Original Research Article

200TH BIRTH ANNIVERSARY OF THE GENETICS FOUNDER GREGOR MENDEL. ART MEDALS.

ABSTRACT

Objective: To explore and introduce into scientific circulation art medals – tangible historical sources studied by medal art, a section of the special historical discipline of numismatics, related to the life and work of Gregor Mendel.
Place and Duration of the Study: Institute of Food Biotechnology and Genomics of the National Academy of Sciences of Ukraine, from January to April 2022.
Methodology: Both general scientific (historical, logical) and special (subject-chronological, retrospective) methods were used in the work. Numismatic and biological literature, materials of international numismatic auctions, and websites of world mints have been studied.
Results: Art medals of the Czech Republic, the USA, Germany, Austria, Portugal and the European Community relating to life and scientific heritage of Gregor Mendel have been studied and described.
Conclusion: The study has become a new step in the development of the history of biological science, supplementing the knowledge of the artistic reflection of the origins of genetics in the art of medal. Material historical sources – art medals, enabled us to capture the pages of the biography and scientific work of Gregor Mendel in a new plane, introducing the medals into scientific (biological) circulation.

Keywords: art medal, genetics, genomics, Gregor Mendel, Mendel's Laws, numismatics

1. INTRODUCTION

The 200th birth anniversary of Czech-Austrian scientist Gregor Johann Mendel (1822-1884), the pioneer of the study of heredity - genetics, will be celebrated on July 20, 2022. Without diminishing the importance of written sources in the study of history, it is necessary to appreciate the ever-increasing significance of material historical sources. First of all, we mean objects studied by auxiliary (or ancillary) sciences of history: numismatics, bonistics, phaleristics, philately, etc. Using the information contained in coins, medals, banknotes, postage stamps and other material sources, one can study the history of branches of science (biology, medicine, physics, chemistry, etc.), types of arts (painting, music, sculpture, architecture, etc.), geography, politics [1]. Reflection in the material historical sources of a prominent figure of science, literature, art, etc., is not subject to any laws. There are many examples where not a single postage stamp, coin or table medal is dedicated to an outstanding person. Another situation is with the image and scientific heritage of Gregor Mendel. They are widely reflected in material historical sources: philately [2, 3], philocarty

[3], and numismatics (including medal art) [3-9]. The publication of images on postage stamps, coins, medals, etc. in specialized philatelic, numismatic publications, and auctions [10-12] cannot be considered the introduction of these tangible historical objects in scientific (biological) circulation. Neither can the publication of images in biological journals without providing the technical parameters of medals and "legends" (images and inscriptions) claim such an introduction [3, 5, 8].
This paper is aimed to investigate and introduce art medals featuring the life and scientific work of Gregor Mendel into the scientific biological circulation.

2. MATERIALS AND METHODS

Both general scientific (historical, logical) and special (subject-chronological, retrospective) methods have been used in the work. Collection, analysis, and interpretation of data on the art of the Order were carried out with the help of specialized books, catalogs, and journals (numismatic and biological). We also found valuable information by researching various numismatic Europian and USA trading platforms such as eBay, DOROTHEUM, Tilman Dohren Briefmarken & Münzen, MA-SHOPS, Delcampe and information on world mints.

3. RESULTS AND DISCUSSION

Johann Mendel was born in 1822 in Heinzendorf bei Odrau, Silesia, Austrian Empire (now Hynčice, Czech Republic) in the peasant's family. Owing to financial problems in his family, Johann was attracted to the Augustine St. Thomas monastery of Brünn (now Brno, Czech Republic). He was accepted as a novice in 1843 and received a classical theological education at the local seminary. After his ordination in 1847 (the name «Gregor» was adopted then), he spent a year as a parish priest. But Gregor Mendel preferred teaching mathematics and Greek in a local school at Znaim (now Znojmo, Czech Republic). Mendel spent 2 years studying science in the University of Vienna. From 1854, he taught physics and natural history in lower school of the Brünn Modern School as an Assistant Teacher as he could not obtain his teaching certificate for the second time. From 1856 to 1863, Mendel undertook his detailed classic experiments on pea hybridization at the St. Thomas monastery in a garden plot sized 35 m long and 7 m wide [2, 5].

A series of medals related with Brünn (Brno) were created by the Czech sculptor V.A. Kovanič. This series started with two award medals: the Czechoslovak Academy of Sciences (Fig. 1 and 2) and the Mendelianum Society, which exists in the Moravian Museum (Brno) [6]. These medals were created in 1965 to mark the 100th anniversary of Mendel's report on his classic work "Versuche über Pflanzan-Hybriden" (Experiments in plant hybrids) at two meetings of the Natural History Society of Brünn in Moravia. In 1984, "Mendelianum" commissioned a medal [5] to commemorate the 100th anniversary of Mendel's death. Between 1965 and 1984, a souvenir medal of the same sculptor, commissioned by "Mendelianum" (Fig. 3 and 4), appeared.

All medals are characterized by the same obverse - a profile portrait of Mendel turned to the left and an inscription along the edge of the medal field, on the left and right: "GREGOR", "MENDEL" (Fig.1 and 3).

The reverse of the Czechoslovak Academy of Sciences medal (Ø 59.5 mm, bronze) - is written in Latin. Above a two-line inscription: "ACADEMIA SCIENTIARVM/BOHEMOSLOVENICA" (CZECHOSLOVAK ACADEMY OF SCIENCES). Below the inscription: "MUSEUM ·MORAVIAE BRVNENSE" (MUSEUM MORAVIA BRNO). The middle part of the reverse bears a five-line inscription: "IN MEMORIAM/ SAECVLAREM/ DOCTRINAE MENDELIANAE/ 1865 1965" (IN MEMORY OF MENDEL'S

SECULAR DOCTRINE) separated from the upper part of the reverse by crossed pea stalks with flowers, and from the lower part by a laurel branch (Fig. 2).

The reverse of the souvenir medal (Ø 60 mm, bronze) shows a multi-subject composition: a globe, a telescope, a barometer, books, scrolls against the background of the pyramids and the sea with a ship (Fig.4). Above and below of the composition there are inscriptions: “MENDELIANVM” (MENDELIANUM) and “MVSEVM MORAVIAE” (MORAVIAN MUSEUM). The composition of the reverse side is probably associated with Mendel’s teaching of natural history and his research in the field of astronomy and meteorology. Mendel made observations of sunspots. As an experienced meteorologist he wrote the accurate description of a tornado that tore through the monastery.

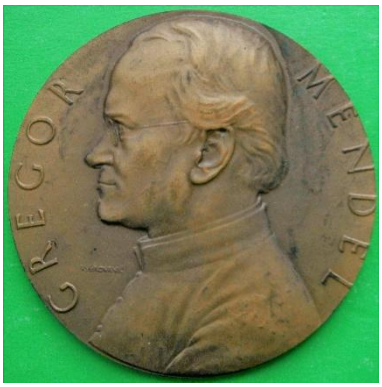

Fig. 1. Czechoslovak Academy of Sciences medal (obverse)

Fig. 2. Czechoslovak Academy of Sciences medal (reverse)

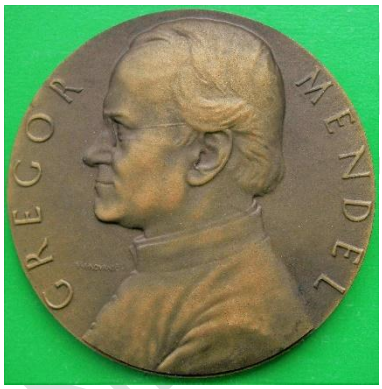

Fig. 3. “Mendelianum” medal (obverse)

Fig. 4. “Mendelianum” medal (reverse)

From 1974 to 1980, the Franklin mint (USA) minted a series of medals “History of Science in Medals”. Among them was a medal (Ø 39 mm, silver) dedicated to Gregor Mendel. On the obverse (Fig. 5) - two images of the scientist: wright - a bust of Mendel facing three-quarters of the left portrait, and Mendel, squatting in his garden with pea sprouts in his hands. On the left - pea sprouts and pods. On the reverse (Fig. 6), above - image of a man on the background of the solar system. Lower half of the reverse - text: “GREGOR MENDEL / 1822–1884 / DISCOVERER OF THE FUNDAMENTAL LAWS / OF HEREDITY. CROSS FERTILIZING DIF- / FERENT VARIETIES OF PEA PLANTS, / HE FORMULATED THE MENDELIAN / LAWS THAT BECAME THE FOUN- / DATION OF MODERN GENETICS“.

Fig. 5. G. Mendel. USA medal (obverse)

Fig. 6. G. Mendel. USA medal (reverse)

On the basis of numerous experiments on pea hybridization with detailed accounting of all types obtained hybrids and variational-statistical processing of experimental results Mendel for the first time established, substantiated and formulated the basic heredity laws. The First Law - Law of Segregation: Each inherited trait is defined by a gene pair. Parental genes are randomly separated to the sex cells so that sex cells contain only one gene of the pair. Offspring therefore inherit one genetic allele from each parent when sex cells unite in fertilization. The Second Law - Law of Independent Assortment: Genes for different traits are sorted separately from one another so that the inheritance of one trait does not depend on the inheritance of another. The Third Law - Law of Dominance: An organism with alternate forms of a gene will express the form that is dominant [11]. Mendel's Laws are reflected in the medal art.

In the last third of the XXth century, the German medal (Ø 35 mm, Ag 925) was minted [12]. Obverse (Figure 7): profile, bust, left-turned portrait of Mendel, circular inscription in German -« GREGOR MENDEL 1822 HEINZENDORF GEWIRKT IN BRÜNN » (GREGOR MENDEL 1822 HEINZENDORF WORKED IN BRUNN 1884). Reverse (Fig. 8): in the center - illustration of the first and second Mendel's laws, circular inscription in German - «SEINE ENTDECKUNG 1865 DIE VERERBUNGSGESETZE» (HE DISCOVERED 1865 THE LAWS OF INHERITANCE). The illustration of Mendel's first and second laws cannot be considered ideal.

Fig. 7. G. Mendel. German medal (obverse)

Fig.8. G. Mendel. German medal (reverse)

In 2000, the Austrian Mint minted a series of «GROSSE ÖSTERREICHER» medals, including an interesting medal (Ø 40 mm, Ag 925, Proof) dedicated to Mendel [13]. Obverse (Fig. 9): wright - Mendel's bust facing three-quarters left, left - schematic representation of

Mendel's third law, above there is a circular inscription in German - «GROSSE ÖSTERREICHER» (GREAT AUSTRIANS), below the images, horizontally «1822-1884», and circular «GREGOR MENDEL». Reverse (Fig. 9): coat of arms of Austria with the coats of arms of nine states, at the top a round inscription in German - «ÖSTERREICH» (AUSTRIA).

Figure 9. G. Mendel. Austrian medal (obverse and reverse)

As shown above, the portrait of Mendel is on a number of medals (awards and souvenirs) of scientific, educational and cultural institutions.

In the 1970s until to 1990s, the sculptor S. Machado created and the Mint of Portugal minted a medal (Ø 80 mm, bronze) dedicated to the College "Mendel" of Augustinian Brothers in Madrid, Spain. A beautiful bust facing three-quarters left portrait of the scientist occupies most of the obverse (Fig. 10). Left, right and bottom inscriptions: "GREGOR/ MENDEL/ 1822-1884". On the reverse (Fig. 11) there is the coat of arms of the educational institution and inscriptions above and below: “COLEGIO MAYOR “MENDEL”/PP. AGUSTINOS” (HIGHER COLLEGE “MENDEL”/PP. AUGUSTINES).

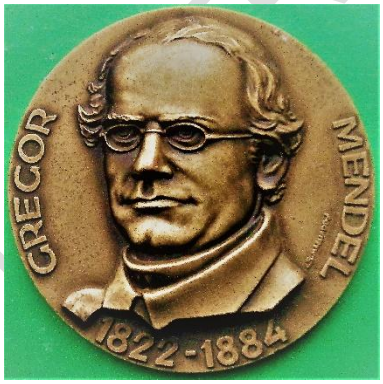

Fig. 10. G. Mendel. Portugal medal (obverse)

Fig. 11. G. Mendel. Portugal medal (reverse)

On 30 March 1868, Mendel was elected abbot of St. Thomas Monastery. His new duties involved many civic responsibilities that took him away from his scientific work. He remained calm, despite the lack of recognition of his work. Shortly before his death on 6 January 1884,

he commented: “My scientific work has given me great pleasure, and I am convinced that soon the entire world will praise the result of this work” [14].

The European Community Mint has minted medals in advance (in 2021) to commemorate the 200th anniversary of Gregor Mendel’s birth [15], gold (Ø 30 mm, gold 999.9, 200 copies) and silver (Ø 30 mm, silver 999, 2000 copies). The central part of the obverse (Fig. 12) is occupied by a portrait of Mendel, above a circular inscription in German: “200. GEBURTSTAG GREGOR JOHANN MENDEL” (200TH BIRTHDAY OF GREGOR JOHANN MENDEL”. Reverse (Fig. 13) – the coat of arms of abbot G. Mendel.

Fig. 12. G. Mendel. EC medal (obverse)

Fig. 13. G. Mendel. EC medal. (reverse)

Mendel’s abbey Coat of Arms consists of a hat, a miter, a cross and a pectoral cross of the prelate. The shield is divided into four quadrants: the cross and the plow in the upper right represent Mendel’s priestly vocation to sow the seeds of the Gospel; the alpha and omega in the lower right corner represent Christ as the One from whom creation began and in whom it finds fulfillment; the lily at the top left is the emblem of the Blessed Virgin and represents purity; the burning heart and joined hands at the bottom left are symbols of the mercy and community of the Order of Augustin, to which Mendel belonged [14].

4. CONCLUSION

Mendel remains one of the great biologists of the nineteenth century and a source of inspiration for one of the most challenging sciences of our time, genetics. The study of tangible sources – artistic medals as an integral part of the historical study, is the important stage in modern historical research.The study has become a new step in the development of the history of biological science, supplementing the knowledge of the artistic reflection of the origins of genetics in the art of medal. The award and commemorative desktop medals have been studied and described, which allow anyone interested in the study of the history of genetics to get acquainted with the work of the founder of the science of heredity - the Czech-Austrian scientist Gregor Mendel. Studied medals have been introduced into scientific biological circulation.

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