

A historical perspective of Ganot's book in Maharashtra

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Translation plays an important role in the transmission and diffusion of knowledge from one geographical location to another. India has a long and rich tradition in this process. From the time of astronomer king Jai Singh and later with the colonial British rulers, science education evolved and transformed with this translation process of foreign texts into vernaculars. The translation of Adolphe Ganot's physics books may be viewed from this perspective. Ganot's physics books, particularly his 'Traité' and 'Cours' were popular throughout the world in the nineteenth century. India was no exception. In English, these were known as books on natural philosophy. The only Indian language in which his book 'Cours' was translated was Marathi. The present note gives a brief overview of the translated version of Ganot's 'Cours' in Marathi.

Communication is the essence of new knowledge created. It is never static; always mobile. It is true for all types of scholarly endeavours, including science. The mobility of knowledge is the backbone behind the creation of societies at large. Whether it is Indian astronomy, or the Arabic number system, or Newton's theory of physics, the transfer of all the newly created knowledge helped to build modern societies. It gave the power to people to transform their own lives. And 'translation' gave this mobility to the knowledge transfer process. The translated versions of science texts are not just another copy in a new language; rather they are the originals in those translated languages. And this is the way science and its ideas move across the boundaries and become universal¹.

India went through a series of metamorphosis in its education sector during the nineteenth century. It was the time when the British colonialists gradually took administrative control over India. As a result, along with other spheres, the Indian education system was also gradually transformed from its indigenous version to the system which the British put in place. As part of this process of proliferation of so-called modern Western education in India, a need arose to have textbooks on the modern science subjects. This led to either the writing of books in native languages or translating English language books in vernaculars. However, this tradition of translating science books written in foreign languages into vernaculars is an old one in India.

Background

Possibly it started with the famous Indian king and astronomer Jai Singh (1688–

1743). He took the initiative of translating the works of Ptolemy and Euclid into Sanskrit and Persian. In its initial days, the British took the 'engraftment' route, i.e. trying to teach European science with the foundation of traditional texts used in India. Keeping that aim in mind, it started translating the vernacular texts like *Bijaganita*, *Lilavati* and others into English. However, due to some concern about its impact on the importance of European education on the Indian minds, they stopped these translation projects. Rather, they decided to reverse this process, i.e. translating English books into vernaculars, and established several Vernacular Translation Societies and Native School Book Societies throughout the Indian subcontinent². For example, the Calcutta School Book Society was established in 1816. The primary purpose behind the establishment of these societies was to identify and make available text books used in local schools either translated in vernaculars or in English (p. 161)³. For example, the English mathematics textbooks were translated into such vernaculars as Hindi, Arabic, Urdu, Bengali, Marathi and Oriya².

However, this translation of English texts into vernaculars was stopped after Thomas Macaulay's (1800–1859) report to the British Parliament, more popularly known as 'Macaulayan Minute' (1835). This reversed the process. Now, English was used as the preferred medium of instruction in schools. Macaulay was of the opinion that it may be the job of the Indians educated in English to develop their own vernaculars and not otherwise. This was reflected in the works of Yesudas Ramachandra (1821–1880) with the publication of *Musallas-o-Tarashai Makhrooti was Ilm-i-Hindsasahb-Algebra* (1844). It was a compilation in trans-

lated version from Hutton's *Trigonometry*, Boucharlat's *Conic Sections* and Simon's *Analytical Geometry*. The same trend was found with the translation of Barnard Smith's *Arithmetic for Indian Schools* in Urdu and Hindi². During the late nineteenth century, this trend was also found in the translation of the popular geology books into Tamil language⁴.

Ganot and his books

In the nineteenth century, translation of French physics textbooks into other languages was a common practice. However, even from that perspective, it can be said that Adolphe Ganot's books were more popular than other physics textbooks. It is proved from the number of languages in which his books were translated. In the nineteenth century itself, his *Traité* was translated into 11 languages. These were as follows: Italian (1852), Spanish (1856), Dutch (1856), German (1858), Swedish (1857–1860), Spanish (Paris, 1860), English (1861–1863), Polish (1865), Bulgarian (1869), Turkish (1876) and Serbian (1876–1877). Here, the years mentioned in the brackets are the dates of publication of the first editions. Later, in the early twentieth century, his *Traité* was again translated into Chinese and Arabic⁵. Akbaş did a comprehensive study for the Turkish editions of Ganot's *Traité*. This was first published in Turkish in 1876 under the title *İlm-i Hikmet-i Tabiiye* in Istanbul by Antranik Gircikyan (1819–1894). As we shall note later, like the Marathi edition of the *Cours*, this Turkish edition of Ganot's *Traité* also carried a lot of illustrations from the original⁶. *Traité* was also translated into Russian in 1898 by Florentij Fedorovič Pavlenkov (1839–1900)⁷.

The presence and use of physics books of Pierre Benjamin Adolphe Ganot (1804–1887) in the 19th and early 20th century Bengal is already known⁸. We learnt that the English versions of his books were used in the classrooms of colonial Bengal. The English translations of his books were first published by Franco-British publisher Hippolyte Bailière (1809–1867). Later, Longmans published the English translations of his books. The translations were done by Edmund Atkinson (1831–1900). In English, these were known as books on natural philosophy. But, the only Indian language in which Ganot's book was translated is Marathi. His *Cours de physique purement expérimentale* was first translated in Marathi in 1898 (Simon⁵ mentioned it as 1899). Interestingly, his other famous book *Traité* was not translated into any Indian language^{5,8}. In this regard, it may be noted that *Traité* was targeted more towards the science students, whereas *Cours* was written keeping in mind the general audiences. It is reflected in the fact that *Traité* carried mostly the illustrations of scientific instruments and without the presence of persons. However, *Cours* is full of artistic illustrations with the presence of persons as a part of the experiments. The title page of the Marathi version of *Cours* (electricity and magnetism part) is reproduced in Figure 1.

History of the Marathi translated versions

The title page of this translated version presents it as a book on the *Basic Principles*

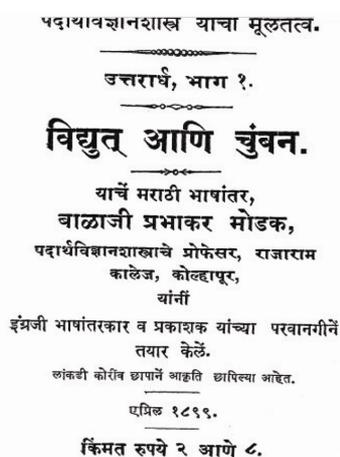


Figure 1. Title page of a part of Ganot's *Cours* in Marathi.

of *Physical Sciences*. It was published in several parts. The present book is part one. It deals with electricity and magnetism⁹. The Marathi title of the book is *Bidyut ani chumban (Electricity and Magnetism)*. The Marathi translation was done by the renowned nineteenth century promoter of science education and research in Maharashtra, Balaji Prabhakar Modak (1847–1906)¹⁰. At that time, he was a professor of physical sciences at Rajaram College, Kolhapur. The title page mentions that it was done with the permission of the publisher and the editor of the English version. From this statement it is clear that the Marathi translation was not done from the original French edition, but from the English translation of the book. Woodcut illustrations were used in the book using stencils. The book was printed at the Nirnaya-sagar Press, Bombay (in Marathi, it is mentioned as Mumbai). It was a hardback book, published in April 1899. The price was Rs 2 and 8 anna. The second part of the book was on heat. It was published in October 1900 (ref. 11).

From the preface of this book⁹, it is known that His Highness Gaikwad of Baroda was the real spirit behind this endeavour. By the orders of His Highness Gaikwad of Baroda, one Professor Gajjar started a series called *Shreesayaji Jnanamanjusha* to publish scientific books. For this purpose, Gajjar asked Modak to translate Ganot's book. This began the process of translation of Ganot's *Cours* in Marathi. As part of this series, Modak translated the first part of Ganot's book on common properties of materials and overall attraction forces, liquid and gaseous state physics in 1898. However, the publication under this series came to a standstill soon and no other part of Ganot's book was published. Later, His Highness Gaikwad of Baroda allowed any other publisher to publish the already translated manuscripts under this series. It also came to light that Modak planned to translate the whole book in four parts. First part was already published as mentioned above. The other planned parts were: *Sound and Light, Electricity and Magnetism and Heat*. Modak also informed us that he planned to publish the images used in the books using stencils. However he faced some problems in this work. He acknowledged the help of Balasaheb Mirajkar in procuring these stencils for the current *Electricity and Magnetism* volume.

Two maps were used in the *Electricity and Magnetism* part. The cover page of the book was printed in colour. The maps and the coloured cover page were printed at the famous printing press of Pune, Chitrashala. Modak also noted that at that time English medium students who appeared at the USF examination were learning physics through Ganot's books. In view of this, he hoped that if the Government establishes high schools using Marathi as the medium of instruction, then as his translations of Ganot's books are based on the original texts, there may not be any objection in using them as the physics textbooks in those schools. He also highlighted the anomaly in the Government's education policy here. He mentioned that the Government wanted to ensure that only those candidates who passed USF examination with physics and chemistry should get Government jobs. But, then, strangely, the Government did not ensure the teaching of physics and chemistry in the teachers' training colleges for the prospective teachers in the Marathi medium schools⁹.

Modak was a sponsor of science education through the vernacular language. In order to teach science through Marathi, he himself wrote and translated various science books into that language. His first science book was on inorganic chemistry, entitled *Rasayan Sastra: Purvardha*. It was an important publication in the history of science education though Marathi language. Translating Ganot's and others' books in Marathi was an endeavour in that direction. The Department of Public Instruction (DPI), Bombay Presidency encouraged him to translate Ganot's book. That his translations of Ganot's books were used widely in Maharashtra is proved from the fact that the then DPI, Bombay Presidency, Chatfield, instructed all libraries through a circular to purchase Modak's translation of Ganot's *Electricity and Magnetism*¹⁰.

Modak delved on his thoughts on education and education policy in the preface of the *Heat* part¹¹ (*Ushnata* in Marathi) of the book. Here he also mentioned that for helping the Government job-seekers, he translated a small biology book from English to Marathi. He was of the opinion that his efforts may help students to learn science in their mother tongue, i.e. Marathi. Like the *Electricity and Magnetism* part, here also he expressed his opinion that Marathi should

be the medium of instruction in schools. He also added that education should not be a costly affair and it is possible to provide high-level education in Marathi at a low cost. It may be learnt from the preface that during this period there was a discussion in Pune and Dharwad about the establishment of Marathi schools. Modak was motivated to express his opinions about the prevalent education system because of his interest in changing the same to spread education among the masses. From the preface we come to know that Modak worked in the Government education department for last 31 years. Possibly, this helped him understand and comment on the colonial education system prevalent in Maharashtra at that time. He added that during this period, the syllabus was changed three times. He was critical of the syllabus preparation authorities. According to him, the present syllabus did not encourage students in critical thinking. He was of the opinion that under the present system, the students took nine years to learn things for which they should not take more than 4–5 years.

According to Modak, students were not learning enough even after spending 8–9 years in schools. He was of the opinion that anyone interested in higher education needs to learn English from the initial years. And if anyone is interested in a Government job in railways or post office, he needed to study English for 2–4 years more. Modak was dissatisfied with the procedure of the syllabus revision in Marathi schools. He felt it was not uniform. He was concerned about the quality of education imparted in Marathi schools. He added that a fifth or sixth grade Marathi medium student was learning what the English medium student already learnt in his first, second and third grades. He was bothered about the pressure and stress of various subjects in lower classes. He wanted to reduce the number of subjects in these lower classes and increase them in the higher classes.

Modak divided subjects in two categories: subjects which can be learnt by memorization and intelligence. He reasoned that as the students do not develop the critical thinking power in the early years, they should be taught those subjects which are learnt through memorization process. Subjects which require critical thinking powers may be taught later based on this foundation of basic

knowledge. Later he discussed about his thoughts on books on grammar, history and geography. He also emphasized the importance of handwriting of the children. He opined that by the fourth standard, children should be aware of basic calculation, letter writing, grammar, basics of history and geography. Students should have the freedom of choosing their medium of instruction, i.e. Marathi or English after class four. Modak wanted to have incremental change in the syllabus with the higher classes. But he noted with dismay that this was not the case. This was particularly true for the fifth, sixth and the seventh classes.

As the course contents of the Marathi upper standards and the first three standards in English were the same, according to Modak, students of the vernacular schools were good in all subjects but in English. But, in the reverse case, according to him, students were good only in English. He also added that the handwriting of the English medium students was not good. According to Modak, as the English medium students did not receive benefits as such even after spending more money behind it, the situation may be improved by employing English teachers in the vernacular schools. He clearly states that as the country was under British rule, the students had to learn English. This was specially true for those who wanted to get jobs in the Government sectors. He was of the opinion that after the primary levels, the students could enter the English medium schools or Marathi medium schools with English. He was confident that every student has the capacity, courage and intelligence to

learn English without going to faraway places.

Modak rued the lack of enough middle-level Marathi medium schools. As a result, students were deprived of education in their mother tongue. He wanted more such Marathi schools where English should be available as a second language and other subjects taught in Marathi. This would help all types of local students to expand their knowledge of the English language. This would ultimately help them to get better jobs. He emphasized the importance of establishing new vernacular high schools. He thought that these schools did not require much funds. One or two graduates and other teachers from Marathi high schools with English knowledge could run these schools. This could be implemented gradually. He once again placed importance on learning English as a second language. This, according to him, should help get new teachers. This should help spread education with low cost. He added that he was not against English medium schools. Rather he wanted to teach primary classes in vernacular. He was confident that if this option was available, most of the students would choose it. This could ultimately lead to the closing down of the English schools. He wanted the education authorities to consider this opinion¹¹.

Unique features of the Marathi version

There were several reasons behind the worldwide popularity of Ganot's books throughout the world⁸. Figure 2 shows a



Figure 2. Electricity experiment in a Marathi version (p. 98).

page from the translated version of the *Cours* in Marathi language. It shows an experiment on electricity.

The interesting point is that this picture (Figure 2) is adapted from the *Cours de physique purement expérimentale* of Ganot. Figure 3 proves this point. Figure 3 is taken from the book *Cours* by Ganot. It may be noticed that some changes were incorporated in the Marathi version to make it localized. The persons became Marathis with local dresses. The watch in the original picture is missing in this version. But the other aspects of the image remain the same. Interestingly, the shoes worn by the people in the Marathi book remain the same as in the original version. The number of persons in both the images is the same (10 in number). Their postures in both the images are identical. Perhaps, it was the ingenuity and foresight of Modak to change the personnel of this and other pictures from persons of the Western world to local people to whom the book was targeted. Possibly, it touched the right chord with the local students of Maharashtra who could identify themselves with the contents of the book meant for them.

Figure 3 was published in the first¹² and second editions of the *Cours* (1859) with girls (p. 462). But, the third edition presented the same picture with boys, as shown in the Figure 2. However, the ninth edition (1887 renewed by Georges Maneuvrier after Ganot's death) did not carry this picture. From this, it may be conjectured that the Marathi version used the third edition of the book. The picture refers to an experiment by Jean-Antoine Nollet (1700–1770), also known as Abbe Nollet (Abonolet in the translation), a physicist. In the 18th century, he debated with Benjamin Franklin (1705/1706–1790) about electricity¹³. Nollet did many physical experiments in the court of King Louis XV (ref. 14). It may be noted that the same picture is used in some other books of Ganot. It was used in the sixth edition (1887) of Ganot's *Natural Philosophy* (translated in English by Atkinson) with boys (p. 445). This picture was also used by W. G. Peck in his *Introductory Course of Natural Philosophy for the Use of Schools and Academies*. It was 'edited from Ganot's *Popular Physics*' with girls (p. 416)¹⁵.

Another interesting feature to note is the fact that in the Marathi version in all the figures the persons are dressed with

Marathi clothes (p. 69, 80, etc.), but the furniture remain in the European style (p. 213, 220, etc.). The same is true for the buildings also (Figure 4)⁹.

Also, the Marathi version (p. 80)⁹ carried some images which were not avail-

able in the original French version (p. 454)¹². This happened because the Marathi version was translated from English text (p. 502)¹⁶ and not from the original French text. So, we may conclude that the Marathi version of Ganot's *Cours* is

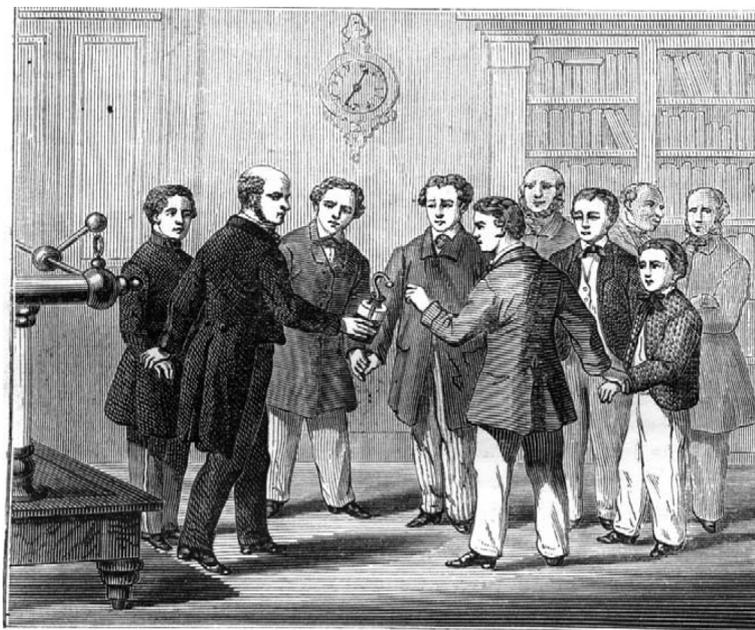


Figure 3. Static electricity experiment in Ganot's *Cours* (p. 476).



Figure 4. A building used in the Marathi book (p. 162).

HISTORICAL NOTES

an example of both translation and adaptation to suit the needs and requirements of the targeted audiences, i.e. Marathi students.

Conclusion

It may be noted that this book was first published in 1859. By 1884, eight editions of the book were published in France. And during the same period, 64,500 copies of the book were sold in France. The nineteenth century saw its translation in six languages (English-New York, 1860; Dutch, 1862; Italian, 1868; English, 1872; Spanish, 1873 (ref. 5); and Marathi (ref. 9). More information on this popular physics textbook writer in India may help us to shed light on the physics education in the country during the colonial era.

Presently, in Maharashtra, the University of Mumbai has a copy of the *Elementary Treatise on Physics* by Ganot. It is the English translation of the book. The translation was done by A. W. Reinold and E. Atkinson. It was published from London by Longmans Green & Co in 1902. It also has a copy of *Ushnata*, translation of *Heat* (*Ushnata* in Marathi) by Ganot. It was translated by Modak and published in 1900. Pune University also has copies of the *Heat* volume in its library.

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