>
<td>5,500 hl.</td>
<td>5.09</td>
<td>1.45</td>
<td>.21</td>
<td>—</td>
<td>1.11</td>
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<tr>
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<td>65.0%</td>
<td>18.5%</td>
<td>2.5%</td>
<td>—</td>
<td>14.0%</td>
<td></td>
</tr>
</tbody>
</table>

*percentage of total costs

Data source: Monnot & Roucou, *L'économie laitière franc-comtoise*.
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1. Percentage based on list of cooperatives producing Comte for the department of Doubs for 1971, published by Chambre d'Agriculture in Besançon.


3. The "Petite" factory is the only privately-owned plant of this type that was observed in the region during the summer of 1971, and may possibly be unique in its character according to authorities on the subject: Ecole Nationale de l'Industrie Laitière, Mamirolle, and Mr. Roger Beuque, wholesaler of dairy equipment, L'Isle-sur-le Doubs.


8. Ibid.

9. Ibid.


11. The factories are divided according to size, in terms of input and type of product manufactured, into eight main classes and the average volume in hectoliters of each class was graphed:

<table>
<thead>
<tr>
<th>Class</th>
<th>Amount Processed</th>
<th>Average Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>less than 5,000 hl.</td>
<td>4,000 hl.</td>
</tr>
<tr>
<td>II</td>
<td>5,000-7,500 hl.</td>
<td>6,250 hl.</td>
</tr>
<tr>
<td>III</td>
<td>7,500-10,000 hl.</td>
<td>8,750 hl.</td>
</tr>
<tr>
<td>IV</td>
<td>10,000-15,000 hl.</td>
<td>12,500 hl.</td>
</tr>
<tr>
<td>V</td>
<td>15,000-20,000 hl.</td>
<td>17,500 hl.</td>
</tr>
<tr>
<td>VI</td>
<td>20,000-30,000 hl.</td>
<td>25,000 hl.</td>
</tr>
<tr>
<td>VII</td>
<td>30,000-50,000 hl.</td>
<td>40,000 hl.</td>
</tr>
<tr>
<td>VIII</td>
<td>greater than 50,000 hl.</td>
<td>60,000 hl.</td>
</tr>
</tbody>
</table>
12. Ibid., p. 20.
13. Ibid., p. 21.

15. Correspondence with Mr. Roger Beuque, wholesaler in dairy machinery, November 23, 1972,

16. Ibid.
17. Ibid.
19. Ibid., p. 718.
CHAPTER 5
IMPORTANCE OF GRUYÈRE CHARTERS AND THE MARKETING OF COMTE

The gruyère charters re-affirmed the importance of Comté production and expressed local pride in the fact that it was concentrated in Franche-Comté: they also served to formalize the region's strict patent on this cheese and to establish grading standards intended to ensure the quality of any that was placed on the market. Altogether the charters provided a framework for a guaranteed quality of product with potentially stable prices.

The first significant charter, the "Tribunal Judgment of Dijon" of July 22, 1952,\(^1\) confirmed the name of the traditional gruyère of Franche-Comté as "Comté gruyère" or simply "Comté" as an abbreviation. The tribunal carefully delimited the geographic zone of Comté production within the province, and affirmed that this region would have the sole patent or right to produce Comté with that "appellation d'origine",\(^2\) a term paralleling the "appellation controlée" used by the French wine industry. According to this charter the making of Comté would have to comply with the local regulations within the province.\(^3\) The livestock fodder utilized should also meet the standards prescribed by the association of fruitiers, and only the milk of the Montbéliard or "Pie rouge de l'Est" race could be used.

In October of 1956 a decree by the Secretary of Agriculture outlined some further conditions. It had been man-
mandatory to place a label on all Comtés. Henceforward all gruyère cheese had to bear an indelible mark or sticker, usually made out of casein and chlorophyll. As previously mentioned, the oval sticker is applied to the soft curd before the cheese is pressed, and Comté gruyère now carries a green label with the following particulars: the country of origin, the name of the department, the percentage of solid content in the cheese, and a two-letter abbreviation denoting the dairy that produced the cheese. To comply with this rule all Comtés must contain 45 per cent "matière grasse". This indelible label enables any wheel of Comté to be traced back to the particular cheese dairy where it originated, no matter where it may be shipped in the world markets. In accordance with the same decree, the Emmental gruyère must carry a corresponding label (only red instead of green) imprinted with the same data. Another stamp placed on all the gruyères, whether Emmental or Comté, must indicate by a number the particular month when the cheese was produced. Unfortunately, in practice, the precise details stamped on the rind sometimes become too blurred to read, especially after the cheese has aged and been transported, but the general identification remains clear enough.

The initial 1952 charter proved too constrictive in terms of area, and in July 1958, another decree authorized by the Minister of Agriculture amended the boundaries of Comté production to include sections of the departments of Ain, Saône-et-Loire and the Territory of Belfort.
But it is the charter of February 1970, presenting a modernization plan for cheese factories, that has had the most striking effect on Comté production. This decree clearly outlined the necessity for improvements in the conditions of production and marketing, but without blurring the "unique" character of the Comté product.

Some of the agricultural organizations in Franche-Comté, such as the Syndicate of Cheese Makers of the departments of Doubs and Jura, the Interprofessional Syndicate of French Gruyère (S.I.G.F.) and the Interprofessional Committee on Comté Gruyère (C.I.G.C.) helped in the drafting of this charter, for all were agreed that the expansion of large-scale cheese manufacturing was essential, as well as the consolidation of milk production.

At the same time, the charter sought to guarantee the quality of the milk by seeing to it that cheese producers henceforth would accept only milk with the appropriate bacteriological qualities. In addition, the gruyère organizations that largely wrote this charter were convinced that the consolidation of Comté factories would increase the potential for profits from the utilization of by-products. These professional cheese associations conceived that the average cheese dairy ought to be able to handle at least 20,000 liters of milk daily if Comté production was to be rationalized. Furthermore, the charter emphasized the importance of coordination between separate research institutions and organizations, including the National Industrial Dairy
School, the Agricultural Analysis Laboratories of each department, the departmental federations of Dairy Cooperatives, and the Technical Institutes of Cattle Raising.¹³

The Interprofessional Committee of Gruyère Comté, with its headquarters located in Poligny, was created in 1963,¹⁴ and has already become a very important body coordinating the marketing of Comté gruyère. This organization is responsible for the collection of all data pertaining to milk and cheese production and their market potentials throughout the whole region.¹⁵ In addition, the C.I.G.C. fulfills a promotional role by informing both French and foreign consumers of potential improvements in the taste and appearance of Comté.¹⁶

This role has gained significance since cheese has recently become the most important dairy product in the Common Market. Since 1964 butter consumption has dropped ten per cent in the Common Market states, for the fear of excessive cholesterol in the daily diet along with the rise and relatively low price of margarine have been effective.¹⁷ Powdered milk production has also suffered a decline of ten per cent during the past two years in the European market.¹⁸ Only cheese and milk products that are fed to calves have been on the increase in Europe, with cheese output rising from 600,000 tons in 1964 to 960,000 in 1970.¹⁹ In reaction to this increasing demand in the Common Market, French cheese production has annually expanded, on the average, some seven to eight per cent since 1960.²⁰
Furthermore, France is the world's leading producer of gruyère, and both her Comté and her Emmental are exported to other members of the Common Market and to her former colonies in Africa\textsuperscript{21} (Figure 16).

Nevertheless France imports more gruyère than she exports. In 1970, to satisfy cheese lovers at home, France had to import 11,400 tons of gruyère while exporting only 7,508 tons\textsuperscript{22} and, in accord with this, the French gruyère market relies heavily on its own national market. In 1970 the national price was 7.30 francs per kilo for Emmental and 8.50 francs per kilo for Comté\textsuperscript{23} much higher than the world price for Emmental which then attained only 4.50 francs per kilo.\textsuperscript{24} But this oversimplifies the complexity of the trade: within France itself there are several regional markets, for consumers' tastes vary from place to place, and slightly different types of Comté must be made to accomodate such regional variations. Around Lyon, for instance, buyers prefer a more "aged" Comté with a very fruity taste, while Parisians fancy a rather whiter-looking Comté with more of the neutral flavor of Emmental\textsuperscript{25}.

These local tastes apart, quality differs, and once the Comtés have aged properly and are ready to be sold, the industrial cheese refiners classify each cheese as "A", "B" or "C" according to its quality before it is dispatched to the gruyère market. The three categories are rather precise:

Category "A" represents the superior quality cheese; its rind and general appearance are nearly perfect, and its taste exhibits the true characteristics of genuine
WORLD PRODUCTION OF GRUYERE 1970

FRANCE 147,639 tons* (Comté- 35,036 tons)
SWITZERLAND 63,225 tons
UNITED STATES 51,000 tons
WEST GERMAN REPUBLIC 30,983 tons
AUSTRIA 29,000 tons
FINLAND 25,000 tons
OTHER 11,000 tons

*metric tons

Comté. The openings within the wheel have very few imperfections. Category "B" does not have an appearance quite as good as quality "A", and cracks may exist within some of the "eyes". The taste is still rather good. "C" quality is irregular in form with a dry crust, and the taste is slightly bitter.26

The Comtés that do not meet the standards of any of these three classes may not receive the stamp of approval, the label of "appellation d'origine".27 Indeed, the Comtés of poorest quality are usually re-processed: they are pasteurized and made into a white cheese spread similar in consistency to cream-cheese—though the distinct taste of gruyère is preserved.

The classification of Comté is based on tests of successive samples taken after one month of aging, two and half months of aging and of three and a half months of aging respectively.28 The results of this grading are made available to the potential buyer. At the same time, the cheese is inspected by members of the C.I.G.C. The Syndicate of French Gruyère further assists by frequently publishing the average quotations of the base price for Comté. The price of milk is also taken into consideration, and milk-price regulations are based on the value of the cheese sold. For this produce represents one form into which milk solids are processed for use and sale.29
REFERENCES


2. Ibid.

3. Ibid.


5. Ibid.

6. Ibid.

7. "Matière grasse" refers to the milk fat and the non-fat solids contained in cheese.

8. "L’Arrêté concernant le marquage obligatoire de certaine fromages." (Mimeographed.)


11. Ibid., p. 5.

12. Ibid., p.

13. Ibid., p. 7.


15. Ibid., p. 11.

16. Ibid.

18. Ibid.

19. Metric tons. Ibid.

20. Ibid.


22. Ibid., p. 5.

23. Ibid.

24. Ibid.


27. Ibid.

28. Ibid.

29. Ibid.
CHAPTER 6
CONCLUSION

Comté gruyère has evolved as an important cheese product within France and it is now impinging on foreign markets, particularly within the EEC. At the present time the processes of manufacturing and marketing this unique cheese are undergoing changes, and Franche-Comté, its home region, is feeling the impact as the modernization and regrouping of cheese dairies take place, trends now favored by many agricultural organizations in the province.

The problems of modernization are manifold. One great disadvantage of the small dairies stems from the prolonged time taken by cheese manufacturing and the limited volume of milk consequent on the use of the traditional copper vats, since only one Comté can be produced at a time. Continuation of this customary practice would mean that the whole curding process would need to be repeated several times in order to assure a sufficient quantity of cheese for the rising market, and more man-hours would therefore be required. Partly because of this pressure it has become more and more difficult for the smaller cheese dairies to get hired labor: the working conditions seem overly strenuous and inconvenient. In addition such antiquated machinery as the heavy wooden press that has long been favored by tradition does not appeal very much to present-day workers who naturally prefer modern equipment. The factory has become
more attractive with its modern multiple stainless steel vats and air compression for cheese pressing. And above all the large-scale industrial cheese factories which employ a greater number of workers offer several social advantages such as allowances for time off, various fringe benefits and vacations.

But this very trend creates a bias against Comté production. Even the new cheese plant at Bannans, previously cited as an example of successful execution of the "modern" plan emphasized in the Gruyère Charter of February 1970, indicates this. For recently this factory has been producing more Emmental and eliminating the manufacture of Comté, and it utilizes pasteurized milk because it handles a greater volume, 25,000 liters daily. And pasteurization is the enemy of the bacteria that give Comté its flavor.

In this way, Emmental production offers many definite advantages over the manufacture of Comté. Since Emmental is made from pasteurized milk, the quality of milk is not so important any more, and different grades can be mixed during cheese-making. Some milk of poorer quality can even be incorporated with that of better quality without apparent damage to the final product. The end result is a cheese standardized in flavor and appearance and linked to a stable and predictable market price. However, the quality of the Emmental is much lower than that of the more distinctive Comté, and the question here becomes pertinent: what does the consumer really get? Inevitably Emmental lacks something
of the peculiar quality of Comté, and that despite its well-established reputation. Therefore in strictly commercial terms it may be more advantageous to produce Emmental because the aging process is faster, one month instead of the six needed for Comté. Consequently there is a much more rapid turnover of the finished Emmental. Faster processing and marketing mean that Emmental appears an attractive alternative. For all these reasons Emmental manufacture competes strongly with Comté-making, regardless of the confessedly superior quality of the latter.

However, the financing of factory-scale production involves some political implications. Under the auspices of the French government, the Minister of Agriculture has taken a close interest in gruyère production. The State is in favor of rationalization, modernization and consolidation of Comté production, and has shown its approval by financial aid to such cheese dairies as will cooperate. Certain obligations, such as a guarantee of the quality of milk and ample technical assistance must, of course, be met by the individual dairy in order to receive State backing. The cheese factory at Bannans, for instance, received 25 percent of its funding from the government.

Unfortunately there are some disadvantages implicit in the encouragement of more factories at the industrial scale. The industrial cheese factory does not have a fixed margin of profit since the market fluctuates, though its modernization and mechanization do permit the acceleration
of manufacture when prices are encouraging. Admittedly, complete mechanization of Comté dairies would bring about a definite increase in the sale of the finished product. But there is a crucial question implied in this very process of acceleration. Would the Comté retain the authenticity sought by the charter and maintained by the small traditional cheese chalet? It appears evident that, given a much larger volume of milk, microbiotic flora would undoubtedly be harder to control and pasteurization may then become a necessity: the Comté, in consequence, would be deprived of one of its unique characteristics.

Furthermore, if Comté were to be commercialized on the same scale as Emmental, with its milk pasteurized, its aging process reduced and its distinctiveness blurred, there would be no reason why other significant dairy regions in France, or even in some foreign countries, might not decide to "cash in" on the Comté industry. There are precedents to suggest that this may well take place. Since 1965 Brittany, which suffered a decline of powdered milk and butter production, has moved into Emmental manufacture. Several large factories in western France with the capacity of 400,000 liters a day have now begun to produce gruyère, to the alarm of Franche-Comté. And if Comté gruyère were to follow the pattern set by Emmental gruyère, what distinctive feature would remain to sustain the pride of Franche-Comté in its regional heritage? The future should indeed be interesting.
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