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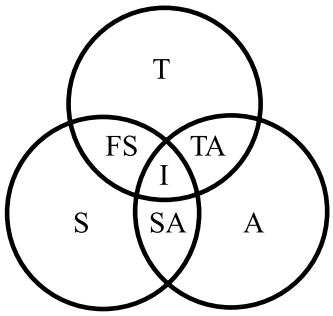
The Beauty of Formative Art

The elegance of exquisite contrivance and the beauties of design in nature fascinate human being. The root of human activities in Science and Arts (S and A) is originated from the sense of wonder for the natural phenomena. A man who is attracted to the contrivance in nature became a scientist in order to elucidate its details. On the other hand, a man who is fascinated to the beauty of the design in nature became an artist, who considered moving man's heart by showing the most beautiful product that surpasses the natural beauty. One of the common concepts of S and A is sometimes represented by the word "elegance" or "beauty".

How can define the interdiscipline between S and A? In order to look for a clue of the problem, let us consider not only the concept between S and A but also a research activity surrounding S and A. Great masters as Leonardo da Vinci and Albrecht Dürer were well grounded in both S and A. However, S and A began to go their respective ways by the rise of positivism as represented by Sir Isaac, Newton. Furthermore, the conspicuous advance of the technology follows the advances of science. At present, the technology is regarded as an independent *genre* derived from science.

The original concept of S and A today allows certain latitude in the definition. It is classified into interdisciplinary category between Science and Arts (Scientific Arts: $S \cap A$), between Science and Technology (Frontier Science: $F \cap S$), between Arts and Technology (Technology Arts: $T \cap A$) and an Integration of Science, Technology and Arts (Integration: $I = S \cap A \cap T$). A new category is shown in Venn diagram.



Field Category Set

T : Technology

S : Science

A : Arts

Interdisciplinary Field Category Set

SA=S∩A : Scientific Arts

FS= S∩T : Frontier Science

TA=T∩A : Technology Arts

I = S∩A∩T:
Integration of Science, Arts and Technology

Here, we give a brief definition for the interdisciplinary field category as follows.

Scientific Arts (SA): Artwork produced on the basis of the algorism in the mathematics, geometry and physics. Essay of the artwork written from the scientific viewpoint. Scientific paper in which a beautiful pattern or solid is obtained.

Technology Arts (TA): Artwork produced using the current technology as an expression, the works of computer graphics (CG) and the holography art.

Frontier Science (FS): Current advanced technology obtained by the result of the basic scientific research. Research paper expected to effect on the technology for the product of Arts.

Integration of Science, Arts and Technology (I): Creation of art products using advanced technology. Scientific research which produce the creation algorism of arts product.

As for Scientific Arts (SA), we introduced already several works in the special issue "The World of Scientific Arts" (*FORMA*, Vol. 9, No. 4, 1994). In this new special issue "The Beauty of Formative Arts", we classify the papers according to the new categories. Two geometric research papers present a new type of polyhedron (AHARA, K.), and a new classification of polyhedral kaleidoscopes (SCHWABE, C.) (category SA). A review presents the techniques for visualizing inside the human body through the images such as X-ray CT images. This is a basic research for the application to navigation observation inside the human body (TORIWAKI, J.) (category SF). The virtual sculpting system with a pressure sensitive pen and a tablet is a typical application of CG for Arts (MIZUNO, S. etc.), (category TA). Another application of current technology is holography. It is shown that the various characteristics of holography enable new expressions that cannot be realized through the existing mediums of expression (ISHII, S.) (category TA). The solid model of the 3D quasi-Fuchsian fractals is introduced by the fractal geometry (ARAKI, Y.). 3D Escher pattern, 3D jigsaw puzzle and Rainbow cube are produced on the basis of the concept of crystallography (WATANABE, Y. etc.). Every solid model is built using the layer manufacturing (category I).

Many scientists are fond of drawing picture, playing or listening to music. On the other hand, some artist creates the products based on the geometrical or mathematic concept. Two essays presented here, express an artistic mind in scientist (TAKAKI, R.) and a scientific mind in artist (CLAHSEN, P.) by their works (category SA). Please notice both are the handmade products. The origin of the concept, "Science and Arts" is yet alive at present.

New column "Art Column" and "Art Gallery" has been introduced in *FORMA*. We welcome for artists to submit their artistic paper, essay or art products to *FORMA*. Fortunately, *FORMA* will be published as a web journal, it is available for media arts such as animation or movie.

Editors would like to appreciate to authors for their cooperation's to publish the special issue.

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Yasunari WATANABE
(Chief editor of this issue)