CLASSIFICATION AND NOMENCLATURE
OF ANAMORPHIC IMAGES

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Abstract. The author of this paper has dealt with geometrical aspects of creation and restitution of ana-morphic images in his research work for many years. The goal of this particular publication is to intro-duce scientific classification of various types of anamorphic images and to unify nomenclature so that it will be used correctly in further publications. The sub-division used here is open for the further devel-opment and can be completed with new insertions.

Key Words: anamorphic images (=anamorphs), geometric transformations, descriptive geometry

1. Introduction

It is a common phenomenon that the authors of numerous publications dealing with specific cases of anamorphic images use incidental and very often misleading expressions and names to describe these types of images. The goal of this work is to introduce scientific clas-sification of various types of anamorphic images and to unify nomenclature so that it will be used correctly in further publications.

The nomenclature system has been developed by taking into account the type of restitution method. All anamorphic images can be assigned into two basic groups. To the first group will belong these images, which restitution does not require any mirror's application. A precise defined observer's stand-point on the proper direction of observation or locus being a point of observation must be determined. To the second group will belong these images for which restitution requires not only setting an observation stand-point but also a mirror must be prop-erly defined.

2. Anamorphic Images - Basic Classification

Dependent on the restitution method of anamorphic images we divide all anamorphic im-ages into two groups:
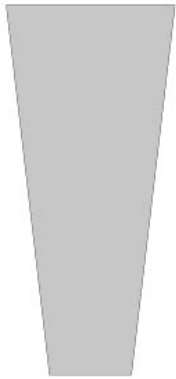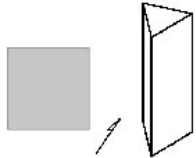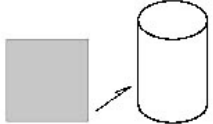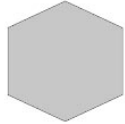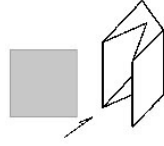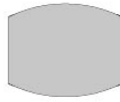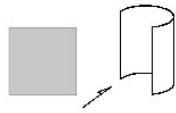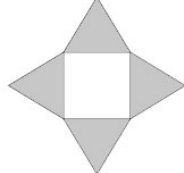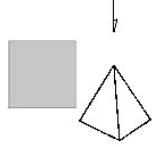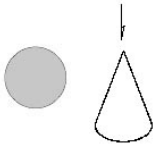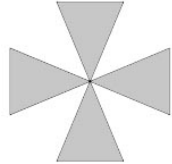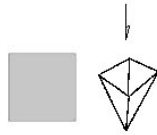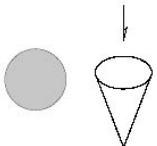
1. **Superficial anamorphic images** – these, which restitution does not require mirror's application
2. **Reflective anamorphic images** - these, which restitution requires mirror's applica-tion. In literature the term "mirror anamorphs" can be found to describe this group of anamorphic images.

2.1. Superficial anamorphic images

To the first group of superficial anamorphic images will belong:

1a. Plane superficial anamorphs– planar anamorphic images, which have been com-posed in a single plane and restitution of which will require observation from the de-termined stand-point

1b. Folded superficial anamorphs- to this group will belong these anamorphic images, which will be created on the unfolded net of a geometrically spatial figure. In this case the restitution requires a spatial figure to be folded up at first. Then its observa-tion from the initially defined, determined direction will be performed.

Table 1: Classification of the superficial anamorphic images based on the shape of the image and restitution field

SUPERFICIAL ANAMORPHS				
plane	folded			
	convex prismatic		convex cylindrical	
image shape	image shape	restitution	image shape	restitution
	concave prismatic		concave cylindrical	
	image shape	restitution	image shape	restitution
	convex pyramidal		convex conical	
restitution	image shape	restitution	image shape	restitution
	concave pyramidal		concave conical	
	image shape	restitution	image shape	restitution

The folded superficial anamorphs will undergo further sub-classification based on the type or shape of a geometrically spatial figure, which faces serve to be image planes. Thus, the folded superficial anamorphs can be:
- Convex Prismatic
- Concave Prismatic
- Convex Pyramidal
- Concave Pyramidal
- Convex cylindrical
- Concave cylindrical

- Convex conical
- Concave conical

The above described system characterizes openness for the further development. To give an example, further diversification can be introduced based on the change of inclination of the axis of a spatial figure in reference to its base plane.

2.2 Reflective anamorphic images (=mirror anamorphs)

The second group of **mirror anamorphs** can be divided into sub-groups based on the shape of a mirroring surface or on the way of its application. These sub-groups can be:

2a. Plane mirror anamorphs
- Singular – with a single, planar restituting mirror,
- Compound (plural) – with a larger number of restituting mirrors,
- Pyramidal – for which restituting mirrors have a common point of convergence.

2b. Cylindrical mirror anamorphs
- Convex
- Concave

2c. Conical mirror anamorphs
- Convex
- Concave

Table 2: Classification of the reflective anamorphic images based on the type of restituting surface and their application

This sub-division will also be open for the further development. To give an example one can describe such anamorphic images, which will be composed on the broken projection planes or restituted in the revolving surface of a mirror, while the axis of revolution of a mirror will be inclined in reference to the image plane. The classification described above has been presented in tabular form. In Table 1 we have categorized superficial anamorphic images. There are schematic icons presenting a shape of anamorphic image together with a corresponding shape of a field of restituted image. In Table 2 we have categorized reflective anamorphic images together with symbolic icons showing possible place of application.

Further discussion will be continued by taking into account the terminology and nomenclature described in this paper. Prior to analyzing specific transformations, a wide literature research has been conducted in order to find referenced publications in the field of anamorphic images. However, in contemporary literature in the field of descriptive geometry, no publications from this area have been found. In historical publications some suggestions have been found in which the authors discuss the problem of creation of deformed anamorphic images and promote geometrical approach to their construction. This problem will undergo further research.

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KLASYFIKACJA I NAZEWNICTWO OBRAZÓW ANAMORFICZNYCH

W dostępnych materiałach bibliograficznych opisujących konkretne przykłady obrazów anamorficznych spotykano dość przypadkowe, a często mylne określenia czy nazwy związane z nimi. W opracowaniu tym podjęto próbę uzasadnionej klasyfikacji oraz ujednolicenia ich nazewnictwa.

Systematyka podziału na dwie podstawowe grupy:
1) anamorfozy powierzchniowe,
2) anamorfozy refleksyjne

została przeprowadzona na podstawie sposobu restytucji obrazów anamorficznych. Zatem w grupie pierwszej mówić będziemy o obrazach, których odtworzenie nie wymaga stosowania żadnych luster, a jedynie doboru stanowiska obserwacji ze ściśle określonego kierunku, czy też miejsca jako punktu obserwacji. Natomiast w grupie drugiej sklasyfikowano te obrazy, których odtworzenie, oprócz doboru odpowiedniego stanowiska, wymagać będzie również stosowania odpowiednich zwierciadeł. Dalsza, szczegółowa klasyfikacja oparta jest na podziale z uwagi na kształt oraz właściwości powierzchni na jakiej powstaje obraz anamorficzny (walcowe, stożkowe, itd.) oraz sposób jego usytuowania (anamorfozy pionowe, pochylone, ścienne, podłogowe, itd.).