

Philadelphia Exhibition 1876

SWITZERLAND

Report Presented To
The Federal High Council
on
The Horology Industry

By
E Favre-Perret,
Member of the International Jury.

(GROUP XXV)

Winterthour
J. Westfehling
1877.

Translated by

Richard Watkins

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Preface

This report had been brought to my attention as “most important”, and I had unsuccessfully tried to get a copy for some time; indeed, I have never seen a copy for sale. Then Béatrice and Frederic Donzé, of *Montres Longines Francillon*, found the report in the Longines archives and sent me a copy (for which I must express my thanks).

The majority of it is a very brief summary of the horology displays at the exhibition, and it is only in the general remarks at the end that Favre-Perret considers the implications of what he had seen. But this is the most important part of the report, and it seems Favre-Perret was much more interested in the future than in describing the exhibition, more interested in the need to stir the Swiss industry out of its lethargy and complaisancy. In this respect the report echoes his speech (an English translation of which is reprinted in the NAWCC Bulletin, Vol 46, No 349, 2004.). However, despite being interesting, it is relatively insignificant compared with Jacques David *American and swiss watchmaking in 1876, reports to the International Committee of Jura Industries on the manufacture of watches in the United States*, although it does make it clear that at least two people were aggressively pushing for the mechanisation of watch making.

Of course, there was much use of machinery in Switzerland and Favre-Perret notes this in his general considerations. But there was a significant *qualitative* difference between Swiss and American tooling, a difference that forms the focus of Jacques David's reports. Favre-Perret does not recognise this and consequently he badly compromises his argument; in pointing out the excellence of Swiss watches and cataloguing Swiss use of machinery he unwittingly provides support to the complaisant and quite likely contributed to the lethargy that David damned.

The following is a rather casual translation. I may have been a little too flexible in my interpretation of the French, but I feel it retains the flavour and purpose of the original.

Richard Watkins, July 2004

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Introduction.

The members of the jury of the 25th group of the Philadelphia Exhibition had to deal with precision instruments and the horology industry in all its branches, from the simplest watch to marine chronometers, the most ordinary clock to astronomical regulators, electric timepieces, etc.

The instruments of physics, optics, mathematics, meteorology, telegraphy, music, etc., are also in group 25.

The jury for this department was composed of eleven people, including six jurors from the United States and five foreign judges.

The former were:

- Messrs *Joseph Henry*, secretary of the Smithsonian Institute, Washington.
- H.-E. Hilgard*, the Coastal Survey Office, also in Washington.
- J.-C. Watson*, astronomer at the Observatory of Ann-Arbor, Michigan.
- General *H. Oliver*, of Salem, Massachusetts.
- P.-A. Barnard*, president of the Columbia College in New York.
- P. Bristow*, author and professor in New York.

The second group were:

- Messrs *W. Thomson*, professor, fellow of the Royal Society of London, representing England (he was named president of the group).
- E. Levasseur*, member of the Paris Institute, representing France.
- Dr. Schiedmayer*, of Stuttgart, representing Germany.
- Dr. Kupka*, of Vienna, representing Austria.
- Ed. Favre-Perret*, of Le Locle, representing Switzerland.

At the beginning of July Sir *W. Thomson* was obliged to return to Europe and was replaced as president by Mr. *H.-E. Hilgard*.

The delegate from Switzerland was prevented by an indisposition from leaving in time, and could not attend the early meetings of the jury, which was brought together for the first time, as had been announced, on May 24. It was at this meeting and the following ones that the various departments were distributed to the jury members. The horology industry, which will be our particular focus, fell to Professor *Watson* and *E. Favre-Perret*. A few days after the first meeting, Professor *Watson* was obliged to return to Michigan, so that the work of class 323 and the 25th group started only after his return, which took place towards mid June; that is, about the time the Swiss delegate arrived in Philadelphia.

As one might have expected, at the time of the opening of the exhibition it was very far from being ready with regard to the countries far away from the United States, and up to the end of July parcels still arrived which were admitted, but not without some difficulty.

The United States, on the other hand, was much more advanced and their exhibition could be considered complete at the time of its opening.

Questions of organization, and in particular the methods to be followed for awarding prizes, had quite naturally occupied the first meetings of the jury.

The Centennial Commission had decided, contrary to what had been practised hitherto at all the world fairs, that it would have only one type of prize for all the exhibitors, a bronze medal accompanied by a copy of the report of the experts. This report was to be, to some extent, the true mark of honour given to the exhibitors. This more democratic system had, said one, great advantages over that followed in old world up to this time.

It is on this basis that the jury began its work, of which we will give a very brief summary in the following report, which does not completely encompass class 323 of group XXV. Commencing with:

The United States.

The Philadelphia Exhibition presented to us a particular fact which deserves to be mentioned; it is that, for the first time we are in the presence of the American watch and clock manufacturers. Indeed, neither in Vienna or Paris, nor in London, did they present the products of their manufacture. Here, on the other hand, they have deployed all their energy, and know-how, and employed all possible means to attract the eyes and the spirit of the visitors. All was implemented: not only one colossal exhibition, but extensive advertising and numerous publications, widespread and profuse. Then, which most particularly touched every consumer, is the fact that, benefiting from the opening of the exhibition, all the American companies gave their products a reduction in price of from 40 to 50%. Was more needed to

succeed in eclipsing and pushing into the background their European competitors? These companies, several having considerable capital, did not simply present "specimens" of what they can do, but rather veritable warehouses. We see, for example, the American Watch Company of Waltham, the largest American company, with an enormous display containing, as indicated by the following inscription with which it is decorated:

"2200 gold and silver watches and movements, the product six working days at 10 hours per day".

We do not have in Europe manufacturers established on such a footing and being able, following the statements which were made by the heads of this company to us, to produce the necessary 425 watches or movements per day.

These few remarks are enough to render intelligible the current importance of watch manufacture in the United States; when we add that the Elgin Watch Company claims to be able to make about 300 watches per day, and several other, admittedly less significant companies, each put onto the American market 8,000 to 15,000 watches per annum, one will understand easily the power of production we have to reckon with today.

We have been struck, we must acknowledge, by the considerable progress realized in such a little time by the Americans; because it is enough to remember that only 25 years ago North America manufactured, so to speak, not one watch, while today we can estimate at 250,000 the number of watches which leave all of her factories jointly in one year. And this number could, if the need arose, be promptly and considerably increased.

The Waltham factory, which occupies us at this moment, asserts that it has introduced the *interchangeable system* of manufacture for the whole watch and claims to be able, on being given only the number of a watch, to replace at will any part of it, so that after being repaired it will work.

Even in Philadelphia we were given no proof of this assertion, but various tests carried out in Switzerland after our return proved to us that the *interchangeable system*, though indeed existing up to a certain point, is not at all so complete as we were led to believe, and hand work is still needed to put into an operating state a watch in which worn or defective parts have been replaced.

Nevertheless, we must recognize that the manufacturing process extensively employed by the Americans is a real advance and gives a greater facility to the watch maker to later repair a watch in bad condition, deteriorated or used.

We find, in the display of Waltham, full plate watches in seven different qualities and 3/4 plate watches in four qualities, all key wound; and, moreover, all of these kinds (except the lowest quality) are also manufactured with pendant winding.

The Americans have adopted the system which has been followed by the Swiss for a long time; that is, omitting the fusee, which still generally retained by the English, and using a going barrel. All their lever escapement watches now have *visible pallets* which, they say, costs them 12 cents (60 centimes) less than covered pallets.

Common watches are made from parts just as they are when they leave the machine, without being improved by hand. One also employs for these same movements, higher quality parts which have been put aside because of defects and which could not be used in the better watches. As quality rises, labour also increases in a notable proportion.

We can only admire the degree of advancement achieved by the American factories in such little time by means of its machines. However, they have not yet reached perfection and we found, on our return to Switzerland, a number of disassembled and examined watches have very defective escapements, not to say more; this in consequence of the obligation put on the workman to make watches run, to make the escapement too vigorous, while lifting one or even both pallets of the lever, thus destroying all the recognized principles agreed to by true watch makers.

The pendant wound watches are, in general, built on the old principle of a rocker carrying the intermediate or flat wheels, a system that was abandoned by Switzerland long ago, except for watches of lowest quality. It was undoubtedly preserved by the Americans because of the greater ease with which it can be made by machines, but it does not have the advantages of safety and regularity of time setting of the new systems employed by the best European manufacturers; which the Americans use themselves, but only for their best qualities.

The American watches not being accompanied by any rating certificate, our colleague, Professor *Watson*, was asked to undertake tests with some of the watches of first quality displayed by the *American Watch Company*. To this end the company delivered 10 watches to him, which were compared with marine chronometers put at our disposal by Mr. *Griby*, special delegate to the Swiss watch industry in Philadelphia¹; with one or two exceptions they had a satisfactory rate.

1 Presumably Theodore Griby.

After having left American soil, we learned that our colleague had published a table of the rates which he had obtained later, using the same watches, at the observatory of Ann-Arbor in Michigan, and which did not coincide with the results obtained in Philadelphia on various points. We know nothing about these tests and their publication, and will raise only one extremely significant thing; it is that the comparison was between the rates of American *simple* chronometers of *first quality*, and complicated Swiss watches with repetition, days of the month, lunar phases, etc. However, we do not admit that they have a similar manner of operating; if one wants to obtain a fair and equitable comparison, do it between similar pieces of like prices and functions. Let us group the simple American chronometer with the simple Swiss or English chronometer, and the complicated watch (when the Americans can make it) with the complicated watch that Europe has already made for several centuries. Let us not seek to establish a comparison between the rates of a watch whose train must work with the weight of additional parts, to overcome the resistance of the springs of a watch with minute repetition, days of the month or lunar phases, for example, and the simplest watch, the only type which the Americans make. It is however what was done, as we were notified in a report that a friend addressed to us from the United States.

Our colleague, Professor *Watson*, did not remember to which watches the bulletins of rate of which he took note applied, and we must raise this doubt: which of the following watches were used by him as points of comparison in his table II, thus:

H-L Matile, n° 10,607, is a repeater watch, sounding the hours, quarters and minutes, independent seconds, chronograph, indicating the phases of the moon, the months and the days.

H-L Matile, n° 10,661, is a watch with independent seconds, fifth of second, chronograph with two split seconds hands.

Jacot brothers, n° 199,315, is a chronograph with minute and second counters.

Jacot brothers, n° 199,310, is a chronograph with two split seconds hands.

Jacot brothers, n° 199,312, is a 5 minute and quarter repeater.

Messrs *Borel & Courvoisier* count among them several chronographs and complicated watches.

Messrs *Ekegren* and *Patek, Philippe & Co*, of Geneva, are in the same class.

We even find, in the watches of the latter, a piece indicated by these makers as of their third quality, hardly being worth Fr. 400 or \$80 in Geneva, and which was used as a point of comparison to American watches of the *first quality*, whose movement alone is worth \$150 or Fr. 750 in New York.

It is obvious that comparison is absolutely impossible and even unjust under such conditions.

All the American movements tested were of first quality from the Waltham factory and were worth \$150; thus let us compare them with Swiss or English movements of an approximately equal price, and we will then judge the result.

We do not intend to criticize or demean what our competitors have done. Quite to the contrary, we repeat that they have taken giant steps, that we can only address our most sincere compliments to them on the success which has crowned their efforts so far; but we add that, for the prize watch, the genuine chronometer, it will be a long time before they can manufacture by their current methods the watches of precision which Switzerland and England produce.

Several other American companies showed their products, but they did not want to participate, nor to ask the jury to come to a conclusion about the quality of their watches; thus we do not consider them in this report.

Passing now to the marine chronometers, which European manufacturers generally believed are not manufactured in the United States. On the contrary, we find a house in New York, Messrs *John Bliss & Co.*, presenting a chronometer which can, without fearing the comparisons which will be made to it, sit beside the most beautiful European products.

The American government also shows, in the building of the Coastal Survey Office, several chronometers of Messrs *Négus brothers* of New York, whose house is already very old and well known in the United States. After this, it remains for us to see the department of pendulum clocks, whose manufacture has also become of great importance in America in only a few years.

Let us start with the largest specimen, the clock of the *Seth Thomas Clock Company* in Thomaston, Connecticut, which is placed at the entrance of the Machinery Hall. It has a *Dennison* (now Sir *Ed. Beckett*) *double 3 legged gravity* escapement, it sounds the hours and the quarters, and is built on colossal dimensions. The iron frame measures 9½ English feet long, 3½ wide and weighs 1,300 lb; the strike barrel is 23 inches in diameter and 20 inches long; the two first wheels are both 41 inches in diameter; the zinc and steel compensated pendulum weighs 200 lb and carries a bob of 500 lb; finally the clock is estimated to cost \$6000, that is to say Fr. 30,000. Let us add to the above that all the parts of this clock are well carried out in all respects.

As well as this masterpiece, the same company displays a rather large number of small clocks, given the general name of American Clocks, whose principal merit is their extremely good rate.

We pass then to the clock of *C. Fasoldt*, of Albany. It is a beautiful piece with a gravity escapement, free and with constant force, which only lets a tooth of the escape wheel pass every 5 seconds.

Stanislas Fournier, of New Orleans, shows a clock which is placed in the terminus office of several tramways to indicate the departure time of the various lines of cars; it strikes one blow for the first line, 2 blows for the second, 3 for the third, etc., at fixed intervals of 3, 4 or 5 minutes, and takes the place of the signal of the conductors. Mr. Fournier is a French horologist of talent who has been established in New Orleans for a long time, and who has already earned distinction at the Paris Exhibition in 1867 where he received a medal.

Several American companies also display the pendulum clocks known as American Clocks, and we will cite among others the *Ithaca Calendar Watch Company*, which makes a speciality of its calendar clocks, *Ansonia Brass & Copper Company* and several others, which make the same kinds of movements using punches and machines, and put them in round, octagonal or rectangular cases, generally not very gracious.

These clocks are sold by the thousands and flood not only the United States, their natural market, but some regions of Europe and Asia, where their low price allows them to spread, particularly in the rural areas.

Switzerland.

As at the preceding world fairs, Switzerland is characterized by the beauty and finish of the products which it presents at the Philadelphia Exhibition.

It was represented in group XXV by 54 exhibitors who received 41 medals, which is 76% of the awards; it is difficult to ask for a better proof of the excellence of her products. As always, Switzerland shines particularly because of a complete display of the most complicated watches and chronometers of all kinds, which were admired by all the experts.

There has not been enough time since the Exhibition in Vienna for us to be able to announce a great number of new discoveries in Philadelphia. Besides, let us not forget that since 1873 we have passed through a violent industrial crisis, which is not conducive to giving manufacturers the courage necessary to sacrifice time and money to the field of invention. Rather they sought to improve on and to make increasingly perfect what already exists, and we believe we can add that they reached that goal.

With very few exceptions we find in the Swiss exhibition watches with lever escapements, and the spring detent reserved for marine chronometers or some watches for special purposes. The cylinder escapement is now the exception and is only used by some houses in very small watches.

The pendant winder is more and more taking the place of the key wound watch; the latter no longer appears at the exhibition, except for some specimens of ordinary quality, and tends more and more to disappear from consumption as the price of the pendant wound watch approaches closer to that of the key wound watch.

We saw with sorrow, and it was the view of the majority of our fellow horologists living the United States, a very regrettable gap in the Swiss display; it is that of the good simple watch, which was not sufficiently represented in Philadelphia.

There are a number of ordinary quality, only a few of what we can call the good simple watch, and then we pass abruptly to the very complicated watches at a great price, which are the main items in the displays of the majority of the Swiss exhibitors. This gap is all the more regrettable as the mass of products of our main competitors, the North Americans, are placed precisely between these two categories. This fact gives the impression, which is not the case, that Switzerland has given up the manufacture of this kind of watch. It is nevertheless this piece of good and solid construction which must particularly draw the attention of the Swiss manufacturers; how many hundreds of individuals will buy a watch of this quality for every one person who will spend a considerable sum for the luxury of a complicated watch, a minute repeater or a genuine chronometer? We especially make a point of noting this fact and we hope, in the interest of our motherland, that this gap will be largely filled by the time of the great exhibition which will open in Paris in 1878, and where we will certainly find our friends in the United States seeking to create a large, luxurious display.

Now let us give a rapid examination of the principal Swiss exhibitors, starting with the house of:

Messrs *H. Grandjean & Co.*, of Le Locle, who are the only Swiss manufacturers showing marine chronometers. They display 6 of them, provided with rating bulletins from the Neuchâtel Observatory, and, in spite of the hardships which they have just undergone by their transport from Switzerland to the United States, they preserved their uniform running extremely well. In particular, n° 94 gave a splendid result, and showed a regularity of rate which was better than all the other chronometers shown in Philadelphia.

It is to be wished, in the interest of our industry, that this house finds many imitators, and that soon the maritime nations will know that they can find ships' chronometers in Switzerland as well made and in as great numbers as in England or France.

The same house presented a collection of pocket chronometers and complicated pieces of great richness. Among them we note a grande sonnerie watch with minute repetition having a simplified mechanism. And there were many minute repeaters, independent seconds, chronographs, etc., the majority of which are accompanied by rating bulletins from the Neuchâtel Observatory.

Mr. *L. Audemars*, of Brassus, retains his long-held reputation in Philadelphia and proves that it is well deserved, by a display of complicated watches which reach prices of 3 to 4 thousand francs. We noted particularly a masterpiece of miniaturising a complicated watch, for which Switzerland has and preserves the monopoly so far; it is a minute repeater of 10 lignes diameter. Then a grande sonnerie clock, sounding the hours and quarters while passing and the minutes at will. The window of this house also contains many other kinds of repeaters, independent seconds, chronographs on an improved system, etc.

Messrs *J.-M. Badollet & Co.*, of Geneva, present a very pretty collection of simple and complicated watches, which also places this house among the best of our watch making artists. Among its complicated pieces let us point out a very beautiful minute repeater, chronograph and perpetual calendar; and the smallest watch shown in Philadelphia with a movement of 4 lignes or 9 millimetres, which earns the admiration of the visitors to the exhibition. A number of its pieces are provided with a new and clever system for regulation.

We also note that almost every year the name of this house is amongst those which are recognised by the Geneva Observatory for the good rate of its chronometers. Let us not omit to point out that the artistic decoration and the beauty of certain engravings in its display also attracted the votes and the admiration which they deserve in all respects.

Messrs *Borel & Courvoisier*, of Neuchâtel, displayed many watches, both simple and complicated, the majority accompanied by rating bulletins from the Neuchâtel Observatory, proving that this house has justly acquired the reputation which it has in the United States.

Mr. *Ekegren*, from Geneva, places himself amongst the first rank of Swiss exhibitors for the finished watches of all kinds which he displayed; we find the name of this artist among those who receive prizes or medals at the majority of exhibitions. The construction of his watches is solid and at the same time he seeks the greatest possible simplicity. The horology industry owes to him several inventions and improvements in the lever escapement and the time setting of pendant winders.

Mr. *E. Francillon*, of St-Imier, whose watch is generally known by the name of the factory engraved on it, the *Longines Watch*, deserves a very special mention for the collection of watches that he presents in Philadelphia. He was one of the first to understand the importance of the system of manufacture by machines, and to put it into practice in the Swiss Jura, by which means he obtains a work well designed and uniform. He improves each day and continues to add to his tools; we can say with certainty that he will very soon arrive at, if he has not achieved it already, being able to provide in all respects a watch irreproachable for its solidity, good construction, and whose parts could be really *interchangeable*. Mr. *Francillon* is thus one of the pioneers in Switzerland of complete manufacture by machinery, and for that we owe him our most sincere compliments. Finally, the reputation of his house has been established for a long time and his watch is well known, not only in the United States but also in all the principal trading centres of the world. The improvements to his tools, which he does not cease making, will certainly result in an increasing and well deserved reputation day-by-day.

It is in the window of:

Mr. *Frankfeld*, of Geneva, we find a watch with calendar inside a pencil case. It is, with the small watch of Messrs *Badollet Co.*, the principal attraction for visitors to the horology exhibition in Philadelphia. This house also presents a collection of valuable watches and simple pieces, in some of which the complete escapement is built on a special plate separate from the movement, and it can be instantly removed and replaced by another².

Messrs *Auguste Huguenin & Sons*, of Le Locle, present, among a beautiful selection of complicated watches, the only specimen of piece with a tourbillon escapement to be found in Philadelphia.

Messrs *Jacot brothers*, of Le Locle, showed a complete collection of all kinds of repeaters, chronographs, and extremely well made chronometers accompanied by rating bulletins from the Neuchâtel Observatory.

² The caliber designed and patented in France by G.-F. Roskopf in 1868 included a porte échappement, so this idea was not new.

Mr. *H.-L. Matile*, of Le Locle, also makes a speciality of complicated watches, and displayed among others repeaters, chronographs and chronometers, also accompanied rating bulletins from the Neuchâtel Observatory.

The two houses above have (as already noted by us in the section devoted to the American display) taken part in rating tests of their watches. We repeat here that we do not believe it is fair to compare simple American movements with the most complicated watches that Switzerland has produced. It is as though the famous Strasbourg clock were compared with the best astronomical clock at Greenwich, and to then to express astonishment that the former does not keep time to a split second with the latter, the simplest and best built observatory instrument.

Messrs *Ch. Meylan & Brothers*, at Soliat, present a considerably simplified chronograph, which they have patented in the United States, enabling them to deliver this watch at a price relatively very much reduced.

Mr. *James Nardin*, of Le Locle, increases further, if it is possible, a reputation justly acquired (in the United States particularly) by a complete display of the various kinds of watches which he manufactures. We find in his window the most complicated watches and also the simplest, of perfect execution and giving away nothing to those of the best Swiss manufacturers.

Messrs *Patek, Philippe & Co.*, of Geneva, also put before the eyes of the public a superb collection of their products, and we will not surprise anybody by saying that this house, whose reputation is universal, supports the honour of the Swiss factory with dignity in Philadelphia. This house is one of the first which generalized the use of the pendant wound watch³. They invented the free spring⁴, avoiding stoppages, and they also designed advantageous and significant modifications in the construction of movements with pendant winding and with independent seconds, of which they have a very special kind. They also use a series of machines, allowing great regularity in its manufacture.

Mr. *David Perret Sons*, in Neuchâtel, makes a speciality *non plus ultra* of the *cheap watch*, and they showed several complete samples in silver cases which, by their very reduced prices, astonish and surprise all the visitors.

If we add that some manufacturers of spare parts have also shown their products, and that several were rewarded by obtaining medals, we will have given an almost complete review of the Swiss watch. Let us mention especially Messrs *A. Rauss & Corcelle & Co.*, of Geneva, for their dials; *Dufaux-Lutz & Sons*, *Montandon-Gentil-Lutz*, *Aimé Perrenoud*, also of Geneva, *Bähni Brothers*, of Bienne, for their balance springs, of which a part are hardened and extremely well finished; *Aubert Brothers*, in Savagnier, *Ch. Jeanjaquet*, of Neuchâtel, and *E. Berlie*, of Geneva, for their mainsprings and lithographic steel; *Bitterlin-Schmidt*, of Le Locle, for its ruby jewels; *Besancet*, of Travers, for the same articles and its escapement rollers and pallets; the last also present a pinion in ruby, whose execution was a work of patience and has surprised all those who could examine it closely.

Lastly, we must not omit him who, without fear of misleading, we can name the elder of the exhibitors in Philadelphia, the nonagenarian *P.-F. Ingold*, of La Chaux-de-Fonds; who reminds America of a name that our current competitors can and must recognise as the promoter of the complete manufacture of watches by machinery. He shows the cutters which he invented and which bear his name; they are, as all know, intended to give wheel teeth the epicycloidal form and to reduce the friction of the wheel on the leaves of the pinion.

We should include in this department the two collections presented by Messrs *Tiffany & Co.*, of New York, and the *Philadelphia Watch Co.*, since one has its factory in Geneva and the other its establishment in La Chaux-de-Fonds; but both appear falsely in the American department. The jury was not able to pronounce a judgement on these two exhibitors. Let us say however, that the products of these two houses deserves praise which they would not have missed if their position had been regular.

The manufacture of clocks seems to have almost disappeared from Switzerland; we find one manufacturer in the Swiss department, Messrs *Leuenberger & Sons* of Sumiswald, who show a regulator and two clocks, one of which has grande and petite sonnerie and the other is an alarm clock. On the other hand, we see with pride this industry replaced in our land by that of the electric clock, of which Mr. *Hipp*, of Neuchâtel, has indisputably the most vibrant and interesting display. Without any doubt, this manufacture has a brilliant future in front of it, and it has already been applied in major cities, such as Cologne, Dresden, Stuttgart, Geneva, Neuchâtel, etc., where the hour is given everywhere by the installation of electric clocks manufactured in Neuchâtel, proving the solidity and excellent execution of Mr. Hipp's clocks, of which the name alone is an authority among those who deal with electricity.

3 See Adrien Philippe *Les montres sans clef ou se montant et se mettant à l'heure sans clef*, 1863.

4 The mainspring which is not attached to the barrel by a fixture, but can slip under friction. Commonly used later in automatic wrist watches.

France.

The French section of the horology industry unfortunately has little representation in Philadelphia. We find one manufacturer of marine chronometers, Mr. *Rodanet*, of Paris, whose pieces are accompanied by rating bulletins. Then the houses of *Breguet* (actually *Brown*) and *Haas Jeune*, also of Paris, who, amongst some genuine French watches, show pretty pieces whose Swiss origin is proven by their Neuchâtel hallmark or by the special marks of certain houses in Geneva or Vaud.

The clock department is, on the other hand, rather rich in beautiful specimens of Parisian pendulum clocks, whose good taste attests the source. The majority, of a very moderate price, are mounted on marble decorated with engravings or gildings. The richest were accompanied by bronze subjects, which complete the seal of beauty and innovation of which Paris has always had the monopoly. Let us also note, in passing, the singing bird clocks of Mr. *Bontemps*, which always had the privilege to attract crowds when they ran. Also those known as mystery clocks, from Mr. *Rosset*, having a large glass dial (suspended by cords or supported by a statuette) bearing the hands on a simple pivot, which work by means of the movement of a counterweight in the head of the hand, and reset themselves each hour when they are primed by some movement. We must claim for Switzerland, or rather for one of her children, the invention of the mystery clock, which was made about 50 years ago by one of our clock making artists, *Jacques-Frederic Houriet*, of Le Locle, who died in 1830. A specimen of his clock still exists with one of his nephews, who showed it to us.

Messrs *Susfeld, Lorsh & Co.*, of Paris, and finally Mr. *E. Farcot*, also of Paris, display a quite large collection of clocks at low prices. The latter maker particularly has, as a speciality, alarm clocks and pendulums of various kinds which are wound up means of a cord, which is drawn down and returns to its original position, brought back by a spring. This rather clever system replaces the inconvenient key and is generally liked.

Messrs *Mauley & Verdier*, of Paris, show a meter for taxis, whose train acts as a clock while a secondary dial indicates the sum to be paid by the traveller. At the same time, a paper roll inside the movement is marked, as on a telegraphic apparatus, and gives the information which is necessary for the controller of the company to check the receipts of the coachman at the end of the day.

Lastly, to finish the French department, we find 3 regulators by Mr. *Mayet-Tissot*, of the Morez-du-Jura, of which one shows lunar phases and the day of the month; they appear to us to be built solidly and at a good price.

It is to be regretted that a highly regarded nation like France, which is today second in quantity of clock production, was not represented on a larger scale at the Philadelphia Exhibition. Without any doubt it holds back its forces for the great display in 1878 in Paris, where we will find her in all her glory.

England.

Great Britain, as well as France, was poorly represented; but if she did not shine by the number of exhibitors, some of the principal manufacturers had the honour to show their flag in Philadelphia.

Messrs *Dent & Frodsham & Co.*, of London, showed, among others, several deck watches, ships' clocks and a considerable collection of pocket chronometers and watches with anchor escapements. Their window also contained specimens of various parts, particularly bi-metallic balances with auxiliary compensation, from which one could judge the finish and perfection of the work leaving their house.

Mr. *V. Kullberg*, of London, also manufactures and displays very beautiful marine chronometers and pocket watches; his reputation is well established and he generally shares the great annual prizes at the Greenwich Observatory with the preceding house.

Messrs *Nicole & Nielson*, of London, also produce watches showing the high quality of these artists and their excellence as clock and watch makers. We do not believe we are in error by asserting that Switzerland is the origin of one of the heads of this house, and saying that he came from the valley of the Lac de Joux, this seedbed of good clock and watch makers, to go to London to found the house with which we are presently occupied.

Mr. *John Poole* and Mr. *Thomas Mercer*, also of London, and Messrs *Sewill & Co.*, of Liverpool, also represent the English factory well, which has always preserved its seal of origin: full or 3/4 plate, always with fusee, and substantial and heavy in appearance, which distinguishes them at first glance.

Germany.

Only one German house, Messrs *Lange & Sons*, of Glashütte in Saxony, displayed watches, of a special caliber, some of which are accompanied by rating bulletins. This factory, which only goes back to 1845, enjoys an excellent reputation. It sought to and succeeded in making a special kind, not resembling those that the English, Swiss or Americans make. We find in the movements certain nice modifications of the escapement which can only add to the reputation that it has justly acquired. It presents, in particular, a movement with repetition, whose dial-work mechanism is considerably simplified.

Beside the house in question, we find a group of Glashütte workmen, known by the name of the Co-operative Society, showing spare parts for watches, bi-metallic balances, pinions, wheels, screws, escapements, etc., the majority of which are extremely well finished.

The factory of Glashütte seems to have avoided until now the pitfall of manufacturing watches of bad quality; let us hope that it will continue to follow this good way.

Germany also had in its department a large, pretty display of regulators and clocks known as Black Forest clocks; particularly let us note a regulator of Mr. *Gustave Becker*, of Freiburg in Silesia. This manufacturer employs between 600 to 900 workmen and uses machinery, which enables him to declare that the parts of his clocks are interchangeable.

Messrs *Carl & Ludwig Haas*, Mr. *E. M. Wehrle*, of Furtwangen, displayed a collection of clocks, known as cuckoo clocks or automats, which attracted the curious each time the hour strikes, with groups of soldiers, pipers, etc., coming out to a fanfare. These houses work on the same principles as the Americans.

Messrs *Leo Kaltenbach*, *Ketterer*, *Benoit Scherer* and *J.-B. Beha*, joined together under the name of the Exhibition Collective of Black Forest clock makers, and show pendulums and travelling clocks in extremely well carved cases, and regulators at much reduced prices, which deserved to be noted. The majority also manufacture, under very good conditions, the American clock.

Finally, let us mention an astronomical clock by Mr. *John Linderoth*, of Stockholm, two marine chronometers and an electric clock by Mr. *Hohn*, of Amsterdam; and we will have seen nearly all that relates to the horology industry at the Philadelphia Exhibition.

General considerations.

To conclude this brief examination of the horology industry display at the Philadelphia Exhibition, we are happy and proud to be able to declare that Switzerland indisputably occupies the first position for this branch of industry. All the principal centers of manufacture in our country were represented with dignity, and leave with honour from the comparisons made with our rival countries.

Switzerland has preserved the monopoly of small watches and appears to have only England as a serious competitor for complicated watches. Only one Swiss house showed marine chronometers. This manufacture, which has had some years of great difficulties and requires, to some extent, the help of England for certain parts, can today, thanks to the goodwill of Mr. *Hipp*, director of the Fabrique de Télégraphes of Neuchâtel, do without any foreign co-operation; he deserves to be encouraged and certainly has a beautiful future in front of him.

As for the civil horology industry, we find in America a serious competitor which we do not yet sufficiently know. We are not the first to announce the danger from the other side of the Atlantic, which threatens our bountiful industry. In 1867, in the excellent report which he presented on the Paris Exhibition, Dr. *Ad. Hirsch*, director of the Neuchâtel Observatory, turned our attention to it; it is to be regretted that, until now, no-one in Switzerland attached to this report all the importance which it deserved.

We have already drawn the attention of the Swiss industrialists to this fact; we will not cease repeating it to all our European colleagues on the jury, and to industrialists who come to Philadelphia during the exhibition. It is time for the old world to hold its head up high to the new, and very soon so that we are not obliged to say "it is too late". All those who sought to understand the current position were struck by the immense progress made in the United States over the last 15 to 20 years, not only with regard to horology, but equally in all branches of industry. The American manufacturers have taken giant steps; today, they feel the restrictions of their home land; their manufacture, pushed to its very limits, no longer finds sufficient outlets within the United States and must, even at the price of sacrifices, to turn to the outside, so that we start to run up against their competition on markets that so far only the Europeans have exploited. We can do no better than to quote a person of authority on this matter, Colonel *Rieter*, the Swiss general representative in Philadelphia. He said on this subject, in a report which he presented on February 23 to the Swiss Federal Council:

"From time to time publications have appeared in various countries which carefully study the progress of America; progress so important for European industry that it is the equivalent of an economic recession for our continent. The activity and production of the new world has not been noticed, because its full strength has not been displayed at previous international exhibitions, and the power of it has been ignored in a way incomprehensible today. There is a completely false idea of the relationship that exists in that country between production and consumption. It is noted, with a visible satisfaction, the use of most of the available man power for agriculture, the rise in wages, the exiguity of the working day in the industrial field, and consequently no-one thought of an imminent and crushing competition from the Americans in North America itself. And it was considered even less that development on other side of the ocean would soon make it possible for the United States to enter into serious competition with Europe in their own European markets.

But, as became obvious, these assumptions rested on a false basis; production in North America has reached, in the majority of the fields which interest us, the limit of indigenous consumption; wages have dropped; the duration of the working day has increased; the intelligence and the activity of the American people are used to best possible advantage; and the attention in this country with which workman dedicate themselves to work and the interests of the owners, which foreigners so often admire, has considerably facilitated this progress. The taste of the American has improved, and it will improve still more in consequence of the exhibition; because in America the owner and the workman compete in zeal, in order to be able to manufacture cheaply, but at the same time to be able to deliver products linking good execution to beauty of work.

It is certain that no nation represented at Philadelphia could fail to notice these obvious facts, while recognizing its passed errors, its surprise and its fear of a hard competition from this side."

We can only agree with the above quotation and join our voice to that of Mr. *Rieter*.

We do not consider the situation which we are in to be irremediable; far from it. Without too much difficulty we can adapt the machines and progress which has been made in the United States in the field of horology, while our competitors cannot create the army of artists and true horologists which we have and who are essential to finish watches of high quality. We are consequently in a better position, and we hope and do not doubt that the Swiss will be able to profit. Let us add, however, that there is no time to lose.

Admittedly we must recognize the great advantages of using a complete set of machines. The first is the production of much more in the same amount time, thus allowing sales at lower price; which must result in, according to the laws of economics, a proportional increase in consumption, while obtaining greater profit for the workman and the manufacturer. The second is a greater uniformity which will facilitate the later repair or change of parts.

We have not reached the present situation without Swiss clock and watch manufacturers using a great number of machines, but we have never, other than rare exceptions, pushed their use as far as the Americans. Let us note, in passing, the ebauche factories of Fontainemelon, Corgémont, Travers, Cortaillod, Cortébert, Sonceboz, Malleray, Moutiers, etc., which could produce annually not just hundreds of thousands but millions of movements if the need were felt. Also note the production of better quality and complicated movements at the *Lecoultre-Borgeaud* factory, in Sentier, which makes movements with sonneries and repetition by machinery; and Messrs *Husson & Retor*, in Geneva, whose workshops we were pleased to visit, where they convinced us that they manufacture a better kind than the Americans and whose parts are really "interchangeable".

Messrs *Vacheron & Constantin* are even more advanced; for 40 years they have not ceased, with the assistance of the skilful engineer Mr. *G. Leschot*, to improve and extend manufacture by machines; we can say with certainty that they have arrived, in the end, at a point which can hardly be bettered, and their products enjoy an unrivalled reputation throughout the whole world.

Without speaking about the houses already quoted in our report, let us add that of Messrs *Aebi & Landry*, of Madretsch, who showed their products in Philadelphia, and have for several years put into practice and increased day-by-day the system of manufacture by machines, by means of which they obtain good results.

Don't we have, in the above, indisputable evidence of the superiority which would be gained by a more intimate alliance of the machine to the labour that we already have? We know, however, that we have many adversaries opposed to their more complete introduction in Switzerland. But let us ask, without taking sides, those who want to get to the bottom of things: to where will this antagonism lead, and where will we be if, instead of moving with the current which must inevitably involve us, we refuse to heed the obvious, palpable fact, that by using a series of machines the Swiss workman will produce, at the same price, 3 or 4 times as much as he can today with those which he already has? Do our opponents seriously think that by remaining in the current position they can stop the movement which occurs on all sides? Certainly not, and as Dr. *Hirsch* expressed it so well in 1867: "All these considerations are nothing against the need which is imposed on us by the laws of economics, which are as inexorable as those of nature."

What 10 years ago could still be doubted can no longer be doubted; England and the United States have taken the responsibility on themselves to give us numerous evidence of it. The objection has been raised that an increase in production will worsen the crisis which already weighs heavily on the watch industry, and it is, we believe, the only reason which would seem to argue in favour of the status quo; but, we repeat, manufacture at low price will have the two consequences of increasing consumption and enabling us to hold our position with our competitors. We will thus be able to keep the significant markets that foreign competition already tends to take away from us.

It is obvious that a considerable transformation will have to take place in the manner of working which we have followed so far. We cannot doubt that it will bring suffering with it, but it will be only short

lived; whereas the longer we remain stationary the more difficulties we will have, which will be considerable and painful to overcome.

Moreover, let us not lose sight of the fact that there will be, by the introduction of machines, a powerful consequence; and it is that if we currently have too many people working in the watch industry, the manufacture and subsequent maintenance of machines will occupy a good number of them. Because it is certain that many workmen, who today are very mediocre watch makers, will be able, according to their aptitudes, to become excellent mechanics, and the increase which this source of work must inevitably cause will become to some extent the equivalent of the introduction of a new and significant industry.

Conclusion.

We could examine some other questions, but we will put them to one side, since we know that they are being studied and that they have even already been put before the National Councils. We will thus abstain from raising them here, and we will simply recall them by finishing this report by warmly supporting and recommending their adoption. They are:

- 1) Patents.
- 2) Trademarks.
- 3) The control of silver and gold.

The first question is in our eyes one of most powerful for the recovery and improvement of all our industries, because we see from it the brilliant results that are obtained by people who enjoy this institution; of which, in Europe, we are almost the only ones who are deprived.

The second is to some extent the corollary of the first.

The third more directly touches our horology industry and will strengthen the confidence which the purchaser must have in the intrinsic value of the object that he acquires.

Let us hope that the discussions which have recently started will lead to laws which will allow us to enjoy all the advantages from which the people who surround us have already profited for a long time.

To summarize, let us say:

Let us not work separately any more, as we have done up to now, but join our efforts together:

- 1) for the prompt introduction to Switzerland of the most sophisticated machines;
- 2) for the foundation of a school of mechanics like our excellent schools of horology.

And finally, let us put into practice our beautiful motto "one for all, all for one". Let us group our forces, and we will promptly and surely arrive at the resurgence of our beautiful industry. What others did we can do, and we will do.