

# Preserving the scientific and technical Heritage of Education: the ASEISTE

*www.aseiste.org*

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## 1 Introduction

The ASEISTE, *Association de Sauvegarde et d’Étude des Instruments Scientifiques et Techniques de l’Enseignement*, is a French association founded in 2004 by Christian Gendron and Francis Gires (current President), aiming at the preservation and study of the scientific and technical instruments heritage of Education, especially in secondary education schools: high schools and grammar schools (French *Collèges* and *Lycées*).

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;

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<sup>1</sup>The “SIC” (Scientific Instruments Commission) is a branch of the International Union of History and Philosophy of Sciences (IUHPS).

- to organize temporary and permanent *exhibitions* of the collections;
- to manage public relations around the collections and collect funds (government, sponsorship).

The 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 Doisteaum-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 several 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 their *Ampère* website<sup>2</sup>.

## 2 The ASEISTE website: [www.aseiste.org](http://www.aseiste.org)

### 2.1 The website: how it works

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 *Vidéos*, 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.

<sup>2</sup>The *Ampère* website, designed and supervised from 2005 by Christine Blondel and Bertrand Wolff: <http://www.ampere.cnrs.fr>

## 2.2 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. We show it on an example.

**An example: the Drummond lamp.** Suppose you are looking for the *lampes de Drummond* (“Drummond lamps”) surviving in French secondary schools (the Drummond lamp was a special lamp used throughout the XIX<sup>th</sup> 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<sup>3</sup>).

The screenshot shows the ASEISTE website's 'Inventaires' (Catalogue) section. At the top, there is a navigation bar with buttons for 'Actualités', 'Association', 'Publications', 'Inventaires', 'Vidéos', 'Contact', and 'Liens'. Below the navigation bar, a message states: 'A l'onglet "inventaires" vous trouverez, à ce jour, 4049 fiches d'instruments de physique et 42 fiches de sciences naturelles objets'. The main content area is titled 'Inventaires' and includes a sidebar with links for 'Fiches instruments', 'Notices constructeurs', 'Typologie', and 'Disciplines'. The main table displays search results for 'Lampe Drummond'. The table has columns for 'Lycée', 'Constructeur', 'Nom', and 'Discipline'. There are four rows of results, all showing 'Lampe Drummond' as the object name and 'Optique - Géodésie' as the discipline. The first three rows have specific lycée names and manufacturers, while the fourth row is marked as 'non signé'.

Lycée	Constructeur	Nom	Discipline
Lycée Bertran de Born (24)	DUBOSCQ et PELLIN	LAMPE DRUMMOND	Optique - Géodésie
Lycée Guez de Balzac (16)	DUBOSCQ	LAMPE DRUMMOND	Optique - Géodésie
Lycée Lalande (01)	non signé	LAMPE DRUMMOND	Optique - Géodésie
-	non signé	LAMPE DRUMMOND	Optique - Géodésie

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

- click on *Inventaires* on the front page: you get the page shown on Fig. 1. Displayed on an horizontal line, a series of buttons allow searching per Institution (*Établissement*), Manufacturer (*Constructeur*), Name (*Nom de l'objet*) or Discipline. When

<sup>3</sup>The light source used by Fizeau for the first terrestrial measurement of the speed of light in 1849 was a Drummond lamp. An example, lent by the ASEISTE, is shown in the “Fizeau” scene in 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 Léon Foucault, produced by the Faculty of Sciences of Orsay (contact: <pierre.lauginie@u-psud.fr>)

allowed, you can choose “All” (*Tous*) or a particular institution, manufacturer or discipline in the pull-down menu.

- in the *Nom de l’objet* button, type *lampe Drummond* and click the *Résultat de la recherche* (“Results”) button. You get a new page (see Fig. 2): 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 be 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).
- would you learn more about the manufacturer? In the left column, click on *Notices constructeurs* (manufacturers biographies), choose *Duboscq*, you get a cross-reference to *Soleil*, and finally a comprehensive biography of the *Soleil-Duboscq-Pellin* dynasty of manufacturers (1819-1940). See Fig 3.

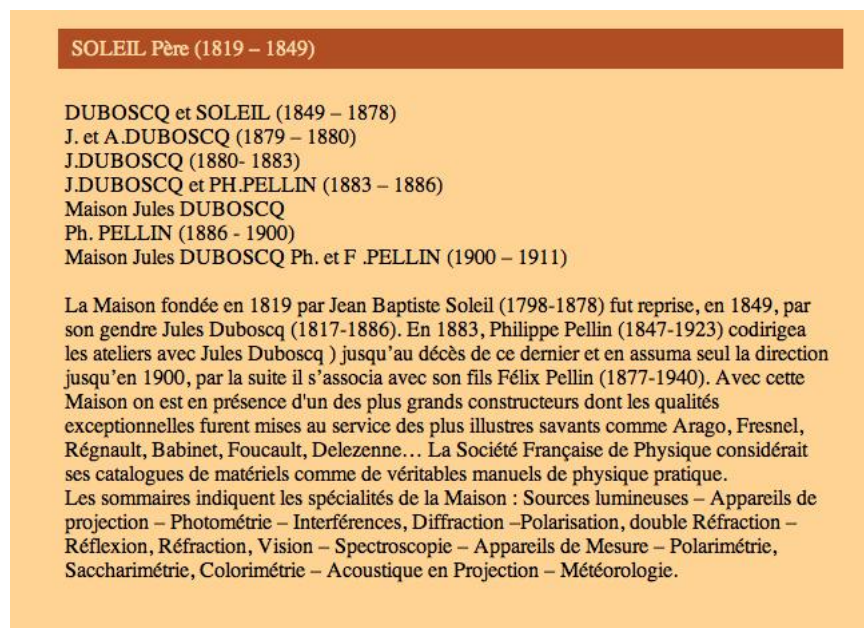


Figure 3: ASEISTE website. The *Soleil-Duboscq-Pellin* manufacturers leaflet.

- now, the best in the best of the website! Back to the Drummond lamps page, click anywhere in the *Lycée Guez de Balzac* line. You get a one-page explanatory leaflet with uses and description of the instrument, directions for use and historical remarks (Fig. 4). A modern H.R. photo and an original plate are also shown.
- now, double click on the photo or on the original plate: you get full-screen wonderful pictures that can be downloaded (Fig. 5). Moreover, high-resolution allows very large zooming so that you can visualize very tiny details. Really, the ASEISTE iconography is wonderful!



**Etablissement :** Lycée Guez de Balzac (16)  
**Ville :** Angoulême

**Discipline :** Optique - Géodésie  
**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.

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

- on the page *Inventaires*, type *Optique-Géodésie* in the *Discipline* button;
- then click the *Établissements* button and, in the pull-down menu, choose: *Lycée Guez de Balzac*. You get 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 this is enough to understand how the website works. But remind that 4048 instruments and the same number of such explanatory leaflets have been recorded (Dec. 2012), and new ones are continuously added!

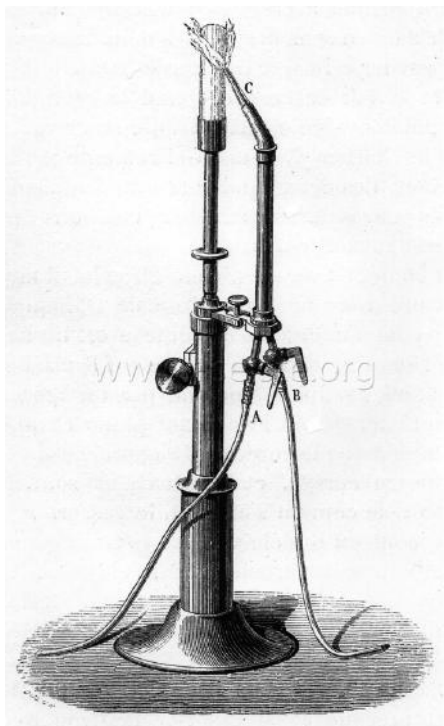


Figure 5: Drummond lamp. *Lycée Guez de Balzac, Angoulême*. Instrument maker: Duboscq.

### 2.3 The videos

On the front page, click on “Videos”: a new page opens on *Lanterne magique et plaques d’astronomie* (Magic lantern and Astronomy slides), a video made at the *Bernard d’Agesci*



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.

Museum (recommended! See Fig. 6). On the left column, the other institutions in which videos of instruments have been made are listed: click on any of them. Exchanges of videos have been agreed with several institutions (i.e. *Fundazione Scienza e Tecnica* or CNRS/CRHST, cf. note 2).

## 2.4 Other examples of objects and instruments of the Catalogue

In order to illustrate the important work made by the ASEISTE, a selection of instruments – among more than 4000 – is displayed in the central pages of this paper ( Fig. 8 to 17). On the website, the pictures are in high resolution, do not hesitate to zoom in. But we should not leave this section without showing the beautiful Newton disc, signed *Soleil*, which has been chosen for the official logo of the ASEISTE (see Fig. 7 below).



Figure 7: Newton disc. *Lycée Bertran de Born, Périgueux*. Instrument maker: *Soleil*. Height: 62 cm. The disc is driven by a handle (hidden).



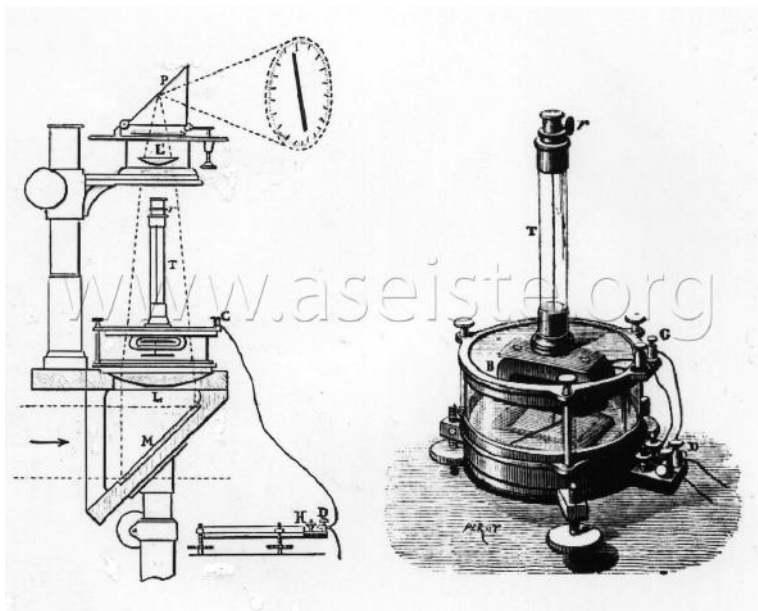


Figure 8: Vertical projection apparatus. *Lycée Guez de Balzac, Angoulême*. Among other uses, the instrument allows visualizing the deviation of a Nobili galvanometer or a spinning Newton disc. Instrument maker: Duboscq.

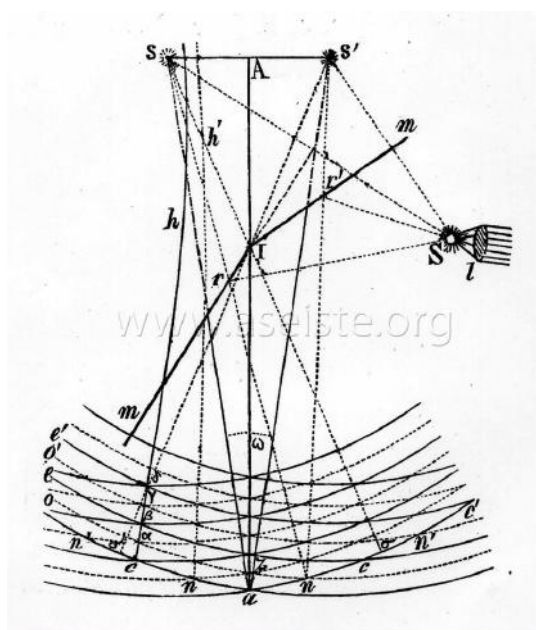


Figure 9: Pouillet interference and diffraction bench. *Lycée Bertran de Born, Périgueux*. Instrument maker: Soleil.





Figure 10: *Left*: A Rojas' universal astrolabe. *Lycée Montesquieu, Le Mans*. Instrument maker: unknown. *Right*: A Magny microscope (1751). *Lycée Henri Poincaré and Musée lorrain, Nancy*. Given by King Louis XV<sup>th</sup> to his father-in-law Stanislas de Lorraine. Instrument maker: Magny et al.

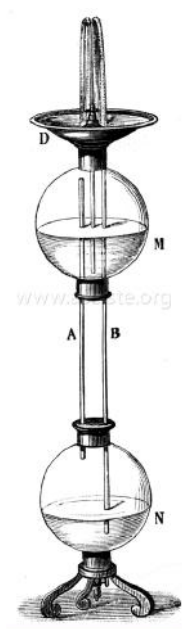


Figure 11: *Left*: Hero's fountain. *Lycée Guez de Balzac, Angoulême*. *Right*: Battery of Leyde jars. *Lycée Bertran de Born, Périgueux*. Instruments makers: unknown.

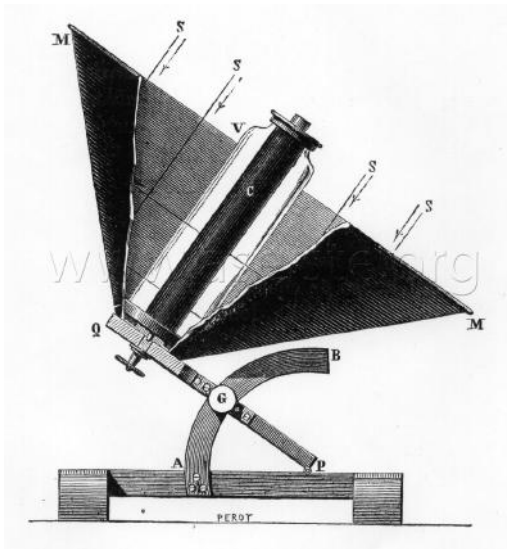


Figure 12: *Mouchot* solar driven steam engine. *Lycée Guez de Balzac, Angoulême*. Instrument maker: Mouchot.

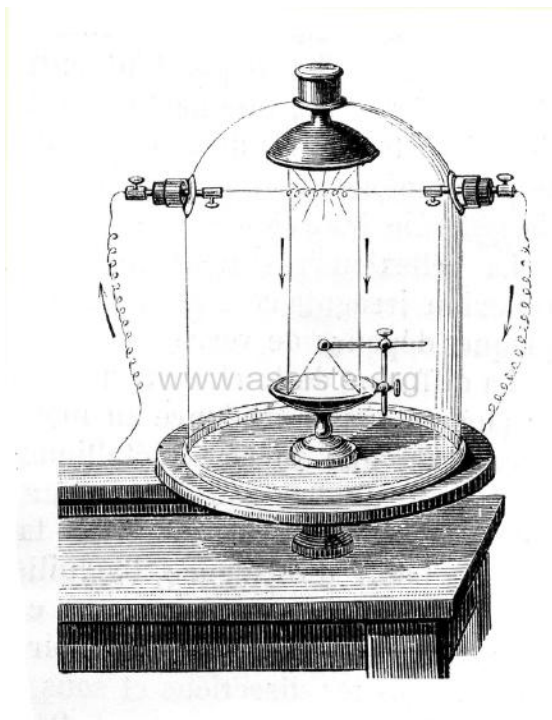


Figure 13: Davy's apparatus "Reflection of Heat". *Lycée Chaptal, Paris*. Instrument maker: unknown.

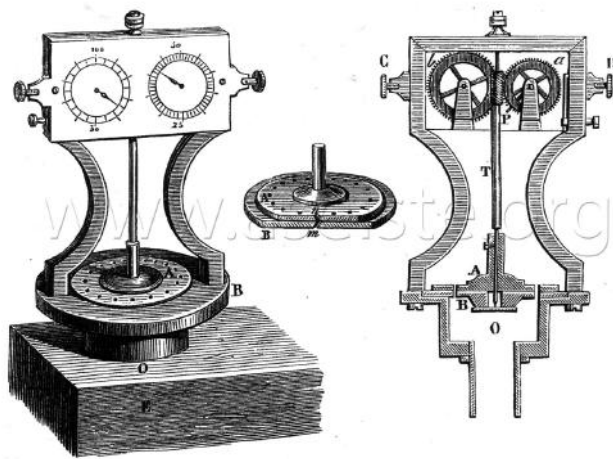


Figure 14: A Cagniard-Latour siren. *Lycée Bertran de Born, Périgueux*. Instrument maker: unknown.

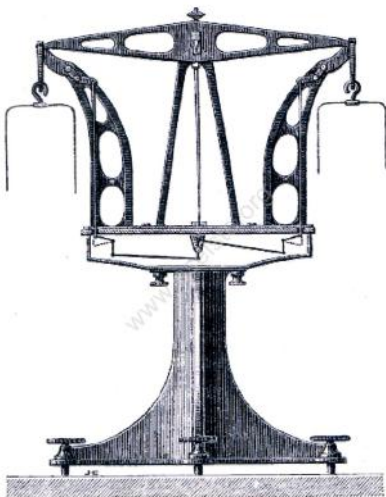


Figure 15: A Deleuil balance. *École polytechnique, Palaiseau*. Instrument maker: Deleuil.



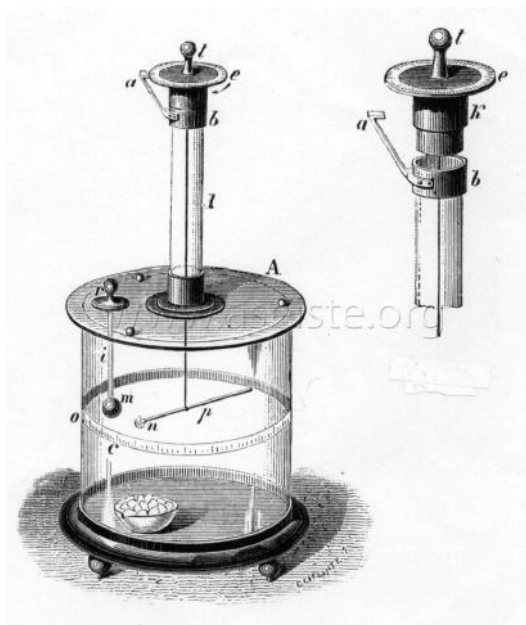


Figure 16: A *Coulomb* electrostatic balance. *Lycée Bertran de Born, Périgueux*. Instrument maker: Pixii.

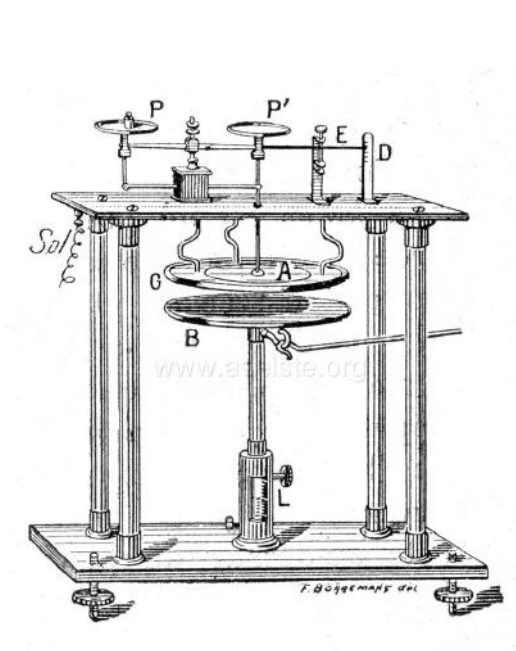


Figure 17: An *Abraham-Lemoine* Electrometer balance. *Lycée Chaptal, Paris*. Instrument maker: unknown.



### 3 Publications of the ASEISTE

The ASEISTE has published beautiful books about the Physics and Chemistry collections. A new book, devoted to Natural History collections is now in press and will appear in March 2013. Important: full contents of the published books can be downloaded from the website as PDF files.

- *Physique côté courS* (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<sup>e</sup> siècle*”. This collection has been later transferred to the *Musée Bernard d’Agesci* in Niort (see section 4, below).
- *Physique impériale* (199 pages, 2004) and *L’Empire de la Physique* (389 pages, 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. 18). The same layout and typography have been adopted in both books:



Figure 18: The two main books about the Physics collections published by the 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. 19;
- 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*.

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* can be ordered to the ASEISTE (see on the website, item *Publications* → *Bon de commande*).

## 264 ŒUF ÉLECTRIQUE DE LA RIVE

Loi ou phénomène ➤ Action du magnétisme sur la lumière électrique dans le vide.

Description ➤ Un œuf électrique (ampoule de verre) dans le lequel on a fait un vide relatif est soufflé de façon à pouvoir être enfilé sur un cylindre en fer doux entouré à sa base d'un électroaimant. A l'intérieur de l'œuf, un anneau en laiton à la partie inférieure et une électrode à la partie supérieure communiquent avec l'extérieur par deux bornes.

Expérience ➤ Si on relie ces deux bornes à une bobine de Ruhmkorff, on voit dans l'œuf une gerbe lumineuse cylindrique qui va de l'électrode supérieure à l'anneau en laiton et dans laquelle on distingue des jets plus brillants que les autres. Si on relie alors l'électroaimant à une pile de manière à aimanter le cylindre en fer doux, la lumière se met à tourner rapidement autour de ce dernier dans un sens qui dépend de celui de l'aimantation du fer, présentant ainsi un nouvel exemple de la rotation des courants produite par des aimants.



H : 41 - D : 14 - D' : 5



### Remarque

De La Rive a utilisé son œuf dès 1849 pour expliquer les mouvements rotatoires observés dans les aurores boréales.

ÉLECTRICITÉ DYNAMIQUE

révélateur

Figure 19: *De la Rive's electric egg* in *L'empire de la Physique*.

- *L'Empire des sciences naturelles* ("Natural History Empire"), the new book to appear in March 2013 (ca. 400 pages), 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. 20.

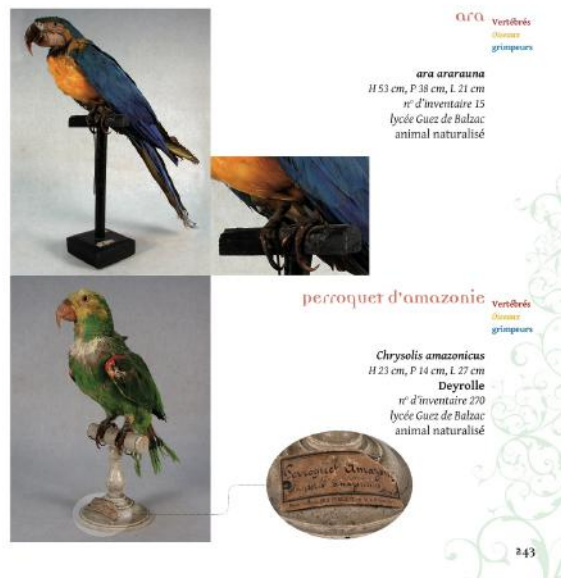


Figure 20: *L'empire des sciences naturelles*. Left: front cover. Right: example of a plate.

## 4 The 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 Bebie. See: <http://www.agglo-niort.fr/-Musee-d-Agesci->. A beautiful Natural History collection is also displayed in a nearby room. Partial views of Francis Gires and Ruedi Bebie rooms are displayed on Fig. 21 and 22.



Figure 21: *Bernard d'Agesci* Museum. Francis Gires room. *Top*: Optics and Heat showcase. *Bottom*: Properties of gases.

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



Figure 22: *Bernard d'Agesci* Museum. Ruedi Bebie 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*, an important traveling exhibition of the instruments displayed in the book published in 2004. The exhibition travelled through several French towns: Périgueux, Bordeaux, Pau. See Fig. 23.

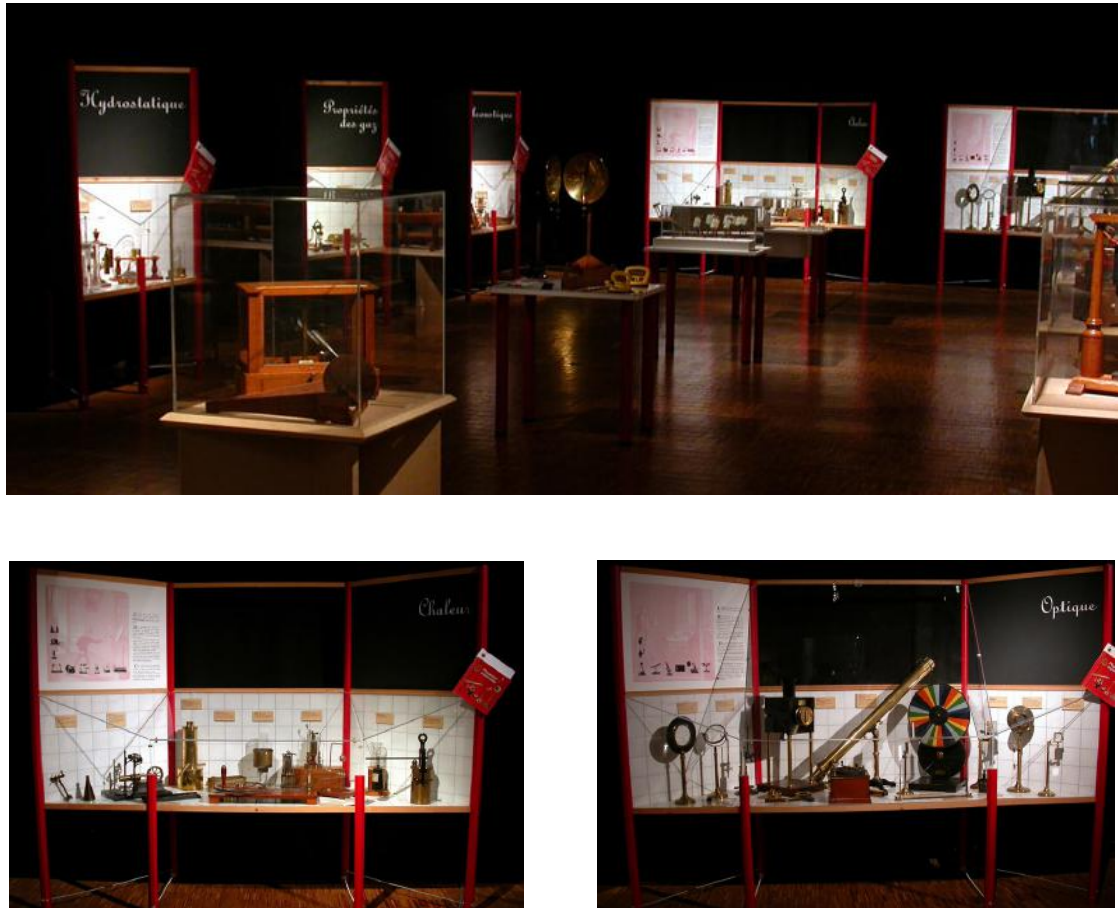


Figure 23: The *Physique impériale* exhibition (2005). *Top*: general view. *Bottom left*: Heat. *Bottom right*: Optics.

- on the occasion of the *Sigaud de la Fond* commemoration in Bourges in 2010: an exhibition of XVIII<sup>th</sup> century instruments organized by members of the ASEISTE (Sébastien Bourdreux, Jacques Cattelin and Christelle Langrand). See Fig. 24.
- 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.

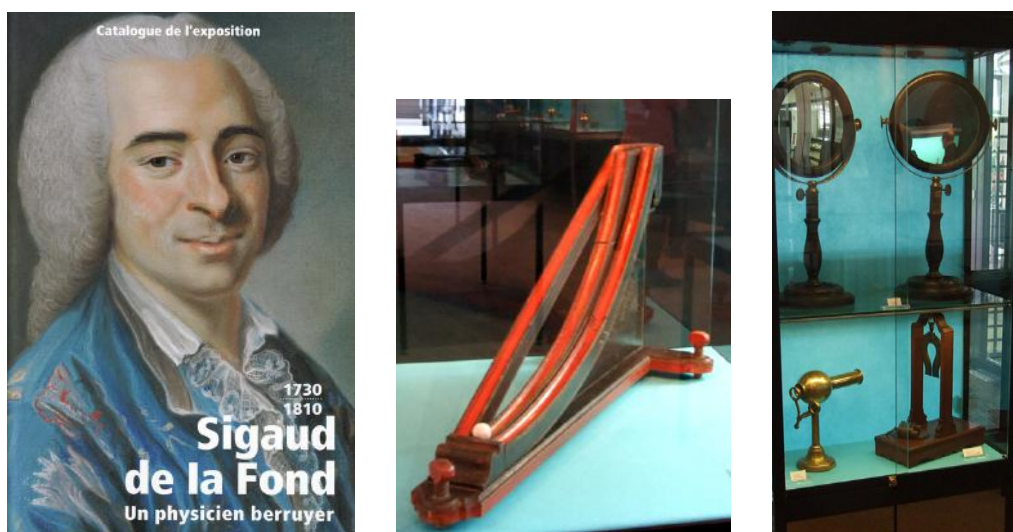


Figure 24: The *Sigaud de la Fond* exhibition in Bourges (2010).

## 5 Projects and Conclusion

A considerable amount of work has been done by the ASEISTE to retrieve, 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. Not forgetting the invaluable voluntary contributions of the association's membership.

For the near future, the ASEISTE has some projects:

- as previously said, the near publication of *L'Empire des sciences naturelles* (03/2013);
- 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 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, the ASEISTE would be interested in the instruments produced by the famous French manufacturers and lying in foreign schools collections. To contact the ASEISTE, just e-mail to Francis Gires <giresfrancis@free.fr>.

