Preserving the scientific and technical Heritage of Education: the ASEISTE

Preservando o patrimônio científico e técnico: a ASEISTE

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Abstract: ASEISTE, Association de sauvegarde et d'étude des instruments scientifiques et techniques de l'enseignement, is a French association aiming at the preservation and study of the scientific and technical instruments of Education, especially in secondary education schools. The main achievements of the Association are described in this paper, specially: the website and its comprehensive catalogue of more than 4000 objects, the videos, the books and exhibitions devoted to important collections. The paper includes numerous photographs of typical objects. Finally, projects are evoked and a call is launched for exchange of informations and cooperation with similar institutions from abroad.

Key-words: education heritage; historical instruments; 19th century; scientific museums.

Resumo: ASEISTE**,** Association de sauvegarde et d'étude des instruments scientifiques et techniques de l'enseignement,é uma associação francesa cujo objetivo é a preservação e o estudo de instrumentos científicos e técnicos de educação, especialmente em escolas secundárias. As mais importantes realizações da Associação são apresentadas neste relato, em especial, o website e seu catálogo contendo mais de 4000 objetos, os vídeos, os livros e as exposições dedicadas à importantes coleções. São também apesentadas inúmeras fotografias de objetos típicos. Finalmente, são evocados projetos e uma convocatória visando a troca de informações e de cooperações com instituições similares de outros países.

Palavras-Chave: Patrimônio educacional; Instrumentos históricos; Museus científicos; século XIX.

1 Introduction

ASEISTE[1], *Association de sauvegarde et d'étude des instruments scientifiques et techniques de l'enseignemen,* is a French association founded in 2004 by Christian Gendron and Francis Gires (current President), aiming the preservation and the study of the scientific and technical instruments heritage of Education, especially in secondary education schools: high schools and grammar schools (French *Collèges* and *Lycées*).

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The objectives of the association are:

• to *retrieve* and *preserve* instruments and collections;
• to create a comprehensive *website* including:
  – an *on-line catalogue* aiming at indexing and describing exhaustively the scientific and technical heritage of secondary schools;
  – short *videos* from those instruments;
  – references and biographies of *instruments manufacturers*.
• to publish *books* dedicated to specially important collections;
• to create *local associations* and favor *exchanges* between collections;
• to organize conferences and meetings around "Scientific instruments and History of Education";
• to emphasize and support the *pedagogical use* of the collections;
• to organize temporary and permanent *exhibitions* of the collections;
• to manage *public relations* around the collections and collect funds (government, sponsorship).

ASEISTE is in frequent contact with local, regional and national institutions. His president has been awarded in 2008 by the *Académie des Sciences* the "Paul Doisteau-Émile Blutet" Prize for scientific information. He has been officially put in charge of the preservation of the scientific heritage of secondary schools by the Ministry of Education. Several collections have been, or will soon be, listed on the National Register (classification as *Monument Historique*). Agreements have been concluded or are in progress with several Regional Councils. Informal agreements have been concluded with educational or cultural institutions for exchange of pictures or videos on their respective websites, specially *Fundazione Scienza e Tecnica* (Florence), *École polytechnique* (Palaiseau) and the CNRS/CRHST for its *Ampère* website (Blondel; Wolf, 2005).

2 The ASEISTE website

The website is the main ASEISTE tool. A typical page is shown on Fig. 1 on which a series of items appear.

Figure 1 – The ASEISTE website. The item *Inventaires* has been selected.

Apart from the usual items: *Actualités* (News), *Association* (ASEISTE life), *Contact* and *Liens* (Links), the main items into which considerable work has been invested are: *Inventaires* (Catalogue), *Publications,* and *Videos*, to which should be added another important item: *Expositions* (Exhibitions) included under *Association*. For each item, a series of subdivisions is displayed in the left column. The rest of this paper will be devoted to a detailed description of those main activities.

2.1 **The Catalogue** (website item: *Inventaires*)

The Catalogue (*Inventaires*) is the main achievement of the ASEISTE. More than 4000 objects from more than 40 institutions (*lycées* and *collèges*) have been listed and described through comprehensive explanatory leaflets, one page per object. The objects are classified according to their Institution, Name, Manufacturer, and Discipline (the disciplinary classification in use at the time was followed, not the modern one). More insight into the use of the website will now be given through a description of the Catalogue.

Let's take as an example the **Drummond lamp** which was a special lamp used throughout the 19th century for land survey, optical experiments, projection lanterns and theatres lighting: a kind of blowtorch directed onto a piece of quicklime that, becoming white hot, emits extremely intense light, almost blinding[2]**.** Let's suppose someone is

2 The light source used by Fizeau for the first terrestrial measurement of the speed of light in 1849 was a Drummond lamp. A copy of that kind of lamp, lent by the ASEISTE, is shown in the Fizeau's sequence of the film *Les magiciens de la lumière* (Wizards of Light), a film tracing the history of the measurements of the speed of light from Galileo to Foucault, produced by the Faculty of Sciences of Orsay.

looking for the *lampes de Drummond* (“Drummond lamps”) surviving in French secondary schools. Then he or she has only to

• click on *Inventaires* on the front page (Fig. 1) and it will display, on a horizontal line, a series of buttons allow searching per Institution (*Établissement*), Manufacturer (*Constructeur*), Name (*Nom de l'objet*) or Discipline. When allowed, someone can choose “All” (*Tous*) or a particular institution, manufacturer or discipline in the drop-down menu.

Figure 2 – ASEISTE website. Four Drummond lamps have been found in the Catalogue.

• in the *Nom de l'objet* button, he or she types *lampe Drummond* and press the *Résultat de la recherche* (Results) button.

• a new page is shown (see Fig. 2) displaying that four Drummond lamps have been found, each one is labeled with its institution, manufacturer (if unknown: *non signé*) and discipline.

• choose, for example, the second one: it can been found in *Lycée Guez de Balzac, département Charente* (n°16 in French counties list), the manufacturer is *Duboscq* and the discipline *Optique-Géodésie* (Optics-Geodesy).

• If someone wishes to learn more about the manufacturer, he or she must, in the left column, click on *Notices constructeurs* (manufacturers biographies), choose *Duboscq*, will get a cross-reference to *Soleil*, and finally a comprehensive biography of the *Soleil-Duboscq-Pellin* dynasty of manufacturers (1819-1940) (see Fig 3).

SOLEIL Père (1819 – 1849)

DUBOSCQ et SOLEIL (1849 – 1878)
J. et A.DUBOSCQ (1879 – 1880)
J.DUBOSCQ (1880- 1883)
J.DUBOSCQ et PH.PELLIN (1883 – 1886)
Maison Jules DUBOSCQ
Ph. PELLIN (1886 - 1900)
Maison Jules DUBOSCQ Ph. et F .PELLIN (1900 – 1911)

La Maison fondée en 1819 par Jean Baptiste Soleil (1798-1878) fut reprise, en 1849, par son gendre Jules Duboscq (1817-1886). En 1883, Philippe Pellin (1847-1923) codirigea les ateliers avec Jules Duboscq) jusqu'au décès de ce dernier et en assuma seul la direction jusqu'en 1900, par la suite il s'associa avec son fils Félix Pellin (1877-1940). Avec cette Maison on est en présence d'un des plus grands constructeurs dont les qualités exceptionnelles furent mises au service des plus illustres savants comme Arago, Fresnel, Régnault, Babinet, Foucault, Delezenne… La Société Française de Physique considérait ses catalogues de matériels comme de véritables manuels de physique pratique.
Les sommaires indiquent les spécialités de la Maison : Sources lumineuses – Appareils de projection – Photométrie – Interférences, Diffraction –Polarisation, double Réfraction – Réflexion, Réfraction, Vision – Spectroscopie – Appareils de Mesure – Polarimétrie, Saccharimétrie, Colorimétrie – Acoustique en Projection – Météorologie.

Fig. 3 – ASEISTE website. The *Soleil-Duboscq-Pellin* manufacturers leaflet.

Etablissement : Lycée Guez de Balzac (16) *Discipline :* Optique - Géodésie
Ville : Angoulême *Typologie :* Utile

LAMPE DRUMMOND

Fonction : Produire un faisceau lumineux intense pour les expériences d'optique.

Description : Le dispositif est constitué d'un tube incliné à sa partie supérieure. A l'intérieur de celui-ci se trouvent deux tubes étroits amenant des gaz et commandés par deux robinets (A) et (B).
- Sur le modèle de la gravure, une crémaillère permet d'ajuster en hauteur le support d'un cylindre de chaux par rapport à la flamme et un réglage coulissant à vis permet de régler la distance de la flamme au cylindre de chaux.
- Le modèle du lycée Guez de Balzac d'Angoulême ne diffère de celui de la gravure que par le système qui permet d'approcher ou d'éloigner la flamme du cylindre de chaux grâce à une vis latérale permettant de faire basculer celle-ci plus ou moins autour de la verticale.

Mode Opératoire : Le robinet (A) commande l'arrivée du gaz d'éclairage.
Le robinet (B) commande l'arrivée de l'oxygène, préparé avec le chlorate de potassium, dans des cornues de fer, et conservé sous pression dans des sacs de caoutchouc. Pour éviter tout risque d'explosion les deux gaz ne se mélangent qu'au moment où ils s'enflamment.
On laisse brûler continuellement le gaz d'éclairage et l'on n'amène l'oxygène qu'au moment de l'expérience.
Les deux courants gazeux arrivent obliquement et la flamme obtenue chauffe fortement le cylindre de chaux qui s'illumine avec grand éclat.

H : 36 - d : 13
Constructeur :
DUBOSCQ

Remarque : Alfred Donné (1801-1878), chef de clinique à la Charité de Paris et professeur de médecine ne pouvait utiliser le microscope solaire puisqu'il donnait les cours le soir, et le ciel, souvent couvert, de Paris n'en permettait pas un usage régulier. Donné avait remarqué que les étudiants se dissipent si les expériences de cours ne fonctionnent pas bien. Aussi, installa-t-il un microscope solaire modifié, dont la source de lumière était un morceau de craie porté à incandescence par un chalumeau au gaz d'éclairage et oxygène (technique inventée vers 1820 par Thomas Drummond (1797–1840) . Un des habiles préparateurs de Donné n'était autre que Léon Foucault !

Figure 4 – ASEISTE website. The Drummond lamp explanatory leaflet.

• Back to the Drummond lamps page, clicking anywhere in the *Lycée Guez de Balzac* line, the searcher gets a one-page explanatory leaflet displaying uses and description of the instrument, directions for use and historical remarks (Fig. 4). A modern high resolution photo and an original plate are also shown.

• Double-clicking on the photo or on the original plate, the person gets full-screen wonderful pictures that can be downloaded (Fig. 5). Moreover, high-resolution allows very large zooming so that you can visualize every tiny details.

Figure 5 – Drummond lamp. *Lycée Guez de Balzac, Angoulême*. Instrument maker: Duboscq.

An alternative path towards this particular Drummond lamp could have been:

• on the page *Inventaires*, typing *Optique-Géodésie* in the *Discipline* button;

• then pressing the *Établissements* button and, in the pull-down menu, choose: *Lycée Guez de Balzac*. There will be displayed a list of the 58 Optics-Geodesy instruments in this institution, including the Drummond lamp (second line). Each explanatory leaflet can be accessed just as above.

We believe these few paths are enough to understand how the website works. And we remind the reader that the website database contains 4083 instruments and an equal number of explanatory leaflets have been recorded (Dec. 2012), and that new ones are continuously being added.

2.2 The videos

On the front page, on “Videos”, opens a new page on *Lanterne magique et plaques d'astronomie* (Magic lantern and Astronomy slides), a video made at the *Bernard d'Agesci* Museum (see Fig. 6). On the left column, the other institutions in which videos of instruments have been made are listed. Exchanges of videos have been agreed with several institutions (i.e. *Fundazione Scienza e Tecnica or École polytechnique*).

Figure 6 – ASEISTE website. The videos page. Here shown is the *Lanternes magiques et plaques d'astronomie* (Magic lanterns and astronomy slides), a 8 min 44s video.

2.3 Some other examples of objects and instruments of the Catalogue

In order to illustrate ASEISTE’s work, a selection of instruments – among more than 4000 – is displayed in the central pages of this paper (Fig. 7 to 16). The pictures are high resolution and the searcher may zoom them in.

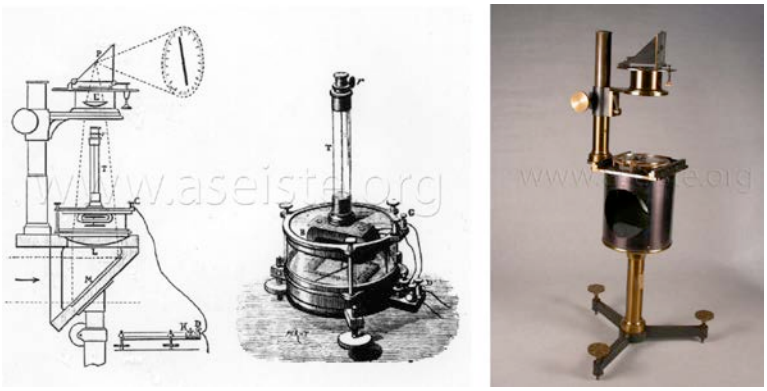

Figure 7 – Vertical projection apparatus. *Lycée Guez de Balzac, Angoulême*. Among other uses, the instrument allows visualizing the deviation of a Nobili galvanometer. Instrument maker: Duboscq.

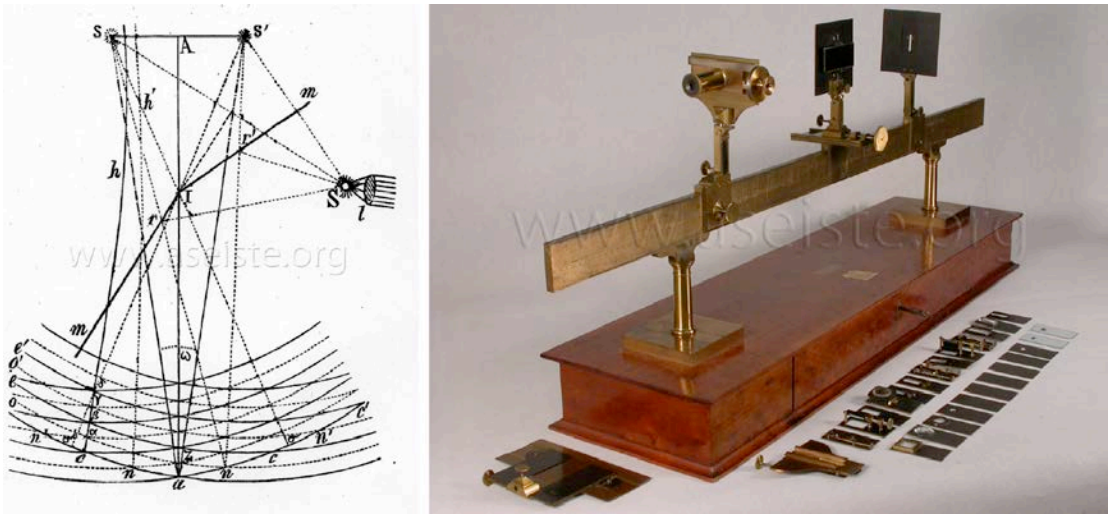

Figure 8 – Pouillet interference and diffraction bench. *Lycée Bertran de Born, Périgueux*. Instrument maker: Soleil.

Figure 9 – *Left*: Newton's disk. *Lycée Bertran de Born*, *Périgueux*. Instrument maker: Soleil.
Right: A *Magny* microscope (1751). *Lycée Henri Poincaré* and *Musée lorrain*, Nancy. Given by King Louis XVth to his father-in-law Stanislas de Lorraine. Instrument makers: Magny et al.

Figure 10 – *Left*: Hero's fountain. *Lycée Guez de Balzac*, *Angoulême*. *Right*: Battery of Leyde jars. *Lycée Bertran de Born, Périgueux*. Instruments makers: unknown.

Figure11 – *Mouchot* solar driven steam engine. *Lycée Guez de Balzac, Angoulême*. Instrument maker: Mouchot.

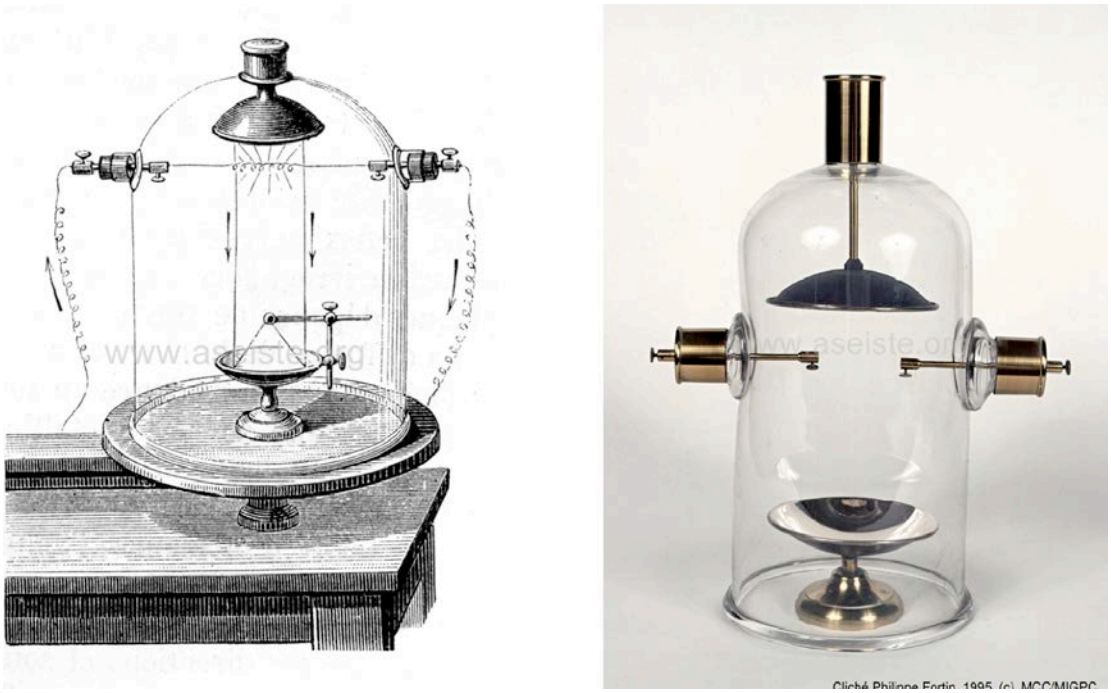

Figure 12 – Davy's apparatus “Reflection of Heat”. *Lycée Chaptal, Paris*. Instrument maker: unknown.

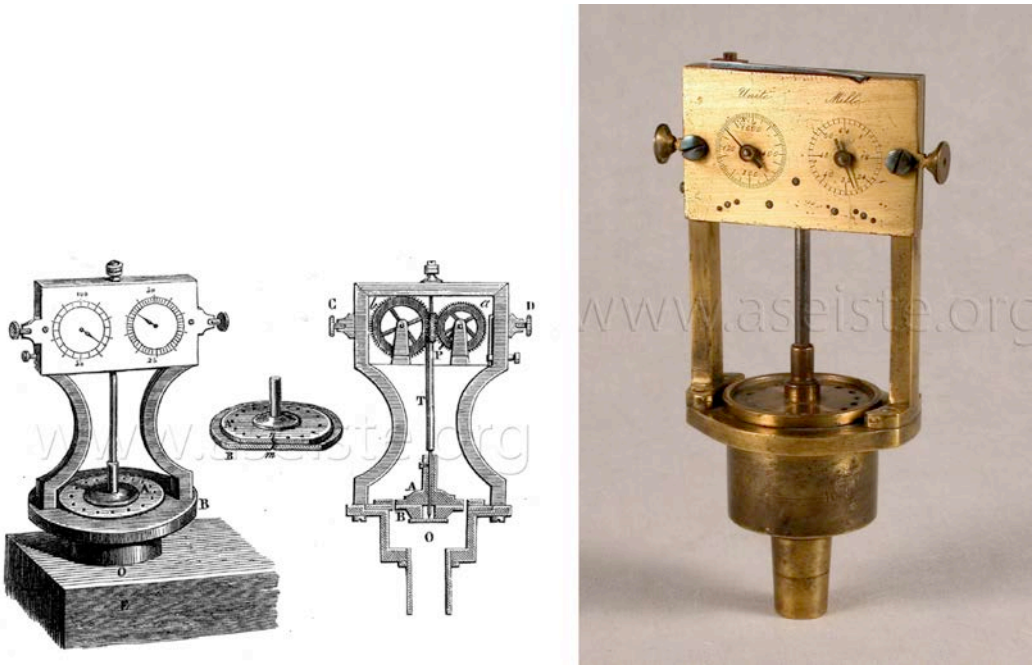

Figure 13 – A *Cagniard-Latour* siren. *Lycée Bertran de Born, Périgueux*. Instrument maker: unknown.

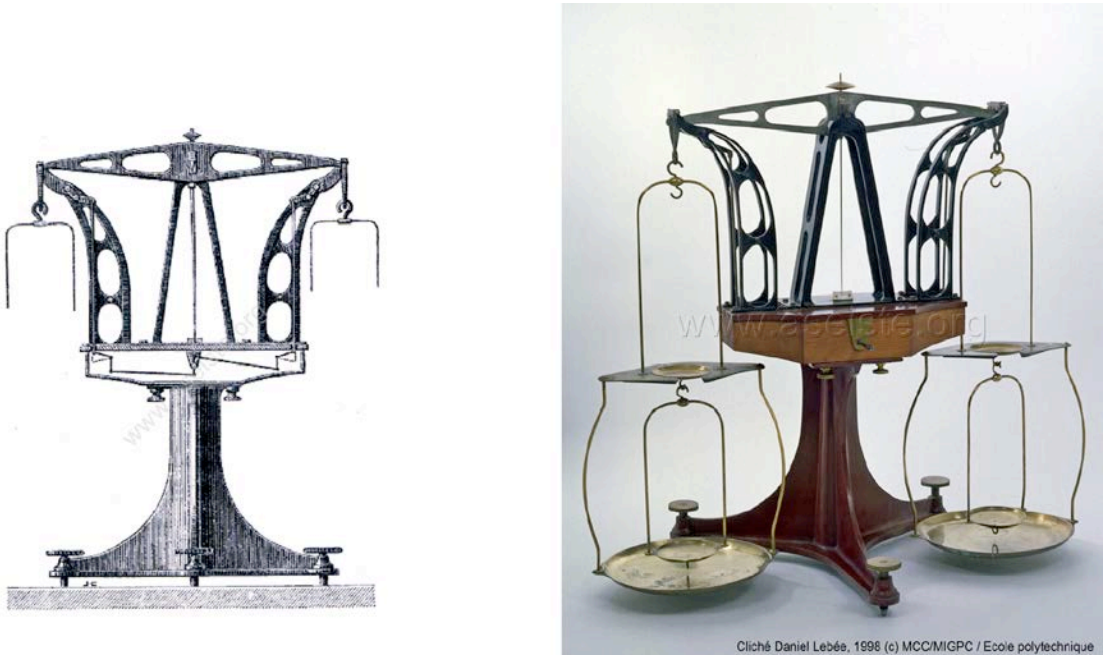

Figure 14 – A Deleuil balance. *École polytechnique, Palaiseau*. Instrument maker: Deleuil.

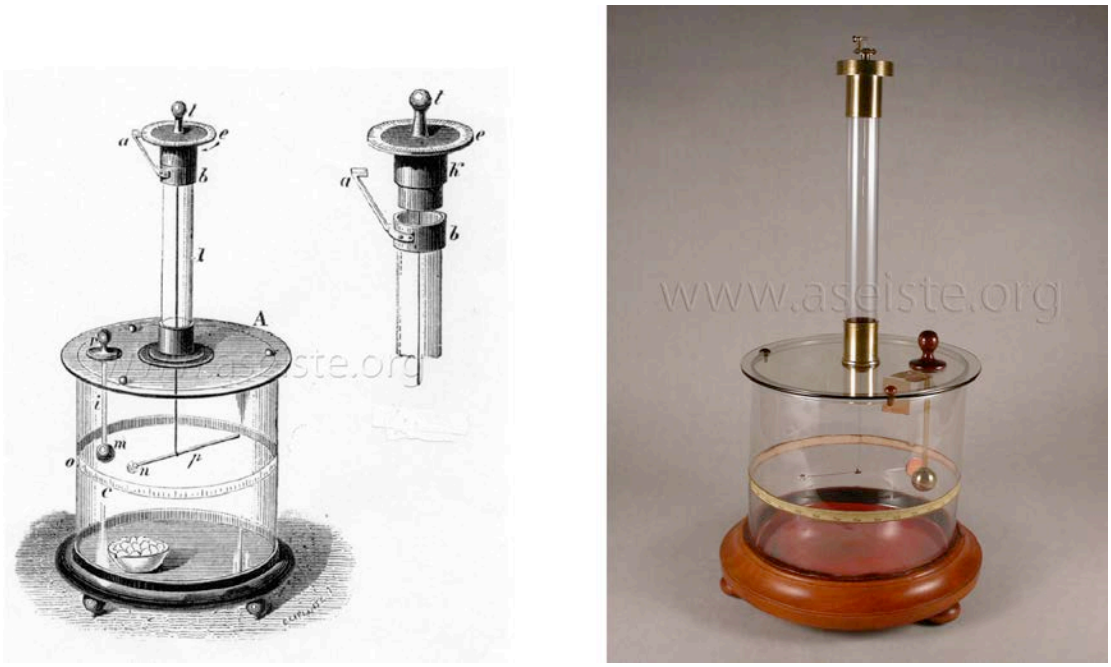

Figure 15 – A *Coulomb* electrostatic balance. *Lycée Bertran de Born, Périgueux*. Instrument maker: Pixii.

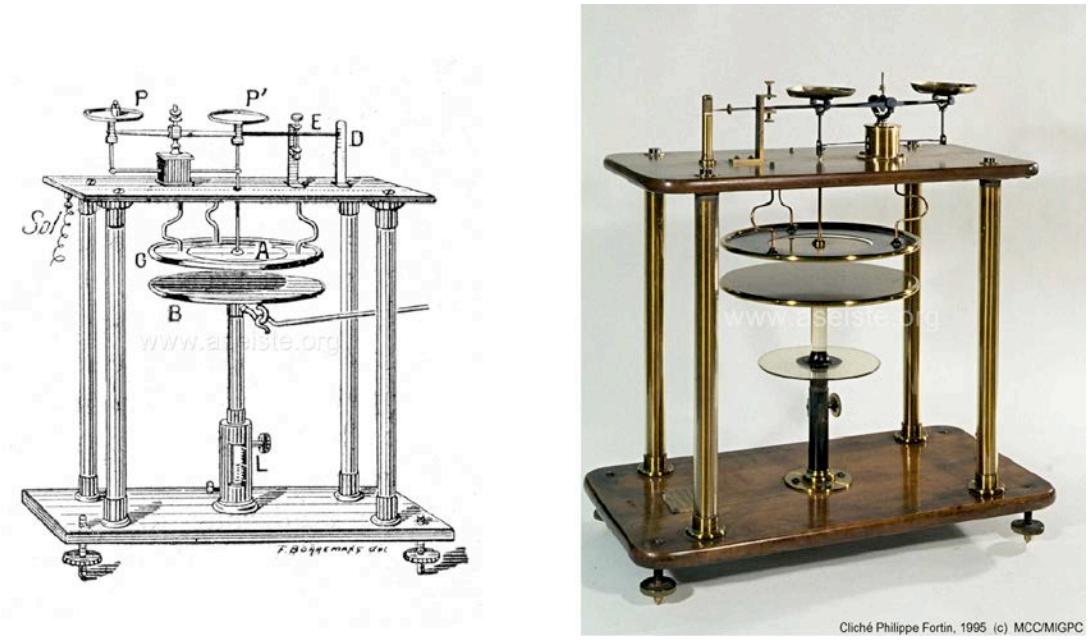

Figure 16 – An *Abraham-Lemoine* Electrometer balance. *Lycée Chaptal, Paris*. Instrument maker: unknown.

3 ASEISTE's publications

ASEISTE has published three books on the Physics and Chemistry collections. A fourth book, devoted to Natural History appeared in March 2013.

• *Physique côté cours* (Gires, 1997) is the catalogue of the exhibition of Francis Gires's personal collection at the *Musée du Périgord* in 1997: "*Cabinets de physique dans l'enseignement secondaire au XIX*^{e} *siècle"*. This collection has been later transferred to the *Musée Bernard d'Agesci* in Niort (see section 4, below).

• *Physique impériale* (Gires, 2004) and *L'empire de la Physique* (Gires, 2006), respectively devoted to the collections of *Lycée Bertran de Born, Périgueux* and *Lycée Guez de Balzac, Angoulême*, are the two main books about the Physics collections published by the ASEISTE (Fig. 17). The same layout and typography have been adopted in both books:

Figure 17 – Two books about Physics collections published by ASEISTE.
Left: *Lycée Bertran de Born, Périgueux*. Right: *Lycée Guez de Balzac, Angoulême*.

– one page for each object, with exactly same contents as the on-line leaflet: function, description, directions for use, historical remarks. An example of such a page is shown on Fig. 18.

– references to discipline, instrument maker (when known) and typology: *didactique* ("didactic"), *utile* ("useful"), *utile-mesure* ("used for Physics measurements") or *récréatif* ("entertainment"). See on the website, item *Inventaires*, left column: *Typologie*.

Figure 18 – *De la Rive's electric egg* in: *L'empire de la Physique*.

The 450 objects surveyed in both books make up a reference for a nineteenth century model laboratory. *Physique côté cours* and *Physique impériale* are now out of print, while *L'Empire de la Physique* is still in ASEISTE catalogue. An Important remark: full contents of those three books can be downloaded from the website as PDF files.

• *L'empire des sciences naturelles* (“Natural History Empire”), is an adaptation of the same concepts to Natural History: collections of *Lycée Bertran de Born, Périgueux* and *Lycée Guez de Balzac, Angoulême*. The front cover and an example are shown on Fig. 19.

Figure 19 – *L'empire des sciences naturelles*. *Left*: front cover. *Right*: example of a plate.

4 ASEISTE’s exhibitions

4.1 The permanent exhibition at the Bernard d'Agesci Museum

A special department of the *Musée Bernard d’Agesci* in Niort is devoted to the *Conservatoire de l'Éducation* (History of Education). In this department, two rooms are devoted to the Physics instruments collections donated by Francis Gires and Ruedi Bébié[3]. A Natural History collection is also displayed in a nearby room. Partial views of Francis Gires and Ruedi Bébié’s rooms are displayed on Fig. 20 and 21.

The *Francis Gires* collection is devoted to the Physics instruments of the general scientific Education (Gravity, liquids and gases, Heat, Optics, Electricity). The *Ruedi Bébié* collection is more devoted to the instruments of technical Education: telecommunications (telegraph, telephone), instruments for Geodesy and an original collection of clockmakers tools.

[3] See: http://www.agglo-niort.fr/-Musee-d-Agesci.

Figure 20 – *Bernard d'Agesci* Museum. Francis Gires room. *Top*: Optics and Heat showcase. *Bottom*: Properties of gases.

Figure 21 – *Bernard d'Agesci* Museum. Ruedi Bébié room. *Top*: general view. *Bottom left*: collection of telephones. *Bottom right*: collection of clockmakers tools.

4.2 Temporary exhibitions

Temporary exhibitions of collections studied by the ASEISTE are organized on the occasion of special events.

• on the occasion of the Physics World Year in 2005: *Physique impériale*, a traveling exhibition on the instruments displayed in the book published in 2004. The exhibition travelled through several French towns, such as Périgueux, Bordeaux, Pau (see Fig. 22).

Figure 22 – The *Physique impériale* exhibition (2005). *Top*: general view. *Bottom left*: Heat. *Bottom right*: Optics.

• on the occasion of the *Sigaud de la Fond* commemoration in Bourges in 2010: an exhibition of 18th century instruments organized by members of ASEISTE (see Fig. 23).

• other exhibitions: on the occasion of the annual *Salon du Livre d'Histoire des sciences et des techniques* (Book of History of Science and Technology Forum), or the annual meeting of the UdPPC (Physics and Chemistry teachers association) in 2007 in Paris.

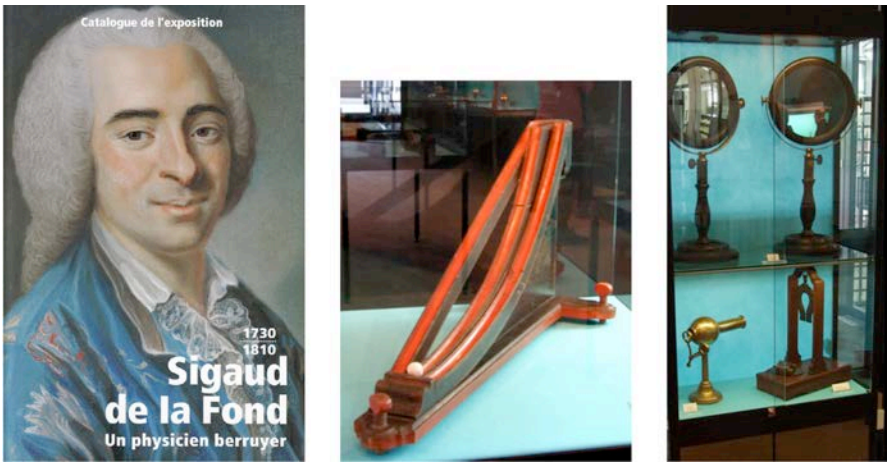

Figure 23 – The *Sigaud de la Fond* exhibition in Bourges (2010).

5 And in conclusion: some ASEIST's projects

A considerable amount of work has been done by ASEISTE to retrieve, study, describe and preserve the scientific instruments of Education, and the work is still in progress. Physical sciences have been favored up to now, but the near coming out of *L'Empire des sciences naturelles* shows that the ASEISTE is henceforth well committed in the field of Natural History. The main tools have been the website -- with its 4083 objects described, the instrument makers biographies and the videos --, the publication of beautifully printed books devoted to important collections, and public exhibitions of instruments. And last but not least, it shall be mentioned the invaluable voluntary contributions of the association's membership.

For the near future, the ASEISTE has some projects, such as:

• the publication of *L'Empire des sciences naturelles*;

• to promote the public opening of important collections;

• to carry on with the work already in progress (more objects, more Institutions), specially in the field of Natural History;

• in the mid-term: a three-volumes encyclopedia on the Physical sciences collections that would be a paper analogue of the on-line catalogue.

However, an outstanding development of the ASEISTE's activities would be now to strike up relationships with foreign similar associations or institutions, specially associations of science teachers. Thus, we launch a call to any of them interested in exchanging informations on instruments collections, or even organizing encounters or common activities. In particular, we would be interested in the instruments produced by the famous French manufacturers and lying in foreign schools collections

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