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MONTRES JAQUET DROZ SA

AUTOMATES & MERVEILLES

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AUTOMATES & MERVEILLES

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AUTOMATES & MERVEILLES

LES JAQUET-DROZ ET LESCHOT

SELECTION OF EXHIBITION TEXTS

During the 18th century, Pierre-Jaquet-Droz, his son Henri-Louis and their colleague Jean-Frédéric Leschot acquired widespread renown in the clockmaking world of Switzerland and throughout Europe. Beyond clocks and luxury watches, many pieces—organ-pipe clocks, miniature clocks, snuffboxes and singing bird cages—attested to their highly inventive and artistic craftsmanship.

As skilful technicians, their visionary creative spirit led these three men to explore the realm of automatons. It was in 1774 that their masterpieces—the three automatons The Writer, The Draughtsman and The Musician, and the accompanying Grotto—first sprung to life. Enthusiastically applauded when premiered in La Chaux-de-Fonds, these works went on to win acclaim across Europe.

These pieces invite us to consider the inquisitive spirit underpinning the Enlightenment; they also reflect lives of wealth and exception. How could these three clockmakers attained such a degree of technical perfection? How were their creations made known the world over? More generally speaking, what does expressing the mechanical reproduction of movements with such infinite realism entail? Also, to what extent can this search for movement be said to foretell the advent of robotics and 21st-century scientific laboratories?



Automate l'Ecrivain
(détail)
Pierre Jaquet-Droz,
1768-1772
Musée d'art et d'histoire,
Neuchâtel, inv. AA 2

© Musée d'art et d'histoire,
Neuchâtel



*Les Jaquet Droz
et Leschot
à Neuchâtel*

Texte de l'Ecrivain
"Les Jaquet-Droz et
Leschot à Neuchâtel"

© Musée d'art et d'histoire,
Neuchâtel

Automate l'Ecrivain
Pierre Jaquet-Droz,
1768-1772
Musée d'art et d'histoire,
Neuchâtel, inv. AA 2

© Musée d'art et d'histoire,
Neuchâtel

ROOM 1:

THE JAQUET-DROZ AND LESCHOT: THREE MEN FROM THE ERA OF ENLIGHTENMENT

Pierre Jaquet-Droz
Emanuel Witz, 1758
Huile sur toile
Collection privée

© Collection privée



Au centre:
Henri-Louis Jaquet-Droz
Non signé. Vers 1780
Huile sur toile
Collection privée

© Collection privée



Jean-Frédéric Leschot
Non signé. Début 19^e
siècle
Musée d'art et d'histoire,
Neuchâtel, inv. AA 4882

© Musée d'art et d'histoire,
Neuchâtel

Much esteemed as a talented mechanic and brilliant timepiece maker, **Pierre Jaquet-Droz** (1721–1790) was born in La Chaux-de-Fonds. After pursuing studies in philosophy in Basel, he apprenticed to a clockmaker in the Neuchâtel mountain area, where this branch had begun developing already in the 17th century. As early as in 1749, he made a name for himself in the field, inciting fellow citizens and notables to flock to his “Sur le Pont” [on the bridge] home and, later, his “Ferme du Jet d’eau” [farm at the fountain]. In 1750, he married Marie-Anne Sandoz, who bore him three children, two of whom—Julie and Henri-Louis—lived to become adults. Widowed in 1755, he continued to pursue his watchmaking activities and their promotion.

Pierre’s son, **Henri-Louis Jaquet-Droz** (1752–1791), teamed up with his father to produce pieces and promote their firm. In Nancy, at age 15, he received a humanist education by Michel de Servan, priest and erudite mathematician and physicist; there he also studied music and drawing. He is thought to have composed several of the pieces played by the automatons he would later create. In 1774, he began traveling all around Europe to show off the group of androids built in collaboration with his father and Leschot. He thus set up a commercial network spanning a number of capital cities. During his travels, he moved about in the upper society circles of London, Paris and Geneva, becoming familiar with the fashions and tastes of a highly refined clientele. Henri-Louis is also known to have participated actively in the Geneva Society of Arts.

Very early on, as an apprentice to Pierre Jaquet Droz, **Jean-Frédéric Leschot** (1746–1824) proved himself a highly skilled technician. A descendant of a family belonging to the Bourgeoisie of Valangin, he accomplished his first watchmaking projects teamed with the six-years-younger Henri-Louis Jaquet-Droz. These two closely befriended men continued to collaborate with Jaquet-Droz father and, like Henri-Louis, Leschot became a citizen of honour of the City of Geneva and was admitted to the Society of Arts. A highly qualified creator, it is to him that the firm owed many of its pieces. Upon the death of the Jaquet-Droz, father and son, Leschot took over the firm’s management until it closed down shortly after 1810.

A VARIED PRODUCTION: FROM CLOCKS TO LUXURIOUS WATCHES



Vue de la première
salle de l'exposition
Musée d'art et d'histoire,
Neuchâtel

© Musée d'art et d'histoire,
Neuchâtel. Photo Stefano Iori

Pendule à la française
(neuchâteloise)
Signée "P. Jaquet Droz
à La Chaux de Fonds en
Suisse". Vers 1760-1775
Bois, écaille de tortue,
bronze doré.
Musée d'horlogerie du
Locle – Château des
Monts, inv. MHL1

© Musée d'horlogerie du Locle –
Château des Monts.
Photo R. Sterchi



Pendule de parquet, dite
"longue-ligne"
Signée "P. Jaquet Droz à
La Chaux de Fonds".
Vers 1785-1790
Poirier teint en noir
Musée d'art et d'histoire,
Genève, inv. AD 2823

© Musée d'art et d'histoire,
Genève.
Photo Maurice Aeschimann



Pendule à jeu d'orgue et
cabinet en écaille
Signée "Pierre Jaquet Droz
à la Chaux-de-Fonds".
1750-1790.
Bois, écaille de tortue,
bronze, émail
Musée international
d'horlogerie,
La Chaux-de-Fonds,
inv. IV-390

© Musée international
d'horlogerie, La Chaux-de-Fonds



Au centre: Montre à carillon
Signée "Jaquet Droz London".
Londres, vers 1780
Perles, émail
Uhrenmuseum Beyer, Zurich, inv. 4374.68

© Uhrenmuseum Beyer, Zurich

Ci-dessus: Montre à oiseau chanteur, dite "Evening"
Attribuée aux Jaquet-Droz. Londres (?), vers 1785
Email, rubis, perles
Collection Montres Jaquet Droz SA,
La Chaux-de-Fonds, inv. J2

© Collection Montres Jaquet Droz SA, La Chaux-de-Fonds

AUTOMATES & MERVEILLES

ROOM 2:

A SEARCH FOR MOVEMENT: AUTOMATONS OVER TIME

(...)

PIERRE JAQUET-DROZ: STEADFAST TECHNICAL KNOW-HOW

(...)

THE TRIP TO SPAIN: PIERRE JAQUET-DROZ AT THE COURT OF FERDINAND VI

Journal d'Abraham-Louis Sandoz, contenant la relation du voyage en Espagne entreprise avec son beau-fils Pierre Jaquet-Droz (1758-1759)
1737-1759
Bibliothèque de la Ville, La Chaux-de-Fonds, Fonds Neuchâtelois, D.1853

© Bibliothèque de la Ville, La Chaux-de-Fonds



On the 4th of April 1758, together with his father-in-law Abraham Louis Sandoz and the young worker Jacques Gevril, Pierre Jaquet-Droz set out on a journey leading from La Chaux-de-Fonds to the court of the King of Spain. Bearing a recommendation from Lord George Keith, governor of the Principality of Neuchâtel, the clock-maker hoped to present his creations to Ferdinand VI (...)

EIGHTEENTH-CENTURY WRITER AUTOMATONS

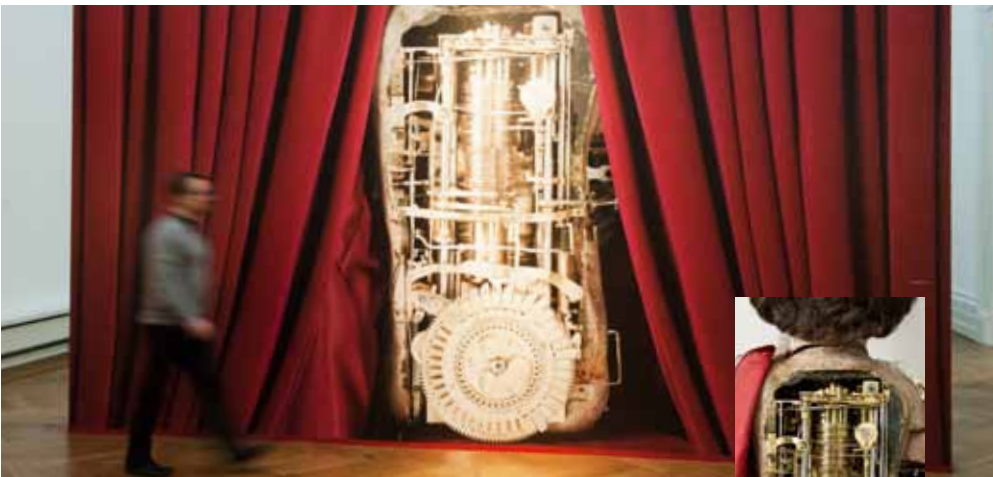
Automatons of writer figures developed briskly during the second half of the 18th century (...)

Jaquet-Droz premiered his own writer figure, The Writer, in November 1774. His creation has the unique feature of containing the whole mechanism within the android's body. The writing device includes stacked cams, three per letter, combined with a programming system, which enable the automaton to write any text of 40 signs in four lines (...)

AUTOMATES & MERVEILLES

Vue de la salle 2:
le mécanisme de l'Ecrivain
Musée d'art et d'histoire,
Neuchâtel

© Musée d'art et d'histoire,
Neuchâtel. Photo Stefano Iori



Détail du mécanisme
de l'Ecrivain
Pierre Jaquet-Droz,
1768-1772
Musée d'art et d'histoire,
Neuchâtel, inv. AA 2

© Claude Bormand, Lausanne

Texte de l'Ecrivain
"Automates et Merveilles"
2012
Musée d'art et d'histoire,
Neuchâtel

© Musée d'art et d'histoire,
Neuchâtel

Automates
et
Merveilles

ROOM 3:

THE AUTOMATONS TRAVEL: THE JAQUET-DROZ SEE TO THEIR PROMOTION

In late 1774, Henri-Louis Jaquet-Droz and Jean-Frédéric Leschot set out on a journey to display their automatons throughout Europe. At a first stopover in Paris, Queen Marie-Antoinette received them at the court. London was their next destination, followed by other cities in Holland, Flanders and northern France. Eleven years later, after going on exhibit in Paris, Lyon, and Geneva, the automatons regained their hometown of La Chaux-de-Fonds. Here they enjoyed a final presentation attended by Henri-Louis. Apart from the court of Versailles, it was in specially set up drawing rooms that the presentations were usually made. Entry fees covered two seating categories: at the presentation at the Hotel Lubert in Paris in 1775, for instance, viewers were charged 6 pounds for first choice seats, or 3 pounds for the other ones. Servants were simply barred from entering at all.

More than mere shows, these presentations were intended to acquaint visitors with the Jaquet-Droz timepieces, and inspire them to become buyers. Thus the four automatons served as a promotional device belonging to an overall commercial strategy.

AFTER JAQUET-DROZ, FATHER AND SON: ON THE TRAIL OF THE AUTOMATONS

At some point in 1788, having gone on tour for over ten years, the Jaquet-Droz sold their four automatons to the Gendre Bros., French merchants settled in Madrid. That firm toured Spain to exhibit them, after which all trace is lost (...)

In the late 19th century, the Canton of Neuchâtel's notables joined forces to promote the return of the automatons to their homeland. In keeping with this interest in the three androids, Jaquet-Droz and Leschot were being honoured anew, as part of the build-up of a local history celebrating the clock- and watchmaking identity of the Arc jurassien. Action undertaken by the Canton of Neuchâtel's Society of History and Archaeology, subsidies allotted by the Confederation, and the generosity of several donors all enabled the acquisition of the automatons from the hands of a Berlin collector. After a triumphant four-year tour of Switzerland, the androids were donated to Neuchâtel's Museum of Art and History.

THE GROTTO: THE MISSING AUTOMATON

(...)

ROOM 4:

FROM LONDON TO CHINA: A WORLDWIDE PROFESSIONAL NETWORK

His tour to present his automatons led Henri-Louis Jaquet-Droz to London, at the time a world capital in clock- and watchmaking. The city offered occasions to encounter renowned timepiece makers and craftsmen, inspiring him to open his own workshop there (...)



Vue de la salle 4:
Jaquet-Droz à Genève:
un luxe accru
Musée d'art et d'histoire,
Neuchâtel

© Musée d'art et d'histoire,
Neuchâtel. Photo Stefano Iori

Horloge de vestibule
(détail). Attribuée
aux Jaquet-Droz.
La Chaux-de-Fonds,
Genève ou Bienne,
1765-1790
Bronze, émail, verre
Collection
Montres Jaquet Droz SA,
La Chaux-de-Fonds,
inv. J31



Horloge de vestibule
Attribuée aux Jaquet-Droz
et à Henri Maillardet.
La Chaux-de-Fonds (?),
vers 1780
Bronze doré, porcelaine de
Meissen

Uhrenmuseum Beyer, Zurich,
inv. 1452.84

Montre en forme de flacon
avec carillon. Attribuée
aux Jaquet-Droz.
Genève (?), vers 1790
Email. Collection
Montres Jaquet Droz SA,
La Chaux-de-Fonds,
inv. J6



Ci-dessus: Montre à carillon. Signée "Jaquet Droz London".
Londres ou Genève, vers 1780. Email
Musée international d'horlogerie, La Chaux-de-Fonds, inv. I-101

© Collection Montres Jaquet Droz SA, La Chaux-de-Fonds

Montre à carillon à 3 airs
Mouvement attribué
aux Jaquet-Droz; émail
attribué à Jean Abraham
Lissignol (1749-1819).
Genève (?), vers 1790
Perles, rubis, émail
Collection
Montres Jaquet Droz SA,
La Chaux-de-Fonds,
inv. J3



© Collection
Montres Jaquet Droz SA,
La Chaux-de-Fonds

JAQUET-DROZ IN GENEVA: GROWING LUXURY

Henri-Louis Jaquet-Droz left London for good in 1783, to set up business in Geneva with his associate, Jean-Frédéric Leschot (...)

Montre en forme d'étoile dite "L'abeille" Attribuée aux Jaquet-Droz, Genève, entre 1790-1795 Email translucide sur fond guilloché, perles Patek Philippe Museum, Genève, inv. S-452
© Patek Philippe Museum, Genève



Vue du mécanisme d'une montre Signée "Jaquet Droz, London". Londres ou Genève, vers 1785 Rubis, perles, émail, ivoire sculpté Collection Montres Jaquet Droz SA, La Chaux-de-Fonds, inv. J9
© Collection Montres Jaquet Droz SA, La Chaux-de-Fonds

SIGNED WORKS:
A PROMOTIONAL STRATEGY

(...)

ROOM 6:

A MECHANISTIC WORLD:
EXPLORING THE BODY THROUGH DISSECTION

(...)

A MECHANICAL WORLD:
AUTOMATONS TO UNDERSTAND
PHYSIOLOGICAL MOVEMENTS

(...)

AUTOMATES & MERVEILLES



Vue de la salle 6: un monde mécanique: l'automate pour comprendre les mouvements physiologiques Musée d'art et d'histoire, Neuchâtel
© Musée d'art et d'histoire, Neuchâtel. Photo Stefano Iori

ORTHOPEDIC ARTIFICIAL LIMBS : MECHANICAL MASTERPIECES

(...)Henri-Louis Jaquet-Droz and Jean-Frédéric Leschot were recognized for their skill as mechanics and their mastery of the human body's movements, as conveyed in the androids of their creation. As such, they were in demand for very special projects, namely to fashion articulated artificial limbs (...)

ROOM 7:

IN THE 21ST CENTURY : SUPER AUTOMATONS AND ROBOTS

The history of automatons continued to develop throughout the 19th century. Once they left the drawing rooms and laboratories, they went on to be displayed at fairs. The 20th century saw the emergence of a new type of machine, namely robots (...)

ROBOTS FOR RESEARCH : IN THE EPFL LABORATORIES

During the 18th century, certain automatons were used as comprehensive tools for scientific experiments. Yet robots, from early in the 20th century, have truly advanced the cause of science (...)



Robot Poulbot utilisé pour des études sur les interactions animal-robot 2010
Groupe Mobots, Laboratoire de systèmes robotiques (LSRO), EPFL, Lausanne

© Groupe Mobots, Laboratoire de systèmes robotiques (LSRO), EPFL, Lausanne.
Photo José Halloy

Robot Verre. 2008
Groupe Mobots, Laboratoire de systèmes robotiques (LSRO), EPFL, Lausanne

© Groupe Mobots, Laboratoire de systèmes robotiques (LSRO), EPFL, Lausanne.
Photo Alain Herzog



ROBOTS : HUMANOID SHAPES OR SPECIALIZED SHAPES

(...)

ROOM 8:

FRANÇOIS JUNOD (*1959)

Lives and works in Sainte-Croix.

Ever since his youth, François Junod has been fascinated by art and mechanics. At the 1964 Swiss National Exhibition, at the age of five, he was mesmerized by Tinguely's machine sculptures. After obtaining a certificate in precision mechanics, he completed training in automata making and restoration, later to be complemented by art and sculpture curricula at the University School of Art and Design, Lausanne ('ECAL').

At the end of 1983, he opened his own workshop in Sainte-Croix where he could undertake his first creations. Acutely imaginative, he is as skilful at reinterpreting traditional automata themes as he is at developing novel subjects, such as the animated sculptures on display in this room.

The three Jaquet-Droz automata, part of the permanent collection of the Art and History Museum, Neuchâtel, remain a source of inspiration and major incentive for François Junod. He has mastered the inner workings of the clock mechanisms and built several renditions of *The Draughtsman* and *The Writer*. Today the wizard craftsman has gained worldwide renown.

Giving in to an occasional urge to work in electronics as in *The Dancer* or *The Automata Procession*, he more often turns to mechanics, sometimes adding small electric engines. Relentless explorer of techniques, François Junod embraces the contemporary vein as well, eager to implement modern mechanical systems. In his reinterpretations of antique automata, Junod utilizes ball bearings, a procedure already existing in the 18th century but absent in the Jaquet-Droz pieces.

One of his latest creations to date is the android Alexander Pushkin, draughtsman and poet. Its ingenuity lies in having a mechanical system that makes possible a random choice of words that form a poem, using a total combination of 1'458.

MUSÉE D'ART ET D'HISTOIRE, NEUCHÂTEL

Automates & merveilles : Les Jaquet-Droz et Leschot

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- Bibliothèque de la Ville, La Chaux-de-Fonds
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- Historisches Museum, Bâle
- Institut d'histoire, Université de Neuchâtel
- Institut d'histoire de l'art et de muséologie, Université de Neuchâtel
- Istituto italiano di tecnologia, Gênes (Italie)
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- Musée d'art et d'histoire, Fribourg
- Musée d'art et d'histoire, Genève
- Musée des automates, Grenoble (France)
- Musée d'histoire, La Chaux-de-Fonds
- Musée d'horlogerie du Locle – Château des Monts
- Musée du Temps, Besançon (France)
- Musée international d'horlogerie, La Chaux-de-Fonds
- Museum für Musikautomaten, Seewen
- Muzeum Historycznym Miasta Krakowa, Cracovie (Pologne)
- Nationaal Museum van Speelklok tot Pierment, Utrecht (Pays-Bas)
- Patek Philippe Museum, Genève
- Patrimonio nacional, Palacio Real, Madrid (Espagne)
- Technisches Museum, Vienne (Autriche)
- The Franklin Institute, Philadelphie (USA)
- The Palace Museum, Pékin (Chine)
- Uhrenmuseum Beyer, Zürich
- Université de Neuchâtel
- Les prêteurs privés anonymes

AUTOMATES & MERVEILLES

AUTOMATA & MARVELS: MARVELLOUS MOVEMENTS... AMAZING MECHANISMS

SURPRISE, ASTOUND, AMAZE

The central theme of the Automates & merveilles (Automata & marvels) exhibition at the Musée international d'horlogerie (International Watchmaking Museum) is music, whether associated with time measuring instruments – clocks and watches – or mechanical musical instruments. “La Musicienne”, the Jaquet-Droz robot, will be a very natural presence throughout the exhibition.

However, the content might seem a little limited. Occupying a central place in an exhibition covering a hundred square metres, bringing together magnificent objects and documenting the history of mechanical music is no mean feat, but don't clocks and watches count as automata in their own right? And what about clocks with orreries? Or curiosities such as the Geiser Père et Fils clock?



Pendule à planétaire
signée Raingo
(planétaire, musique et
décor) et Antide Janvier
(mouvement de la
pendule) à Paris.
Premier quart du XIX^e s.
[détail du planétaire]

Coll. Musée international
d'horlogerie, La Chaux-de-Fonds
/Crédit photographique MIH



Horloge “à mouvement
perpétuel”,
Jean et David Geiser,
La Chaux-de-Fonds,
vers 1815. Détail

Coll. Musée international
d'horlogerie, La Chaux-de-Fonds
/Crédit photographique MIH

The exhibition's subtitle, "marvellous movements... amazing mechanisms" develops the theme, casting a new light on around fifteen pieces from the museum's permanent collection. Films and sounds accompany the objects to enhance the learning experience. And the work of contemporary artist Martin Müller has been chosen to complement the exhibits.



Klatscher
Kinetische Skulpturen,
Martin Müller



Geige
Kinetische Skulpturen,
Martin Müller



Uhrknall
Kinetische Skulpturen,
Martin Müller

Martin Müller, an artist who works with kinetic media, has a dual association with the exhibition thanks to his creations which develop sound in a playful, interactive way, as well as those which combine sound and time, such as, for example, his "Uhrknall" ("bang" clock) which is designed to reproduce several successive "big bangs". A clock movement sends a command to a device which inflates balloons until they burst at fixed intervals, creating the installation. At the end of the exhibition's 5 months, the area covered by burst balloons represents the time which has elapsed.

Incorporating **Automates & merveilles: merveilleux mouvements... surprenantes mécaniques** in the museum's 2'000 m² space has also allowed some major works to be exhibited in a more conducive environment, in particular a pair of automaton elephant clocks attributed to James Cox (private collection), elephant clocks from the horology collection of the Musée d'art et d'histoire in Geneva and the astronomical clock made by Antide Janvier.



Eléphant,
détail de l'œil mobile

Collection particulière/Crédit
photographique Daniel Narezo



Pendule éléphant à
automates attribuée à
James Cox faisant partie
d'une paire

Collection particulière/Crédit
photographique Daniel Narezo



Hercule portant une
sphère armillaire –
pendule d'Antide Janvier
(1795)

Collection particulière/Crédit
photographique Daniel Narezo

AUTOMATA

The spotlight is naturally on automata, which have been given their own **Automaton Theatre** in recognition of their original purpose: these types of pieces were often on show at annual fairs, which visitors paid to enter, and were originally designed for this kind of theatrical set-up. “La Musicienne” is accompanied by a precious birdcage, the great Maillardet magician or the Flying carpet, a contemporary work by François Junod.

AUTOMATES & MERVEILLES

“Ture buvant du café
sur un tapis volant ”

Collection La Semeuse



Le Grand Magicien

Coll. Musée international
d'horlogerie, La Chaux-de-Fonds
/Crédit photographique MIH

ROBOSPHERE

Robot Gilberto
Collection Robosphère



However, in order to ensure a thorough treatment of the complex and fascinating subject of automata – and that’s without considering the developments of the 20th and 21st centuries – the decision was soon taken to incorporate the world of robotics.

Robosphere, a futuristic educational theme park to be opened in the Neuchâtel mountains, has its own completely original exhibition which has been specially designed for the museum space. This showcases some of the most important creations in the world of robotics: humanoid robots, companion robots, industrial robots, artistic robots, maintenance robots, research robots, microscopic robots, flying robots, transformable robots, solar robots, teaching robots, autonomous robots, bio-inspired robots... and even RoboSnack, a fully robotised cafe!

CRANKS AND TOOTHED WHEELS

And last but not least, a purely mechanical and interactive section of the exhibition aimed at the very youngest visitors and developed by the Espace des inventions, Lausanne. The experience reveals the complex technology employed in the field, including gears, ball bearings and vibrating devices.

Table de démonstration
des engrenages

©Espace des inventions,
Lausanne



AUTOMATA, WATCHES AND KEYS:

Quelques clés
d'automates et
de pendules



The keys used to wind the springs inside the watches and automata are what bring them to life. And they are not without their own interest. Large, small, functional, decorative or plain; each has its own personality – without them there would be no miracles and the automata would remain lifeless.

This is why they are used as the emblem of the exhibition – in the ampersand which appears in the main title, the USB key specially developed for the event and finally as direction markers indicating the route through the Automates & merveilles: merveilleux mouvements... surprenantes mécaniques exhibition.

AUTOMATES & MERVEILLES

By way of 34 stopping points, from the pool at the entrance to the museum to the Carillon sculpture in the Parc des musées, the visitor is able to discover the movement of automata and the sounds of musical clocks. The keys are the symbols for each of the proposed stops.



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d'horlogerie, La Chaux-de-Fonds
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- the **amazing mechanisms** of the Geiser “perpetual movement” clock or Vachey’s monumental clock
- the **marvellous movements** of the two large pairs of elephants or Maillardet’s magicians
- the **music of the heavens** in the Ducommun or Janvier orreries



Kinetische Skulpturen, Martin Müller



- the **light-hearted music** in the creations of the Basel artist Martin Müller or alarm clocks with automata



Coll. Musée international d'horlogerie, La Chaux-de-Fonds /Crédit photographique MIH



- the **salon music** of the *Fox and the Stork* or *Jaquet-Droz La Musicienne* clocks



Coll. Musée international d'horlogerie, La Chaux-de-Fonds /Crédit photographique MIH



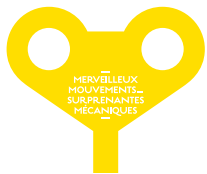
- the **pocket music** of the snuff boxes or jacquemart and musical watches



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- the **contemporary music** of the Carillon sculpture.



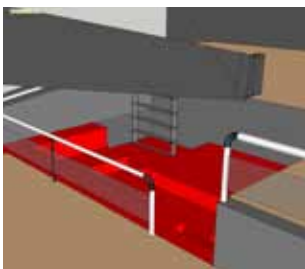
Boite à musique, avec cylindre et jeux de cloches, vers 1880, coll. Musée Baud, L'Auberson



- The **heart of the exhibition** which traces the history of mechanical music



Coll. Musée international d'horlogerie, La Chaux-de-Fonds /Crédit photographique MIH

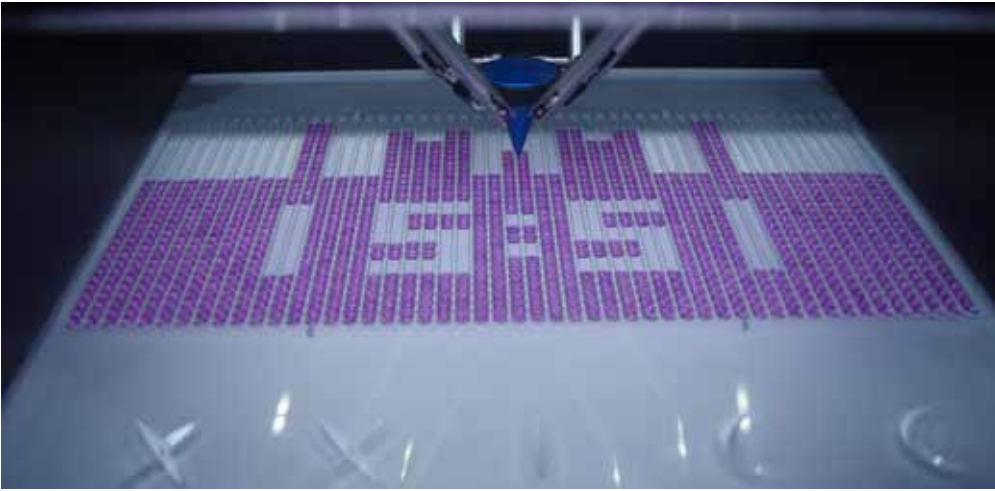


- The **Théâtre des automates** (Automaton Theatre) re-
vives the link with tradition: the large automata are exhibited in a theatre where watchmakers activate them in scheduled performances.

A CLOCK OF THE FUTURE

Developed by Serge Bringolf for the Robosphere project, the XXI CC “twenty-one CC” (twenty-first Century Clock) is the successor to the Neuchâtel clocks of the 19th century, both in terms of its creator’s origins and the intellectual and technical processes he has employed in its development.

However, this is a brand new concept: the world’s smallest, fastest and most precise industrial robot moves a thousand watchmaking jewels every minute to form a digital display of the exact time. Operating horizontally, a system of mirrors allows the time to be read from a distance. The stones, which are moved in columns, create a graphic which disappears after one minute.



Pendule XXI CC,
détail de l’affichage

©Espace des inventions,
Lausanne

A BRIEF HISTORY OF MECHANICAL MUSIC

Musical clocks, automaton tightrope walkers and magicians... these sophisticated mechanical devices demonstrate that the inventiveness and expertise of mechanics and horologists from centuries past are still alive in the creations of today.

10 display cases trace the history of clocks which have at some point been associated with automata, then musical movements, including the carillon, the serinette and the set of flutes, continuing on through the development of the music box and the evolution of mechanical music.

AUTOMATA AND CLOCKS

The Renaissance saw the birth of the table clock, in which the weight was replaced by a mainspring. Artisan clockmakers produced timepieces featuring an array of forms and decorative details – sometimes accompanied by automata – for those fortunate enough to afford them. Triggered automatically every hour with chimes or animated by the clock’s motion, the movements of the automaton were simple, evoking scenes from daily life, hunting tableaux or characters.

Animals figured prominently in the automata of the time: we see a vast range of species and animated movements: lions move their eyes and open their mouths, dogs dance and leap, birds move their beaks and flap their wings, bears dance and mythical beasts illustrate the imaginative power and skill of the artisans who created them.



Cerf couché attaqué par un chien, cuivre doré, mouvement signé par Nicolas Le Constençois, Horloger du Roy, Paris, vers 1550, dimensions: 160x178mm.

Coll. particulière

BELLS AND CARILLONS

Bells have always served either a religious or lay purpose. Their sound could be heard far and wide, and was used to call meetings, alert villagers to fires or simply signal the time. And all religions have used the system to assemble congregations of followers.

Usually comprising four bells, the first mechanical carillons date back to the Middle Ages. Incorporated in a mechanical clock, a carillon is activated at set times to play melodies “pre-recorded” on a barrel containing pins which actuate hammers. The carillons on town clocks were sometimes accompanied by “jacquemart” automata – human figures made from wood or metal – which signalled the time by striking the bells with a hammer.

*Horloge en fer à carillon, France, début du 17^e siècle
Une des cloches porte la signature: Jean Dubois au Puy. Le carillon comporte neuf cloches dont huit servent au jeu de la mélodie et une à la sonnerie des heures. Il est déclenché à chaque quart d'heure par le mouvement de l'horloge.*



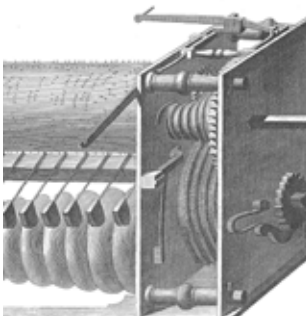
Musée de l'horlogerie Beyer, Zurich

CARILLON CLOCKS

In the 18th century, the appearance in various horological treatises of descriptions and explanatory illustrations concerning the production of mechanical music illustrates the desire among clockmakers to add musical mechanisms to their creations. The volume of Diderot and Alembert’s Encyclopedia dedicated to horology, published in 1765, contains a plate showing a perspective drawing of a fifteen-chime carillon, including the gear train that activates it, which is practically identical to those produced by horologists for their clocks.

These carillons usually comprised a horological gear train whose speed was regulated by a fly, a weight or a mainspring which supplied the energy required to play the music. The critical component was without doubt the barrel which contained pins positioned according to the melody to be played. These pins controlled hammers which struck the bells, whose number varied depending on the size of the instrument.

Planche XXVII du volume de l'Encyclopédie de Diderot et d'Alembert dédié à l'horlogerie, publié en 1765, qui présente un carillon à quinze timbres vu en perspective avec le rouage qui le fait mouvoir.



BIRD CAGES AND SETS OF FLUTES

Bird cages represent a special development in the history of mechanical music: they were not originally designed to produce music mechanically, but rather to reproduce as faithfully as possible the song of one or more birds. The sliding-piston whistle, believed to have been invented by Jaquet-Droz and Leschot, along with their associate Jacord Frisard, was designed to replace the serinette – whose miniature flutes struggled to produce a natural-sounding imitation of birdsong – and quickly rose to prominence in the last quarter of the 18th century. Like the serinette, it consisted of a motorised movement which produced air using a bellows. The set of flutes was replaced by a piston whistle, a kind of small slide-operated flute controlled by a set of cut cams which allowed the system to reproduce the desired melody as accurately as possible



Cage à deux oiseaux chanteurs et fontaine centrale, attribuée à Jaquet-Droz. Fin du 18^e siècle. – détail

Collection particulière/Crédit photographique Daniel Narezo

while synchronising the movement of the bird's beak, the flapping of its wings and its rotation. In some cages, the bird would even hop from one branch of its tree to another. This device also allowed the applications to be miniaturised so that they could be incorporated in snuff boxes and decorative objects such as mirrors, perfume spray pistols and even pocket watches.

MUSICAL CLOCKS AND WATCHES

A discovery at the end of the 18th century would revolutionise the production of mechanical musical instruments: in 1796, the Genevan clockmaker Antoine Favre presented a mechanical movement “without chimes or hammers” to the “Committee on Mechanics” in Geneva. Inside the music box which, like carillons and organs, consisted of a mechanical movement which rotated a pin barrel, the musical notes were produced by a “keyboard” formed of a series of perfectly tuned vibrating flexible blades made from steel. Initially used in watches, rings and snuff boxes, larger musical movements were incorporated in the bases of clocks, then in ornately decorated wooden boxes which offered exceptional sound quality.



Montres à automates

Coll. Musée international d'horlogerie, La Chaux-de-Fonds /Crédit photographique MIH

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MUSIC BOXES

In the 19th century, most music boxes were produced in Geneva, Switzerland – the cradle of the industry. However, it was in Sainte – Croix and L'Auberson in the Vaud



Détail de la boîte à musique d'une horloge

Coll. Musée international d'horlogerie, La Chaux-de-Fonds /Crédit photographique MIH

Jura that it was to develop. The barrel, which is the movement's main component, allows a limited number of melodies to be played – usually between four and ten. To change the melody, the barrel moves slightly on its axis in order to position a different set of pins in front of the keyboard. In some music boxes the barrel can be changed to increase the number of melodies.

Sets of bells, additional keyboards for bass notes, small drums, carillons and even automata were sometimes added to large music boxes.

The cases, which act as soundboxes to enhance the sound produced by the mechanisms, are made from the finest wood decorated with beautiful inlays. On the inside of the cover, a card, known as the “tune card”, lists the tunes played along with their composers.

AUTOMATON AND MUSICAL PENDULUM CLOCKS

Following in the illustrious footsteps of Jean-Eugène Robert-Houdin, the renowned French illusionist, inventor and creator of automata born in Blois in 1805, magicians and conjurors became increasingly popular in the 19th century. They inspired clockmakers to incorporate magician automata into their clocks, in the tradition of those designed by Jean-David and Henri Maillardet, the large and small magician, held in the collections of the Musée International d’Horlogerie in La Chaux-de-Fonds.

Other decorative clocks, borrowing elements from the gothic architectural style, were also fitted with mechanical music boxes. Inside the wooden bases supporting the clocks, the music is generally triggered by the clock movement when chiming the hours.



*Pendulette à escamoteur
Japy Fils Mignon Paris
vers 1860*

*Photo Renaud Sterchi
©MHL*

AUTOMATON CLOCKS

A wide range of creations inspired by everyday life, rural scenes or the world of entertainment adorned automaton clocks throughout the 19th century. Characters animated by mechanisms comprising metal wheels, cams and rods start moving at regular intervals, generally on the hour when the chimes sound. The craftsman’s workshop, such as that of the blacksmith in the French clock on display here, or scenes illustrating circus arts were particularly well received by the public.

Music would often accompany the sequence of events: single music boxes, able to play one or more tunes, were ordered from specialist craftsmen and integrated in the clock bases.



*Pendule neuchâtoise
avec acrobate*

*©Musée d’art et d’histoire,
Ville de Genève, Inv. AD 3084.
Photo Maurice Aeschmann*

SINGING BIRD CLOCKS

Japy, the company founded in Beaucourt at the end of the 18th century, which became Japy frères & Cie in 1806, specialised, amongst other fields, in the manufacture of figure clocks, automaton clocks and musical clocks. Mantel clocks with singing birds, such as those on display here, are fitted with a device independent from the clock movement, which drives the mechanism for the birds and a system of bellows and flutes imitating their song. The bellows are designed to blow air into a small flute, whose length can be varied using a set of cams. The beak, wings and tail of each bird move as it sings one or more tunes against a backdrop of a waterfall represented by a twisted glass rod, rocks and a blossoming tree.



*Pendule de cheminée
à oiseaux chantants,
Japy frères & Cie,
Paris vers 1865.*

©Musée d'art et d'histoire,
Ville de Genève, Inv. AD 3084.
Photo Maurice Aeschimann

DISC AND GRAMOPHONE MUSIC

By the end of the 19th century, the production of traditional music boxes was facing competition from discs, which were being produced more cheaply in Germany. Measuring up to a metre in diameter, the disc replaced the pin barrel. Indented hooks were stamped beneath its surface, in place of the pins on the barrel. The discs were usually rotated by gears whose teeth engaged in the holes positioned around their edge. Perforated cards, which were used by Jaccard in the textile industry and subsequently employed to produce mechanical music from the mid-19th century, significantly increased the possibilities offered until that point by barrels. Technically easier to produce and simple to change, in particular they allowed longer tunes to be played. At the end of the century they began to be powered electrically, enabling the construction of large musical automata, fairground organs and orchestrions.



Gramophone

Coll. Musée international
d'horlogerie, La Chaux-de-
Fonds /Crédit photographique
MIH

In the 20th century, the popular success of the gramophone, which used cylinders and later discs to freely reproduce music or the human voice from recordings, would spell the end for the production of traditional mechanical musical instruments.

ORGANISATION OF THE EXHIBITION

Automates & merveilles : merveilleux mouvements... surprenantes mécaniques exhibition

Exhibition concept and design

Nicole Bosshart, Jean-Michel Piguët,
Ludwig Oechslin,

Graphics and scenery

Polygone Publicité et communication

Display case design

Serge Perrelet, exhibition technician

Construction of Automaton Theatre, bases and visual media

Carpentry and painting : La Chaux-de-Fonds
Public Works Department

Restoration of pieces : Centre for the restoration of old and antique clocks

Daniel Curtit, Aurélie Michaud,
Pascal Kunz, Julian Vallat

Exhibition mounting

Serge Perrelet, Vanni Stifani, Daniel Curtit,
Jean-Michel Piguët, Justo Arancibia,
Laurence Schmid

Technical assembly Cédric Brossard

Cranks and toothed wheels exhibition

Design Espace des inventions, Lausanne

Assembly and setup Romain Roduit,
Cédric Brossard, Serge Perrelet

EXPOSITION MANIVELLES ET ROUES DENTÉES

Conception

Espace des inventions, Lausanne

Montage et mise en place

Romain Roduit, Cédric Brossard,
Serge Perrelet

ROBOSPHERE

Design: Nicole Bosshart, Serge Perrelet,
Serge Bringolf

Assembly: Serge Perrelet, Vanni Stifani,
Cédric Brossard

Coordination and administration

Nicole Bosshart, Amandine Cabrio,
Manuela Bolgiani

Metal construction

Alphaset

Plexiglas

Jauslin SA

Printing

Jura Néon SA
Verdon SA

Flooring

SolHeimo

Films

Vidéo Clap

Jaquet-Droz Automaton films

REC Production audiovisual

Translations :

Star SA

Lenders

Musée d'art et d'histoire, Neuchâtel
Musée d'horlogerie du Locle, Château des
Monts

Musée d'art et d'histoire, Geneva

Musée des automates à musique, Seewen
CIMA, Ste Croix

Musée Baud, L'Auberson

François Junod, Ste Croix

Musée Beyer, Zurich

Uhrensammlung Kellenberger, Winterthur

Martin Müller, Basel

La Semeuse, La Chaux-de-Fonds

Private collections

The Automates & merveilles exhibition is supported by

- Montres Jaquet Droz SA
- Loterie romande
- Sandoz Foundation
- Ernst Göhner Foundation
- Etat de Neuchâtel
- Bureau de contrôle des ouvrages
en métaux précieux
- La Semeuse SA through the creation
of a special exhibition coffee
- Croisitour SA through the provision
of transport and travel support
- amisMIH
- Ulysse Nardin Foundation
- Laboratoire Dubois

AUTOMATES & MERVEILLES

MASTERPIECES OF LUXURY AND MINIATURISATION

THE WORKS OF PIERRE AND HENRI-LOUIS JAQUET DROZ
AND JEAN-FRÉDÉRIC LESCHOT

*Extract taken from the exhibition catalogue,
by Sharon Kerman, April 2012*

AT THE CROSSROADS

Pierre Jaquet Droz and his son Henri-Louis, joined by their associate and friend Jean-Frédéric Leschot, are considered some of the most inventive and visionary clockmakers and mechanical engineers of the mid to late 18th century.

The ingenuity and grace of their work ensures they hold a privileged place in the history of horology. They are also key characters who were placed by the era in which they lived at the crossroads of the Ancien Régime and the post-revolutionary world. They were the last generation of “*établisseurs*”, the manufacturer-tradesmen of the Ancien Régime, bridging two eras – that of the unique piece or pieces made in very small numbers for a select public, and that of the machine-aided manufacture and the start of mass production.

Jaquet-Droz and son and Leschot were also at another crossroads, where science and entertainment briefly united before going their separate ways for good. While 18th century automata – particularly the “*moving anatomies*” created by Vaucanson – are a reflection of the questions being asked by the great thinkers, for example Descartes, Pascal and La Mettrie on the spirit and matter, their main purpose was to surprise and amaze. This was certainly the aim of Henri-Louis Jaquet Droz and Jean-Frédéric Leschot when, from 1774 onwards, they exhibited their three androids in the major cities of Europe.

In the work of Pierre and Henri-Louis Jaquet Droz and Leschot, we can increasingly see a juxtaposition of the large and the infinitesimally small, a fusion of macrocosm and microcosm. This focus on the most minute detail is combined with ambition on a universal scale.

Automate Le Dessinateur
Henri-Louis Jaquet-Droz,
La Chaux-de-Fonds,
1772-1774

© Musée d'art et d'histoire,
Neuchâtel



Pierre Jaquet Droz (1721-1790) had a background in studying the watch complication. Like many of his clockmaking contemporaries, in it he saw the best way of moving ahead of his counterparts.

For clock and watchmakers, “complication”, is used to mean anything which is added to the simple indication of the time and which provides the piece with an additional attraction, whilst presenting the maker with a technical challenge.

Watch complications include scientific and practical functions, such as hour and minute repeaters, or the indication of the moon phases, and magnificent frivolities such as the addition of an animated scene or a piece of music.

Until well into the latter part of the 18th century, the addition of watch complications meant that the resulting pieces were necessarily large. A piece of music – produced by a serinette or carillon – an automated scene, the chime of the hours, quarter hours or minutes, all these required the incorporation of an additional mechanism.

MINIATURISATION AND LUXURY GOODS: A NEW INDUSTRY

Around 1770, at the time Henri-Louis Jaquet Droz (1752-1791) was returning from his studies in Nancy, the Jaquet Droz and Leschot production processes had evolved. The firm had then started to devote itself to manufacturing small volumes of pieces, an approach better adapted to the changing markets, and easier to produce and transport. Instead of continually expanding their field of vision, like an astronomer studying the sky with a telescope, they instead turned the lens around to look deeply into the heart of the miniature universe.

Singing birds are, without a doubt, the most striking example of miniaturisation in the work of Pierre and Henri-Louis Jaquet Droz and Leschot. These mechanical birds, which imitate the movements and song of real birds, were very popular at the time.

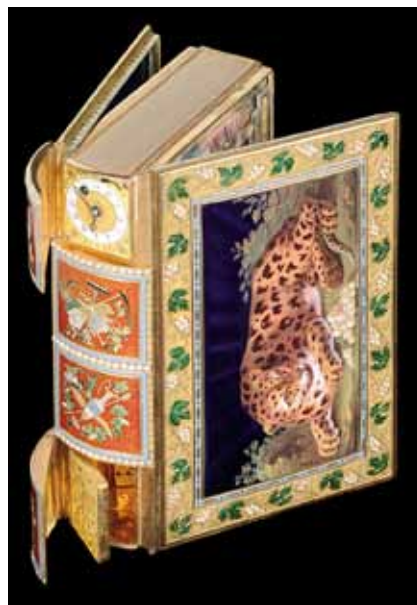
The first wave of pieces included a set of organs housed in their base. Called “serinettes”, meaning “little canaries”, because they owed their existence to the practice – widespread in the 17th century – of raising canaries to be taught how to sing, these mechanisms consisted of several organ pipes, each of which produced a note and a large bellows to provide the air. A cylinder embedded with pins, or “pin barrel”, dictated the notes to be played.

The firm Jaquet Droz and Leschot produced large cages with one or two singing birds known as hanging birdcage clocks, with a dial underneath to enable the time to be read when the cage was suspended.

But the market was continually crying out for something new, and towards the end of the 18th century, one invention would revolutionise the world of singing birds: the sliding-piston whistle. Generally attributed to Jaquet Droz and Leschot, who were the only people at the time making very high quality mechanical bird pieces, this critical development led to a massive expansion of the genre. In the years to come, and until

Tabatière à oiseau chanteur (détail mécanisme), Jaquet-Droz

©MIH



Carnet de bal Tabatière avec montre et automate, Anonyme Genève, vers 1810

Photo Renaud Sterchi ©MHL

the beginning in the 20th century, a huge number of miniature singing birds would be created.

The principle was a simple one: replace the bulky set of organs in the serinettes with a single small whistle pipe. The notes were produced as the piston slid along the pipe, like a little trombone, sounding all the notes in the musical scale as it passed. A miniaturised set of cams controlled the piston, while a small bellows provided the air.

Incredibly agile, the sliding-piston whistle could produce trills and glissandos; it was also able to repeat notes in rapid succession. This made them better at imitating bird-song than the serinette. Taking up very little room, this invention made it possible to create a vast range of small decorative objects: watches, mirrors, snuff boxes, bottles, small cages, cane pommels... and even small pistols which, when the trigger was squeezed, released a little bird which then sang!

For the creation of their singing bird mechanisms, Jaquet Droz and Leschot called on an independent craftsman, Jacob Frisard (1753 - 1810). Frisard worked closely with Jean-Frédéric Leschot (1746 - 1824), who was in charge of the workshop. The two men, proud of the quality of their pieces, were incredibly aware of what made them stand apart from the competition, as revealed by this extract from a letter sent by Leschot to Frisard:

“We need to try and keep this field to ourselves as long as we can, as there are plenty of envious people here, but they cannot imagine all the difficulties that have to be overcome, and without that they will never manage more than the idiotic things they currently produce, like the inclusion of several flutes. Let us just allow them to continue as they are, they can never damage the sales of our pieces.”¹

Around 1775, a branch was set up in London, and Henri Maillardet was entrusted with its management. This was a major turning point for Jaquet Droz and Leschot. At the time, London was an important centre of horology with international prestige. The word “London” engraved on the dial was a guarantee of its quality in the mind of the purchaser. The British capital was the point of departure for boats supplying the flourishing Oriental market.

By opening a branch in London, Jaquet Droz and Leschot became closer to the major English merchants with whom they were already working: James Cox (of Cox and Beale, then Cox, Beale and Laurent), Duval and Magniac. These merchants were catering for a clientele which appreciated luxury in every sense of the word: high quality, rarity, technical refinement, rich decorations, high prices.

This passion for exclusive luxury pieces was a driving force which stimulated commerce and trade between countries and continents. Voltaire, both a clockmaker and a fervent advocate of commerce, noted:

The treasures of the earth and main, With all the creatures they contain :

These, luxury and pleasures raise ; This iron age brings happy days.

Needful superfluous things appear ;

They have joined together either sphere. ²

The pieces designed for the Chinese and near eastern market were decorated according to well-defined canons. For China, brilliant colours and rich, elaborate ornamentation were required – not just of the visible part of the timepiece, but also of the movements, which were engraved on every surface. The bezels were set with pearls and other precious stones, and they featured incredibly beautiful scenes painted in enamel.

The Emperor and the Mandarins were fascinated by the movement, for example by the one which drove the central seconds hand. They loved small automated tableaux which moved in time to the music, and cages and snuff boxes with singing birds. They preferred to purchase their precious timepieces and animated scenes in pairs, which encouraged the établissements to create “mirrored” decoration – with each timepiece featuring the reverse image of the other.

Another particularity of the Chinese market was the constant demand for the new, which encouraged the merchant-établissements to continually renew and vary the appearance of the objects.

The Turkish market favoured the brightest contrasting tones, accented with colours from across the spectrum: candy pink, mint green, deep crimson; and scenes finely painted onto enamel, where subjects included boats resplendent under full sail and prosperous commercial ports, surrounded by the high towers of the minarets.



Cage à oiseau chanteur,
Jaquet-Droz

Photo Renaud Sterchi
©MHL



Pistolet lance-parfum. Anonyme, Genève, vers 1810
Photo Philippe Pellaton. ©MIH



Chenille
attribuée à Maillardet,
Genève-Londres
vers 1820

Photo Renaud Sterchi
©MHL

Montre de poche signée
Jaquet-Droz et Leschot,
London, vers 1780

Photo Laurence Bodenmann
©MHL

“LA FABRIQUE”

In 1784, Jaquet Droz and Leschot left La Chaux-de-Fonds for Geneva, where they took the opportunity to set themselves up in the very heart of the Genevan manufacturing industry, known as “La Fabrique” (the factory). In the 18th and 19th century, this word covered the entire trade connected to the creation of timepieces and jewellery: clock-making, goldsmithing, enamelling, setting, and all the related activities.

“La Fabrique” was organised by the merchants and manufacturers known as “éta-blisseurs”, who designed, financed and controlled the work, advanced the money to purchase materials, paid the labourers and found sales outlets for the finished objects. They did not receive payment themselves until many months, sometimes a year, later. The craftsmen, often working on their own account, were independent in spirit and proud of their expertise. They were the famed “cabinotiers”, or master clockmakers, whose small workshops, or “cabinets”, were perched at the very top of houses to make best use of the light required for their highly precise work.

Automaton Exhibition
Gothic Hall
scan Sharon Kerman Iq



Pendulette lyre à oiseau
chantant et automate,
signée
P. Jaquet Droz et Leschot
London

Photo Renaud Sterchi
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While Jaquet Droz and Leschot employed, and no doubt partially trained, some of the best clockmakers of this time –Isaac Daniel Piguet, Nicolas-Constant Le Maire, the Maillardet brothers, the Rochat brothers – most of their collaborators remain anonymous. Their accounts provide a few names of craftsmen and suppliers: those, for example, of the goldsmiths Rémond and Lamy, and Guidon, Blondel & Gide, who supplied the gold snuff boxes.

Amongst the names of enamel painters, we find Soiron – doubtless Jean-François Soiron (1755-1813) – cited on 18 March 1788: “By Soiron, for painting of 6 lost domes, 60 French livres”, and the two references in November 1788 to “J. Coteau” and “Coteau of Paris”, probably the renowned enameller Joseph Coteau (1740-1801). A “Mussard”, possibly from the dynasty of enamellers with the same name, is mentioned in October 1789.

The goldsmiths, chasers, engravers, setters and enamellers of La Fabrique were masters of a wide variety of techniques. The goldsmith’s work included engraving, repoussé and chasing techniques, along with the application of decorative motifs made from coloured gold. Animated scenes adorning the timepieces and snuff boxes were often made in coloured gold against a painted enamel background. The tiny automated characters were finely wrought; so finely that even under the magnifier, we can admire their delicate beauty.

Amongst the enamel-workers, a domain rich in exceptional talents, some artists excelled in “painting on enamel”, so called because it resulted in true miniature masterpiece paintings. Other techniques such as cloisonné and champlevé enamel – coloured and translucent enamel applied to a guilloché background – requiring an immense level of expertise, were used for decorative purposes with remarkable results.

Some techniques, such as the use of “paillons”, or spangles, were typically Genevan. These minuscule pieces of cut silver or gold were applied to the case of the timepiece,



Tabatière
à oiseau chanteur,
Jaquet-Droz

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which was then covered in a colourless layer of enamel known as flux. This gave a result of exceptional depth and brilliance. Jaquet Droz and Leschot combined gold spangles with finely cut ivory, on a background of royal blue enamel. An example of this is the pair of timepieces sent to China in 1785, decorated with an “ivory subject with stars in small pearls, double circles, in pearls and rubies”³.

Another type of “spangle”, flakes of silver cut or stamped and painted, were sometimes used instead of feathers on the singing birds. The accounts from 15 August 1786 mention “4 Birds covered in coloured spangles”.

The international character of the market ensured that all the parties involved in La Fabrique – clockmakers, case-fitters, goldsmiths, enamellers, guilloche workers, engravers, setters, établissements and merchants – were able to successfully master a broad range of different styles to cater for the specific tastes of each market.

WRENCHED FROM THE NEST, OR SAILING ON THEIR OWN WINGS: COLLABORATORS, RIVALS, SUCCESSORS

The French Revolution and its consequences, which had repercussions across the whole of Europe, caused major disruption to sales of luxury items; the Napoleonic wars and the continental blockage ensured this disturbance continued until around 1815. Jaquet Droz father and son passed away in 1790 and 1791 respectively; too early to truly comprehend the changes that were to come.

But their contemporaries and those who had worked alongside them as labourers, associates, collaborators – and their rivals – found themselves in a world stripped of their familiar landmarks. Perregaux and Perrot compared them to “poor birds that the storm has wrenched from the nest”⁴.

Unfortunately, Jean-Frédéric Leschot never managed to find his place in this new world. When he took over the firm single-handedly after the death of Henri-Louis Jaquet Droz, he was confident. But the next twenty years were a constant struggle for him. The difficulties mounted up: the scarcity of raw materials such as gold; hazardous, sometimes impossible, transportation of precious merchandise across a Europe at war; uncertain exchange rates; the need to pay his craftsmen quickly, themselves often in great distress, while sales dried up and payments were sometimes long overdue.

In addition to these problems, his most important customers were starting to default: in 1792, Cox, Beale and Laurent in Canton left an unpaid debt of 4'570 pounds Sterling; in 1798, the firm Duval in London followed suit.

Other of Jaquet Droz and Leschot's colleagues met only with embarrassment. In the first few years of the 19th century, Jacob Frisard struggled in vain to make a name for himself. Becoming increasingly distant from Leschot, in whom he confided his frustration at having remained in the shadow of the Jaquet Droz et Leschot firm, he dearly wanted his talent to be recognised. Seeking to display his pieces to Napoleon Bonaparte, he was hampered by a refusal from the Minister of the Interior, Lucien Bonaparte ("the state of the public Treasury and the government's need for all of its funds... are not conducive to any expenditure...")⁵. In 1809, Frisard travelled to Constantinople, no doubt hoping to obtain money and fame by exhibiting his animated pieces. He died on the return journey. Henry Maillardet became a demonstrator of automata after the London company of Jaquet Droz & Maillardet was dissolved in around 1789. A brochure for his 1811 exhibition in the Gothic Hall on Haymarket lists creatures of an alluring exoticism – an "Ethiopian caterpillar", a "Siberian mouse" and an "Egyptian leopard". Despite an initial degree of success, his exhibitions do not seem to have made Henri Maillardet's fortune, as he appeared to have been in financial difficulty in the later years of his life⁶. Some former collaborators and colleagues of Jaquet Droz and Leschot, on the other hand, succeeded in making their name and prospering. Starting with the son of Jean-Frédéric Leschot, Georges Auguste (1800–1884), who invented machine tools which facilitated the quick production of similar pieces. This was an important step towards the interchangeability of components, one of the factors which promoted the development of watchmaking in the 19th century.

During this period, the watch industry started its gradual transformation, due to the introduction of machines into the workshop, enabling production to be simplified and sped up whilst reducing costs. In terms of animated pieces, from the start of the 19th century, the use of miniature musical movements using a rotating disc and vibrating blades became more widespread, facilitating production of automated and musical clocks and snuff boxes.

One of the greatest successes of the post-Revolutionary world was that of the firm Piguet & Meylan. Isaac Daniel Piguet (1775– 1841), originally from Le Chenit in the Joux valley, worked for Jean Frédéric Leschot in Geneva as an independent labourer; his name appears in the accounts in 1802. In 1811, he joined forces in Geneva with Philippe Samuel Meylan (1772– 1845), also from the Joux valley.

The firm Piguet & Meylan, active from 1811 until it was dissolved in 1828, succeeded in making its name in a market where the merchant-établisseurs of the Ancien Régime had started to lose ground to the new manufactures, and in an economic climate that was still very difficult.

They specialised in very high quality automated and musical pieces, tracing a direct line from Jaquet Droz and Leschot. Like them, Piguet & Meylan worked for the Chinese market. An amusing fact: one of their most well-known timepieces, which features a dog that barks to sound the hours and quarter hours, is highly reminiscent of a timepiece by Jaquet Droz and Leschot made for James Cox: "A cylinder timepiece with a dog which barks when the bezel is opened"⁷.

Amongst Jaquet Droz and Leschot's other former workers who made a name for themselves are the Rochat brothers. The sons of David Rochat, François Elisée (1771–1836); Frédéric (1774–1848); and Samuel Henri (1777–1854), from the village of Le Brassus in the Joux valley, were sub-contractors employed by Jacob Frisard to prepare the singing bird mechanisms.

They are mentioned several times in the correspondence between Frisard and Leschot, and when Jacob Frisard was not available, Leschot went to them directly.

Setting themselves up in Geneva around 1813, the Rochat brothers met with great success as manufacturers of singing birds, producing a wide variety of very beautiful pieces; a second generation of Rochats took over the family business.

Nowadays, while the twin requirements of speed and profit seem to have consigned such fantasy pieces to history, there are still a small number of artisans who practice crafts which have barely changed since the time of Pierre and Henri-Louis Jaquet Droz.

They are supported by a few watch manufactures who understand the value of the knowledge and techniques of old, and who wish to celebrate it through the production of exceptional and unique pieces.

Precision, patience, attention to detail, appreciation of fine work: these are the qualities which characterise these enamellers, setters, engravers and marquetry workers – master craftsmen who spend countless hours perfecting their creations.

These contemporary pieces of fine watchmaking bear witness to the continued appreciation of Pierre and Henri Louis Jaquet Droz and Jean Frédéric Leschot, and the timeless nature of their work, which has never ceased to fascinate and move people.

¹ Letter from Leschot to Frisard, March 1793.

² Voltaire, *Le Mondain*, 1736 (translation Smollet, Francklin et al).

³ Accounts of Jaquet Droz and Leschot, December 1785.

⁴ Perregaux and Perrot, *Jaquet Droz and Leschot*, Attinger Frères, 1916.

⁵ Correspondence between the Prefecture in Haut-Rhin and the Minister of the Interior, Regional Archives of Haut-Rhin.

⁶ In his testament, dated 22nd August 1827 and approved on 27th August 1830, Henry Maillardet spoke of the “very little that I currently own”.

⁷ Accounts of Jaquet Droz and Leschot, December 1785.