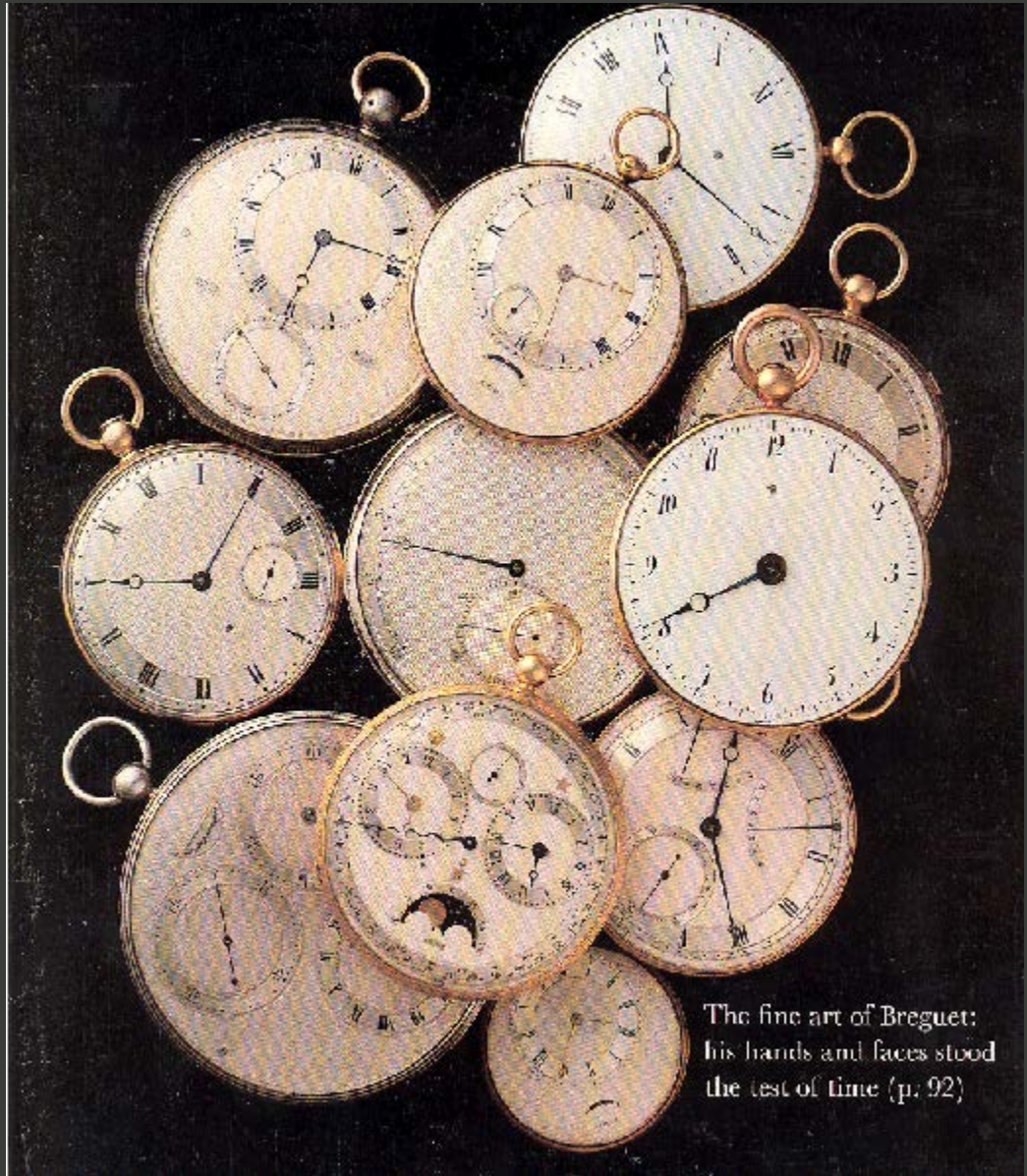


Varieties of
Capitalism and the
Role of the State:
Path Dependency
and Global
Competition in the
World Watch
Industry

Amy Glasmeier
Professor
Department of Urban
Studies and Planning
Massachusetts Institute
of Technology



The fine art of Breguet:
his hands and faces stood
the test of time (p. 92)

What Shapes the Form Industrialization Takes? Does Geography Construct the Basis of Competition Across Locations?

- Industrial regions around the world rise and fall through time, why? Is it an accident?
- How do external and internal factors influence the development of competitive industries?
- What role does the state and institutions play in the success of industrial competition?

The Role of the State and Economic Regulation

- What are the most important differences among national economies? Is globalization forcing nations to converge on an Anglo-American model? What explains national differences in social and economic policy?
- This talk explores the role of business and industrial culture in the construction and maintenance of national systems of innovation.

What Role Does Geography Play in the Formation Path Dependency and Technological Lock-in

- **Path Dependency:**
- Path dependency is like a cheetah sprinting full speed after an antelope. Out of the corner of its eye, the cheetah may see even bigger game, but it's already barreling after the smaller one, and changing course would require enormous energy. Therefore it's easier just to continue in the same direction.
- Economists have chronicled hundreds of examples where an accident of history put the economy on a path from which it is almost impossible to diverge, even though better paths open up. Examples include the inferior QWERTY typewriter keyboard, the gasoline engine, the VHS video system, light water nuclear reactors, Hollywood and the location of the film industry.

Technological lock-in

- “**Lock-in**” describes a situation in which a product, technical standard, production process, or service continues to be produced by actors even though it may be in the broader social interest (and even the interest of the private sector) to adopt a fundamentally different pattern of technological capacity. Firms succumb to this same problem. Lock-in implies that, once led down a particular technological path, the barriers to switching may be prohibitive.

The Role Of Geography

- Geography is a force in path dependence and a source of lock-in.
- Culture is a force in path dependence. Culture provides directionality in the form of practices based in custom, routines of problem-solving, and in the size of intellectual aperture.
- Locational lock-in suggests even if conditions change and a new location is more competitive, built up interdependencies constrain firms from switching locations.

Where And Why The Battle Unfolded For Industrial Supremacy

In The World Watch Industry

- **Where?**

- Six countries and 250 years
 - Britain
 - Switzerland
 - America
 - Japan
 - Hong Kong
 - China

- **Characterizations**

- Rigid production systems
- Cheap labor
- Complementary markets
- Organizational ossification
- Technological change
- Formation and implementation of standards
- New competitors
- New markets
- Geopolitical turmoil
- Trade restraints

Many Possible Causes, Which IS Most Important ?

- Depends. Precisely because of time and space.
- Shifting competition reflects interaction of several forces and events, some endogenous and some exogenous.
- Scale matters

Theoretical challenge is to figure out the sequencing of factors by building in the origin and meaning of variation across time and space.

Outline of the talk

Goal

- Demonstrate how multiple factors affect the competitiveness of a nation's industry
- Illustrate how forces interact with existing practices to produce new economic realities

Plan

- Review history of the industry across time and space
 - Highlight path dependency and technological lock-in
 - Highlight inflection points that challenge production systems
 - Illustrate how path dependency and lock-in structure options

The Essence Of Beauty



1730



1815



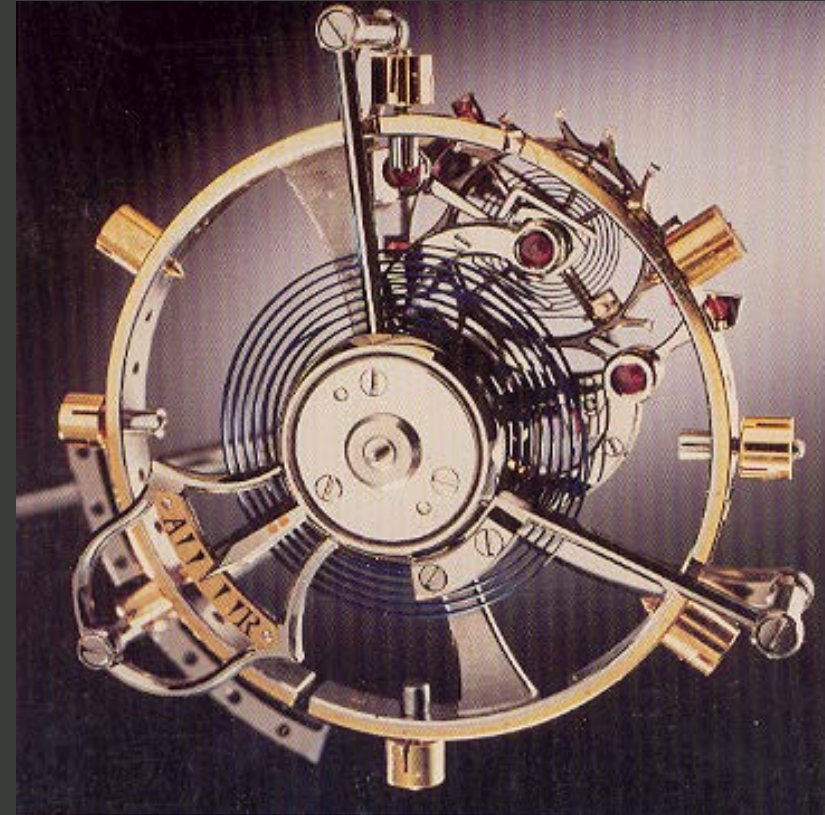
1930s



The Art Of Precision



1970s



1980s

The Emergency And Transfer Of National Supremacy

1. The beginning of the story:
late 18th early 19th century
England

Britain: Bobbles, Bluster, And Guilds

The First Major Shift In Fortunes

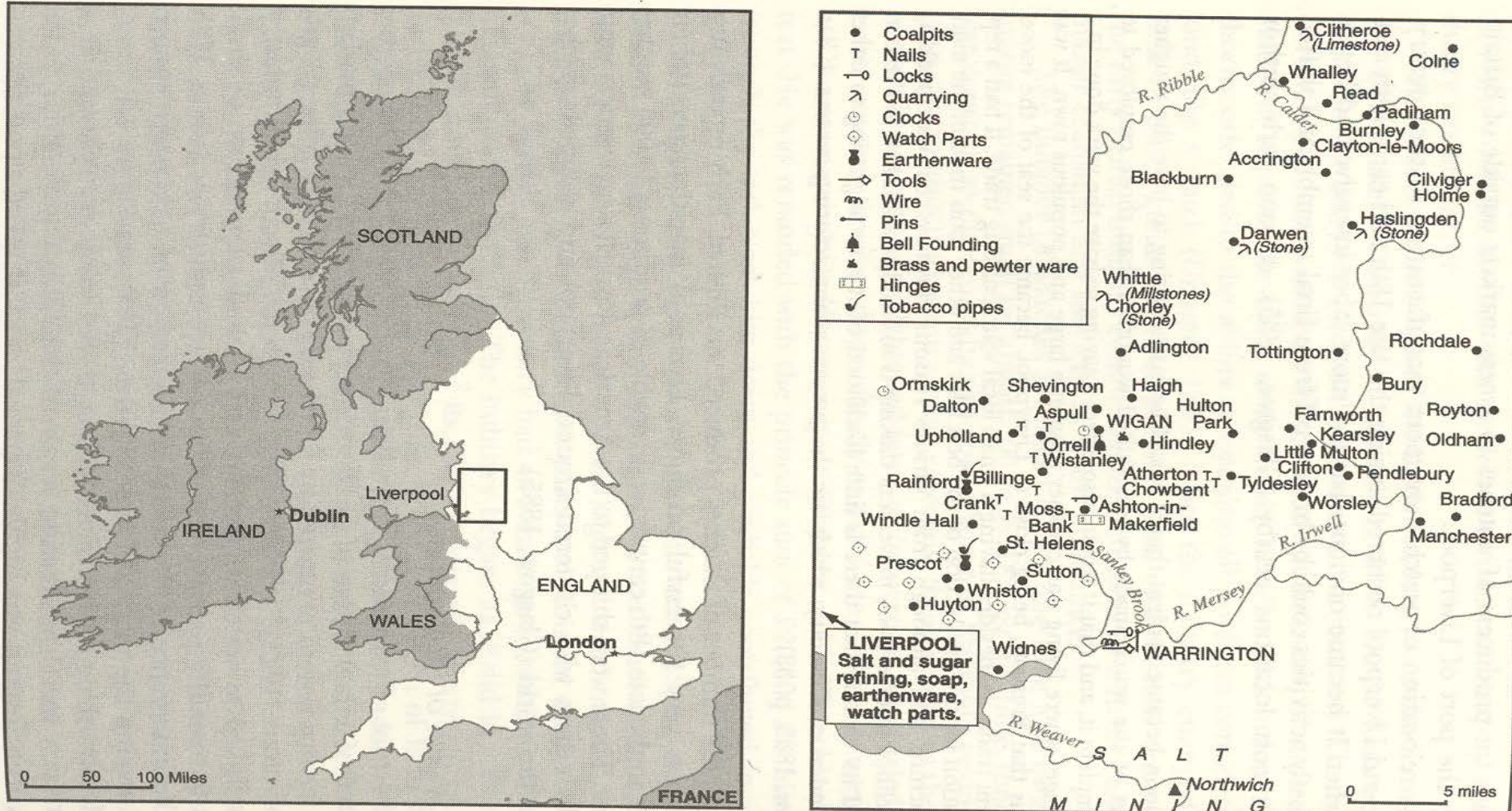


FIGURE 4.1. Mining and metal industries—about 1725 (Liverpool, England region). Cartography: Erin Heithoff. Source: Map-Art; Bagley (1961), *A History of Lancashire*.

History

Location: *London then
Lancaster*

Production process:

Craft

Mode of organization:

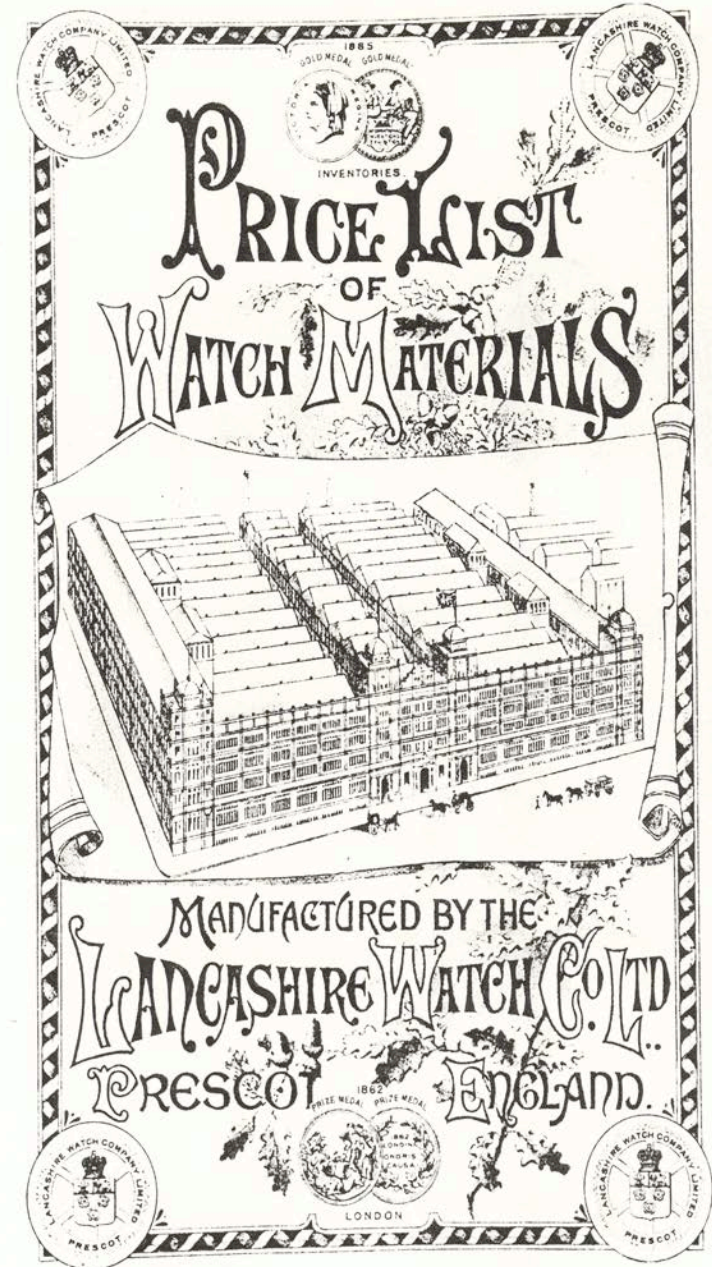
*Putting out and then
Guild*

Cultural predisposition:

Conservative

View of industrialization:

*Production for elite
consumption*



Cover Design from *PRICE LIST OF WATCH MATERIALS*, c. 1900
(Note View of Works as originally intended, but never completed)

From Leader To Laggard

By 1862, the British industry was stuck at annual production levels of 160,000 watches. At the same time, the Swiss could complete 2.5 million watches.

In 1855, One Industry Observer said

of the British and Swiss Industry Competition:

But hitherto the attention of English watchmakers has been directed to the **improvement** in the quality of watches, rather than to their **cheapness** of production. Questioned whether the introduction of the factory system, and the wholesale adoption of machinery in manufacture, would at all **benefit the trade in this country**.

English watches have **always** commanded their price in the markets of the world, and the **good name** they have ever borne has led to **their imitation** by foreign producers, both the forgery of English makers' names and of the English hall-marks in the cases, and by sending unfinished cases here and getting them marked at the Goldsmith's and the provincial halls through the agency of case-makers and others.

What would become of their **esteem** if, instead of continuing to maintain our high position, we were to **compete with the slop trade** of Switzerland or America? There are many people who will tell us that some wretched thing in the form of a watch "goes well enough for them," but is such an argument sufficient to **lower our standard of excellence**? (Glasgow, 1885, p. 34).

What happened?

In 1862 The British industry produced only 160,000 watches while the Swiss completed 2.5 million watches

- **Path dependence**

- Artisan-based
- Small volume, costly, large, overstated

- **Technological and organizational lock-in**

- Hand-hewn
- Guild structure remained, even as the industry moved toward factory production
- Openly opposed factory production

How and why?

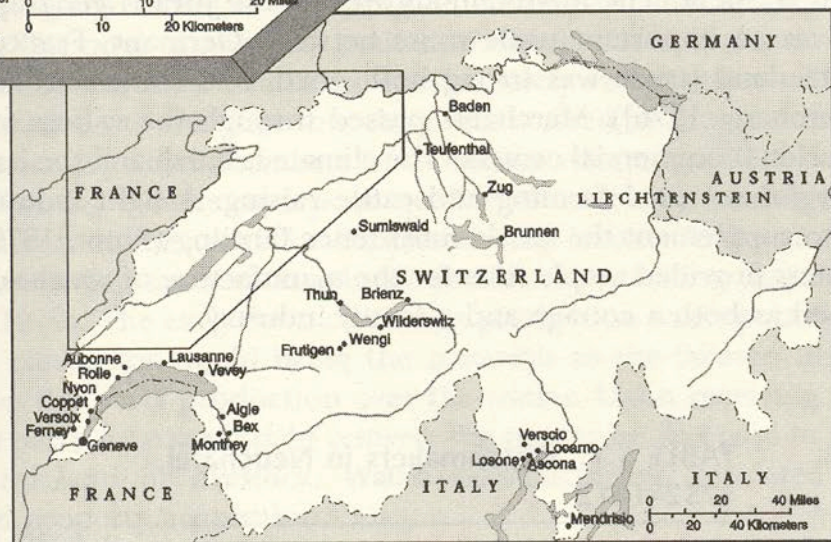
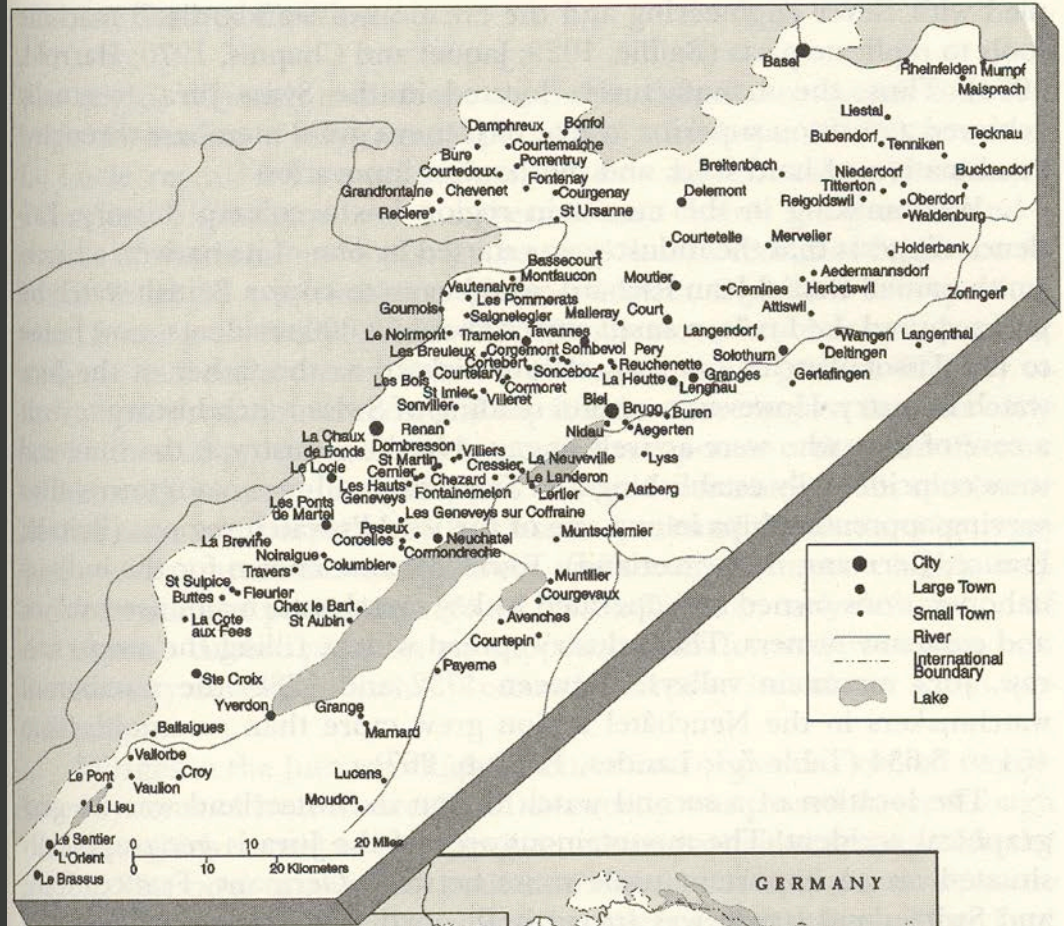
- New competitors
- Cheap labor
- Contraband
- New product development
- Organizational change
- New markets
- Complementary markets
- Geopolitical turmoil
- Rigid production systems
- Trade restraints
- Formation and implementation of standards
- Organizational ossification
- Technological change

Industrial Leadership changes hands as technological lock-in hampers change in Britain's industry.

By the 1830s the die was already cast.

Why Switzerland?

The Jura, an isolated agricultural region



Huguenots, cheap labor, ebauche, etablisser, and the meaning of precision

In the beginning:

Skilled immigrants

Traders from the 15th century

Jewelry

Guild structure

Over time:

Extreme division of labor

Incredible attention to detail

Competition and emulation

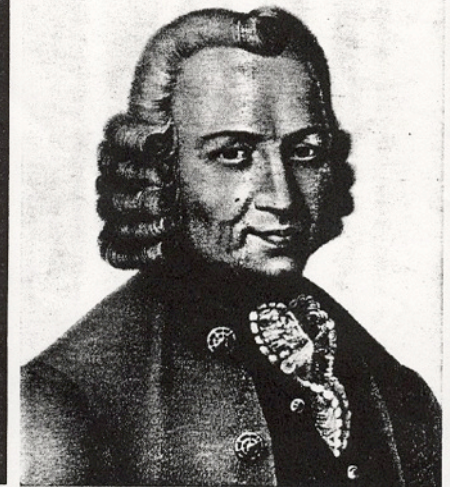
Proto factories

Escaping the Guilds: A move to the mountains

The father of the Swiss Jura watch industry, a blacksmith in the mountains.



Swiss Pioneers of Industry and Technology



DANIEL JEANNERET

1

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THE INSTITUTE OF ECONOMIC RESEARCH
ZURICH (SWITZERLAND)

Swiss Superiority Reins for Relatively Short Period

- Between 1830 and 1860 the Swiss controlled more than 80 percent of the world market for watches
- Sold watches to the far flung reaches of the globe
- Watches for the masses becomes closer to reality, but not quite there yet

War, Closed Markets, Economic Crisis

- The civil war results in a partial closure of the US market to imports.
- Tariffs levied in support of the war effort.
- Domestic demand allows watch producers to grow and proliferate.
- Crisis of 1873 chokes off demand.
- The Swiss lose access to a large and growing market almost overnight.

On the Eve of the Centennial Exposition 1876: Challenges Facing the Swiss

Path Dependence

Produced either high end or cheap watches; cheap also was unreliable.

Hand-hewn pieces.

Limited factory production.

Excessive competition.

Tech and Org Lock-in

Extreme division of labor.

Fragmented system or organization.

Fragmented production process.

What Happened? A New Competitor and Closed Market

Table
Watch Movements 1864-1987

Year	Swiss Expor U.S.
1864	169,000
1865	226,000
1866	262,000
1867	207,000
1868	209,000
1869	206,000
1870	330,000
1871	342,000
1872	366,000
1873	204,000
1874	187,000
1875	134,000
1876	75,000

Source, Moore, 1945, pg. 65.

What Happened To The Swiss? Enter The Americans

A new path dependency

- **American system of mass production**

Technological lock-in

- **Railroad standards**

- **Cheap labor**
- **Rigid production systems**
- **Contraband**
- *New competitors*
- *New markets*
- *Complementary markets*
- *Geopolitical turmoil*
- *Trade restraints*
- *New product development*
- *Formation and implementation of standards*
- **Organizational ossification**
- **Technological change**

Waltham, Massachusetts and Elgin, Illinois

Beg, Borrow, Steal: industrial technology spreads across the ocean and competition overcomes space

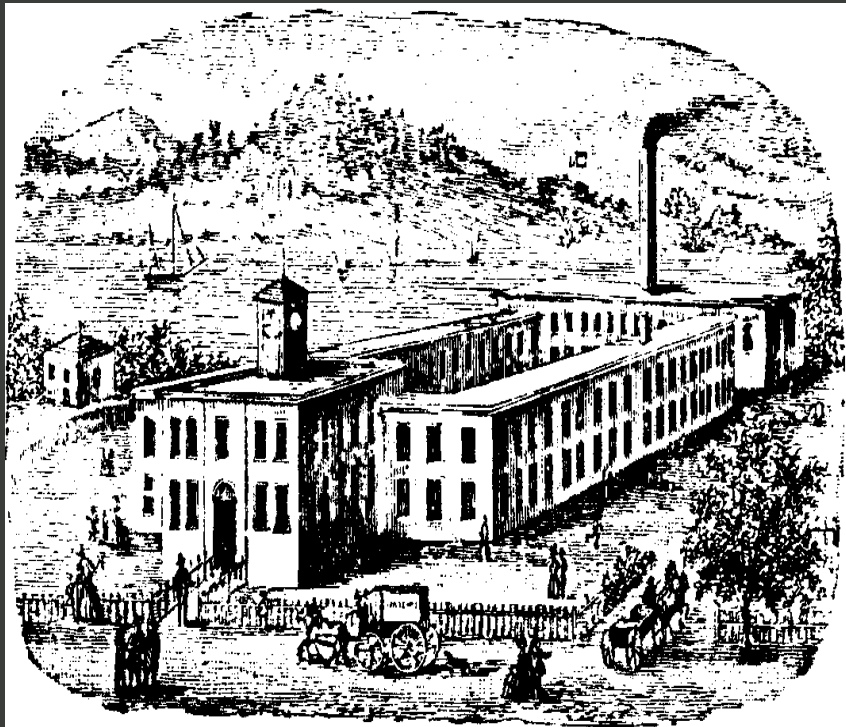
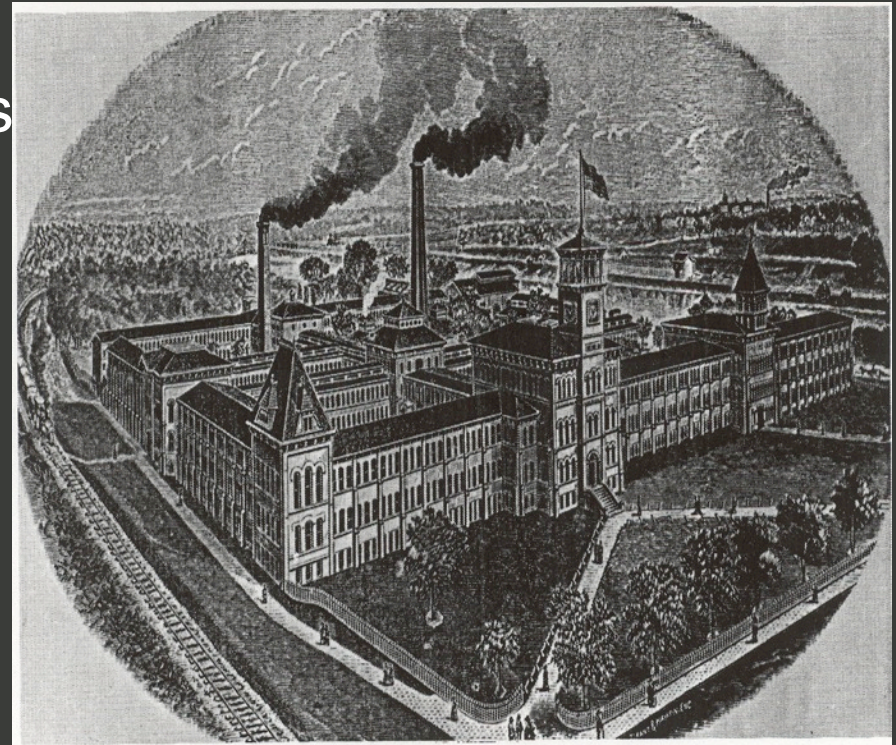


Figure 1. The Waltham watch factory in 1857, when purchased by Royal E. Robbins, capable of producing about 300 watches per month.



The big watch factory after the expansions made between 1879 and 1883. By the end of the '80s, some 2,700 employees were turning out 1,650 fine jeweled movements daily.

The two early competitors

Genealogy of American Companies 1850-1890

A new industry is born and it spawns a competitive race across the nation

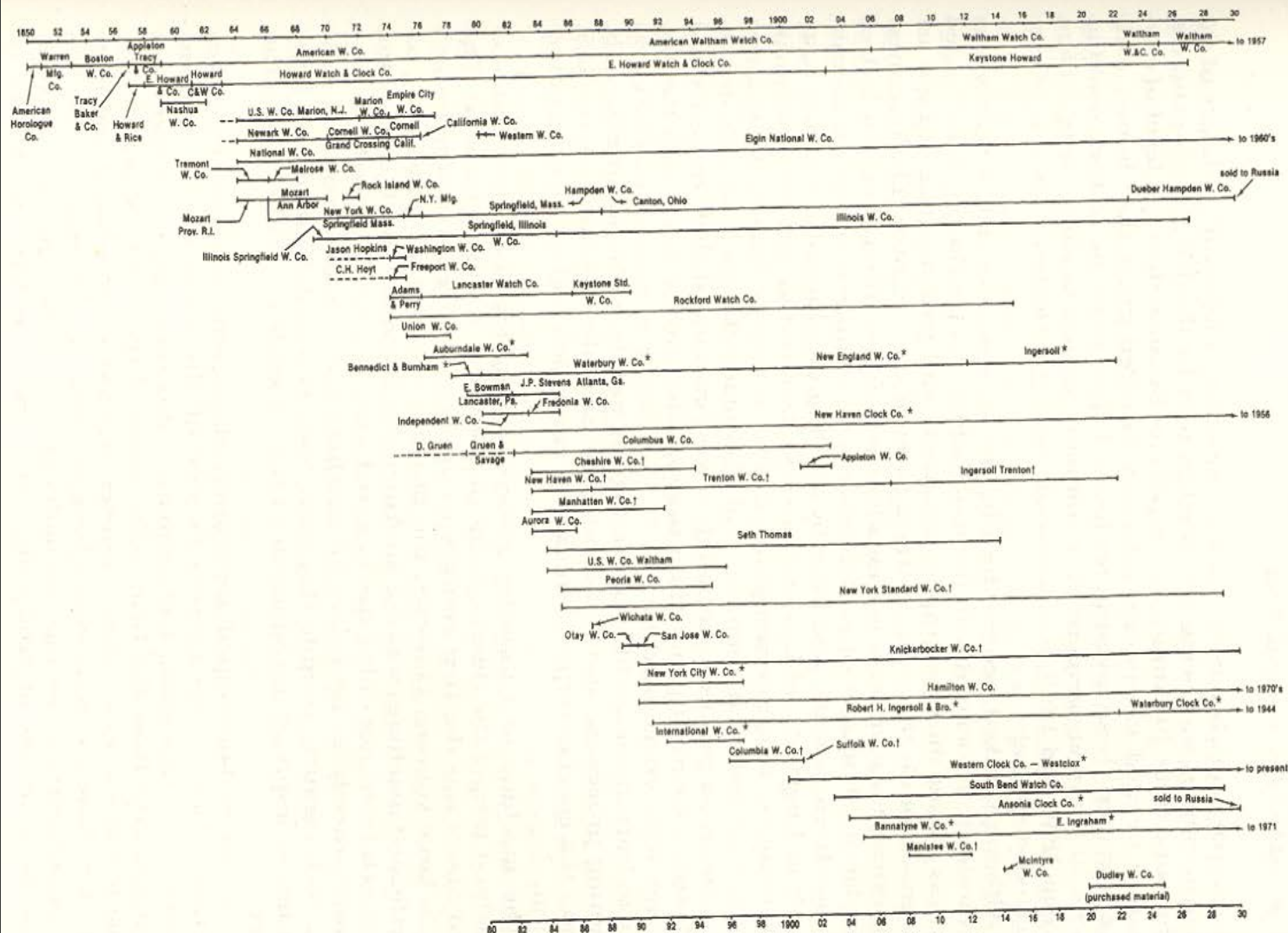


FIGURE 6.1. American watch factories. *Dollar watchmakers, † Inexpensive jeweled watchmakers. Copyright 1981 by M. C. Harrold.

What Happened? American Industry Rises Like a Rocket Then Eventually Sinks Like a Stone

Path dependence

- Two models of production two firms vie for supremacy. Price competition throttles the powerful.
- Lock-in
- Capital- intensive system rigid with huge sunk costs.
- New products require new production system
- Standards create rigidity

Why

- Cheap labor
- Rigid production systems
- Organizational ossification
- Contraband
- New and old competitors
- New markets
- Complementary markets
- Geopolitical turmoil
- Trade restraints
- New product development
- Formation of standards
- Technological change

The early 20th century

In 1912 America Imported 2.6 Mil Swiss Movements; By 1926 The Number Increased To 11.8 Mil

Two competitors, the US and the Swiss vie for supremacy, both in their own way, compromised.

- Path dependence
- The Swiss re-orient and add selective mechanization, but with flare
- Technological lock-in
- The pocket watch versus the wrist watch
- Design versus functionality
- Fragmented versus mechanistically rigid

The Swiss: Exogenous Events Shape the Future

- The Depression of 1931 stings everyone and nations respond
- The Swiss create: The Statut de l' Horlogerie
- The US pursues protectionism, but it is almost too late as the industry is almost in a complete collapse

Another Exogenous Event: The War Years

1926, 11.6 Swiss watch imports, which by 1934 had fallen to 900k. Swiss watch imports rose back up to 6 mil in 1942

The Combatants

US industry
commandeered for
armaments purposes

Japan's precision
capability works for
war and peace

The Neutrals

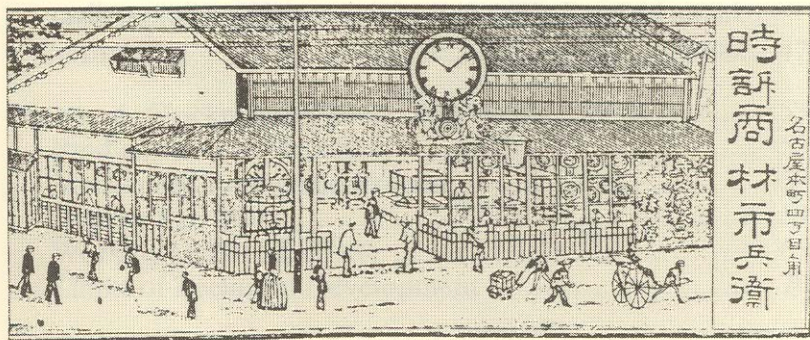
The Swiss: neutral,
but at a price

Hong Kong: an
entrepôt economy

The Day after The Armistice

Watch production began anew. With all of the destruction, how could this be?

25k watches made in 1945, 4.2 mil in 1958



Woodblock print of the branch of Ichibei Hayashi Clock Shop in Meiji Era

THE UNITED STATES STRATEGIC BOMBING SURVEY

THE EFFECTS OF STRATEGIC BOMBING ON JAPAN'S WAR ECONOMY

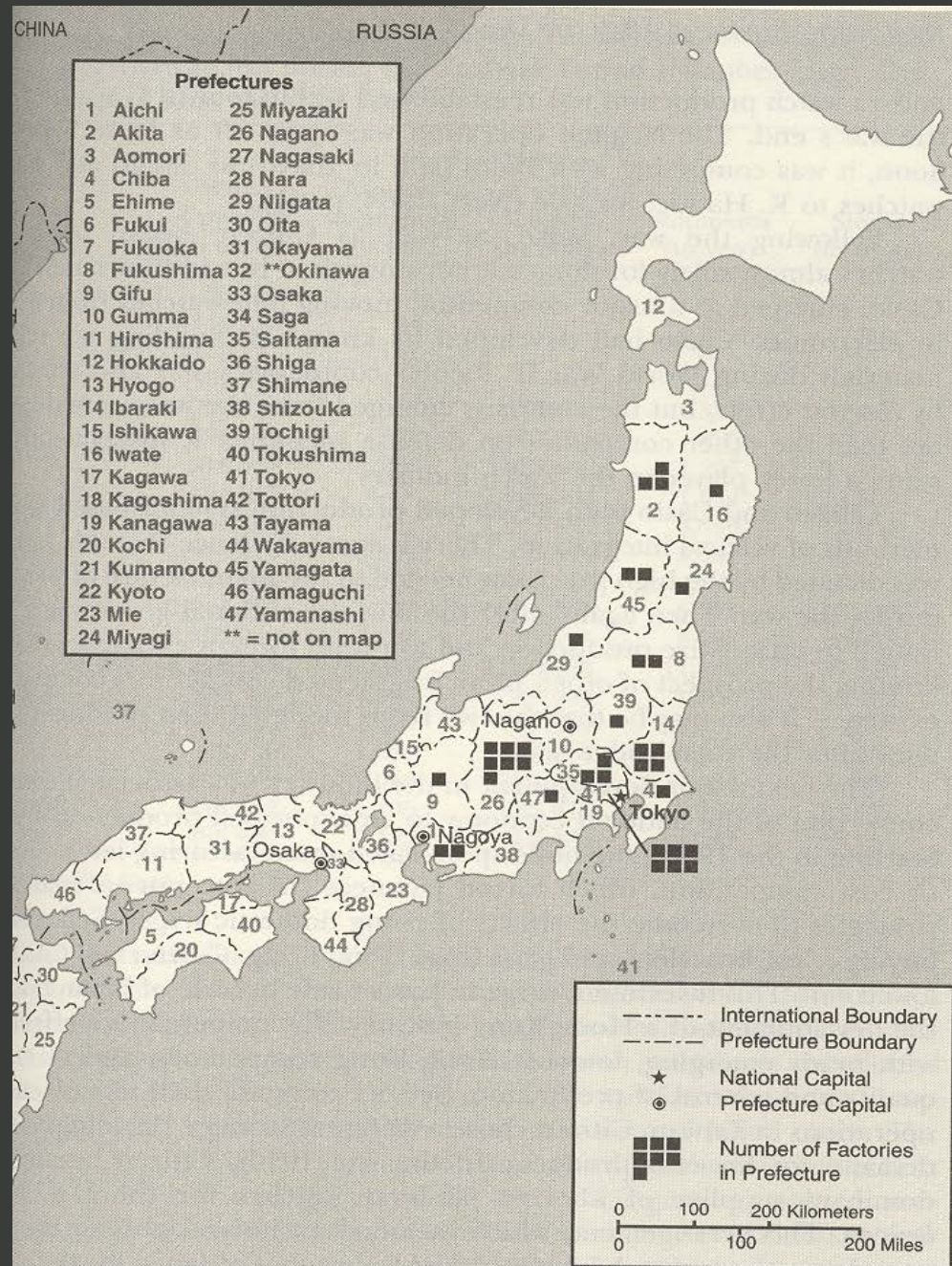
Appendix A B C

OVER-ALL ECONOMIC EFFECTS DIVISION

December 1946

Keeping Track of Time:

Tokyo relocated factories preserved capability, and ideology makes possible a relatively seamless transformation from war time to peace time activity.



The 1960s-1970s Dueling Technologies, Winner Takes All

America, the presumed technology leader, crippled by war production mandates. No governmental assistance for post war adjustment.

Japan, the more cunning and flexible decision-maker, focused by government oversight.

The Swiss, overly confident, lumbering laggards, indecisive, and unprepared; failed to invest during the war effort.

Digital Delay: The Swiss Dawdle, Americans Let Market Forces Prevail, **The Japanese Plan**

Flexibility trap: a case analysis of U.S. and Japanese
technological choice in the digital watch industry

Tsuyoshi Numagami^{a,b}

^a *Associate Professor, Institute of Business Research, Department of Commerce, Hitotsubashi University, 2-1 Naka, Kunitachi, Tokyo 186, Japan*

^b *Visiting Fellow, Centre for Corporate Strategy and Change, Warwick Business School, University of Warwick, UK*

Final version received February 1995

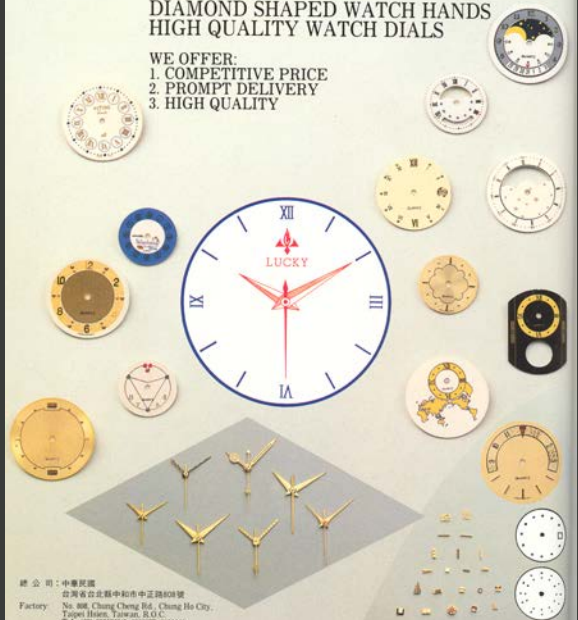
Once Again, Path Dependence And Lock-in

- Path dependence
- US digital watch firms were chip manufacturers and not watch makers
- The product line in the US only digital
- The Japanese go both ways
- Technological lock-in
- The US bets on LED
- The Japanese bet on LCD

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Game Changer: Digital Movements

Low cost labor
now the key;
precision no
longer a
competitive
prerequisite.

In a matter of five
years a takeover
is imminent

Hong Kong challenges for top spot in watchmaking

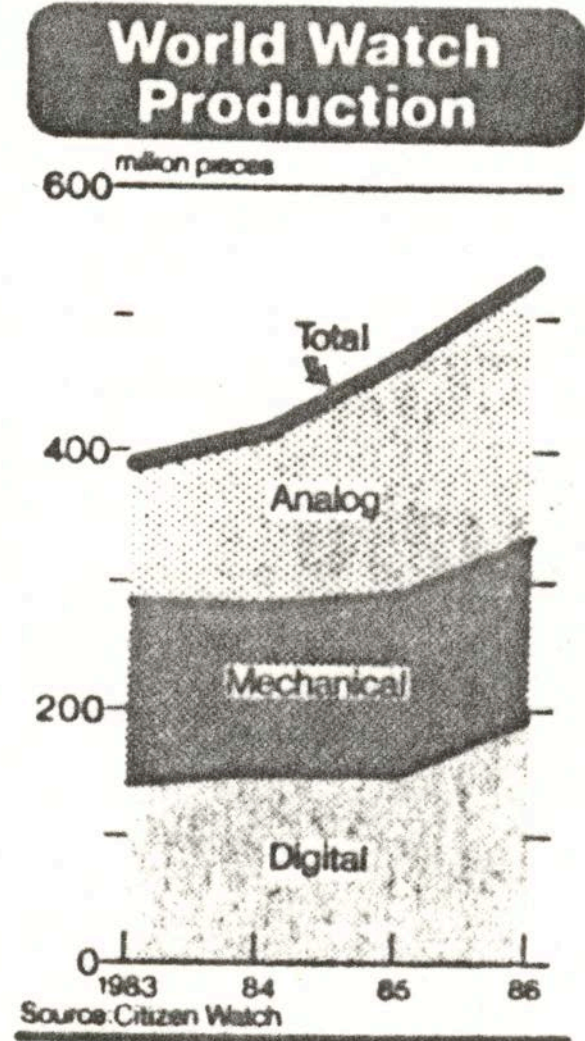
BY CHRISTOPHER PARKES, CONSUMER INDUSTRIES EDITOR

HONG KONG is challenging strongly to overtake Japan as the world's leading source of wristwatches.

Output from the Crown Colony soared by 40 per cent last year to about 140m units, according to Citizen watch of Japan.

Citizen, the world's second largest producer after Hattori Seiko, reports that Japanese output increased by only 7 per cent to 190m watches. This was the country's first single-digit increase for several years.

The value of Japanese production fell 20 per cent to Y290bn (£1.2bn) because of price competition and the appreciation of the yen against the US dollar. Swiss volume output rose 7 per cent to 64m pieces, Citizen says, while the value of sales remained unchanged. Global production increased 14 per cent



COMPANIES & FINANCE EUROPE

Swatch looks to add some extra shine

After a late start, the Swiss watch manufacturer is targeting the jewellery sector in an attempt to spread its earnings potential



Road to nowhere: chairman Nicolas Hayek's hopes of joining the world's carmakers have so far been a non-starter

By William Hall in Biel

Swatch, the world's biggest watch manufacturer, is expanding rapidly into jewellery in an attempt to diversify its earnings. The move comes amid evidence that the recent boom in the Swiss watch industry has ended.

Swatch, unlike competitors such as LVMH and Richemont, has been slow to enter the jewellery market, which is estimated to be four times the size of the global watch industry.

It said yesterday that it was launching two new jewellery brands linked to its successful Omega and Breguet watch brands and would promote them through its growing chain of retail stores.

This follows September's launch of the Swatch jewellery range, offering products with prices of up to SFr250 (\$144). Omega jewellery would be priced at SFr800-SFr20,000 and Breguet at SFr1,800-SFr200,000.

Nicolas Hayek, Swatch chairman and chief executive, declined to disclose the size of the group's jewellery sales. However, he expected jewellery to be an important part of the group's business.

Bank Vontobel has esti-

mated that the group is seeking sales of SFr500m-SFr700m in five years.

Mr Hayek, who salvaged the Swiss watch industry from bankruptcy in the 1980s, has been searching for years to find a winning product to take over from the mass-produced plastic wristwatch.

The company abandoned Mr Hayek's ambition to join the world's carmakers with his hybrid Swatchmobile. Plans to sell a wristphone to challenge the likes of Nokia and Ericsson have also been put on the backburner.

The expansion of Swatch's jewellery operation should help offset investor concerns at Swatch's ability to meet Mr Hayek's earlier sales forecast of 10-15 per cent growth in 2001.

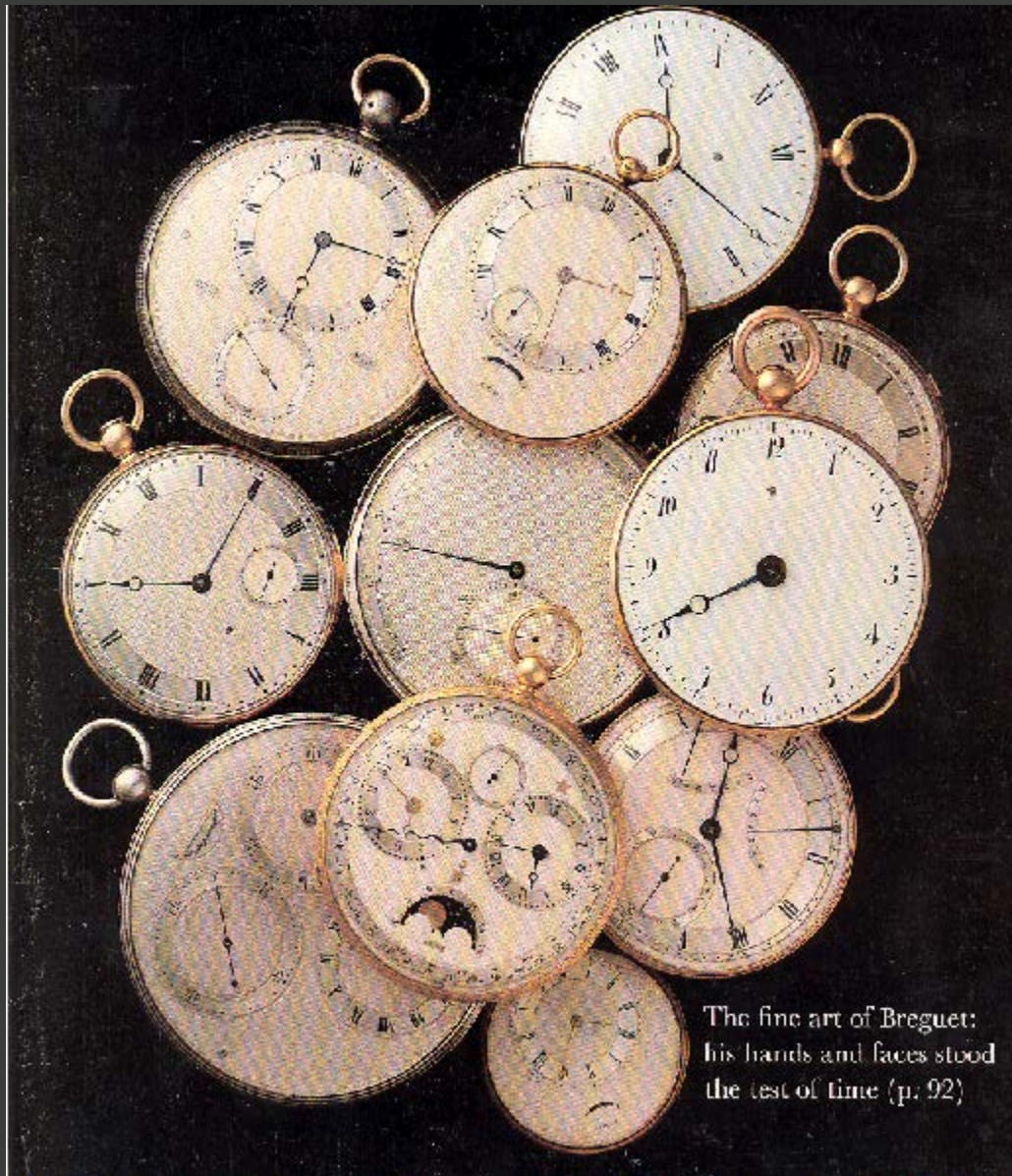
Last year the rate of growth of Swiss watch exports doubled to 16.7 per cent. Swatch increased its net profits by 48 per cent to SFr651m, helped by higher margins and strong volume growth.

However, the Federation of the Swiss Watch Industry reported last week that Swiss watch exports fell 3 per cent to SFr790m in March after two years of uninterrupted growth.

AP

The Moral Of The Story

- No single explanatory factor
- The interaction of time and space
- Myopia and self-satisfaction are signs of delusion
- Culture and Identity reinforce practices
- Andrew Grove's popular adage applies:
Only the Paranoid Survive!



The fine art of Breguet:
his hands and faces stood
the test of time (p. 92)