艺术的本质
及其
与科学的关系

The Nature of Art and Its Relationship to Science
Categories of Arts

• Visual art (painting, drawing, sculpture, photo...)

• Film

• Literature

• Performing art (dance, drama, body/action art, linguistic...)

• Music

• Architecture

• Designing art

• New media arts (photonic, digital...)

• ...

• ...
A collection of failed attempts in **defining** art

A collection of failed attempts in **interpreting** art
Dutton’s 12 features of art

1. Direct pleasure
2. Skill and virtuosity
3. Style
4. Novelty and creativity
5. Criticism
6. Representation
7. Special focus
8. Expressive individuality
9. Emotional saturation
10. Intellectual challenge
11. Art traditions and institutions
12. Imaginative experience

Unfortunately, all these features are shared by the other creative discipline called physics, and hence are not unique to art.
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**The Nature of Art**

_Thomas E. Wartenberg_"
Nature of Arts
For a long time, art was associated with aesthetics. No longer so.

Wu Da-Yu  吳大羽  1903–1988

- 1922–1927: Study in Paris
- 1928: Head, oil painting dept., National Art Academy, Hangzhou
- Students: Zhao Wujie, Wu Quanzhong, Zhu Dequen...
The Puzzle of Arts

- Arts are not always about beauty but could be about (all kinds of) emotions, too
- It is also about the description and interpretation of everything else in nature
  — just like in physics, say
- And it could be about “nothing”
- It is somehow constrained by human nature, too
Two Types of Arts

Applied Arts

Pure Arts

The puzzle
The Emergence of Arts

Human History
- 1.6 million years ago, first use of fire; more complex stone tools created
- 400,000 years ago, earliest evidence of cooking
- 195,000 years ago, modern humans (Homo sapiens) appear
- 60,000 years ago, second wave of migration out of Africa

- Mimesis (to mime, imitate, gesture, rehearse of skill) was there 2 million years ago.
- Three days of heavy rains. What would they do? They created arts to kill time.
- Arts was the first safe job in human history!
- Applied arts could start 1 million years ago; pure arts, later, when community large enough to support professional artists, about 10,000 years ago.
Five criteria of pure arts that last:

1. Aim at receiver’s neurons
2. Kill time
3. Kill time gently and harmlessly
4. Passivity (physically speaking)
5. Human creation or intervention

Content and form of pure arts are secondary, to support Criteria 2-4 only!

PS: In the near future of AI-robots people will have more free time to kill; arts (and entertainment) will play an important role in the new economy
Art and Science
### Arts and Science

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<tr>
<th>Characteristics</th>
<th>Arts</th>
<th>Science</th>
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<tr>
<td>Both are part of science</td>
<td>Arts processes and studies are part of science (artworks not)</td>
<td>Mostly about nonliving systems</td>
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<tr>
<td>Different aims</td>
<td>Arts aim at receiver’s neurons</td>
<td>Science aims to understand how nature works</td>
</tr>
<tr>
<td>Receiver</td>
<td>Arts need a receiver to appreciate the artwork</td>
<td>Science needs no receiver (but has to compare with Nature, the ultimate judge)</td>
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<tr>
<td>Different history</td>
<td>Arts started at least 35,000 (could be 1 million) years ago</td>
<td>Science started about 2,600 years ago since Thales (c. 624-c. 546 BC), after the invention of language and writing</td>
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**Relationships between arts and science**

- Both involve creative process *(for different reasons)—but same in many other human activities*

- **Arts are humans’ creation, reflecting on the world of human and nonhuman systems; the principles governing this world are the same principles (e.g., symmetry, spontaneous symmetry breaking, fractal, chaos, active walk) studied by scientists**

- Progress in science (and related technology) advances the development of arts; e.g., pigments → color painting, film/camera → photographic art, electricity → cinema, laser → photonic art, computer → digital art
The Importance of Arts

Cai Yuanpei (蔡元培):
1868–1940

Science and art to culture, is like the two wings of a bird, the two wheels of a cart.

Tsung-Dao Lee (李政道):

Science and art are as inseparable as the two sides of the same coin; the coin is culture.

They are wrong!

Reasons:

• Art and science appeared at very different times
• They are separable
• Ancient Greece run quite well before science appeared

Art and science are two (of three) major pillars of any modern civilization!

• Ethics exist since millions years ago (when broken, will cause instability of the civilization)
• Art, at least 35,000 years ago (cave art)
• Science, 2,600 years ago
Artist and Scientist
Artist’s science is generally better than scientist’s art, it seems
Past - attempted

《核子重如牛，对撞生新态》。这是1989年李可染为中国高等科学技术中心举行的“相对论性重离子碰撞国际学术研讨会”创作的主题画

吴作人的《无尽无极》。1988年5月，中国高等科学技术中心举办“二维强关联电子系统国际会议”。吴作人在看了李政道的科普介绍后，用“两仪”变形图案表现二维强关联电子系统。
Artist and scientist go watching sunset together
Recommended for artists and scientists

Buy my two books and read Chapter 1
Conclusion

• Arts appeared at least 35,000 years (cave art) ago, very likely 1 million years ago

• Arts could be divided into applied arts and pure arts (just like in any discipline)

• Pure arts is to kill time gently, harmlessly and passively; the different means/contents (changed with time) are vehicles to achieve this aim

• Arts and science both are
  • Creative processes
  • Differ very much from each other in their aims and history
  • Both reflect nature
  • Arts are constrained by human nature; science constrained by nature

• Progress of science did influence significantly the development of arts, but not vice versa
Su Dong-Po
1036-1101, Song Dynasty
Poet, painter and mandarin

Bamboos and Stones
106 cm x 28 cm, partially shown

Some bamboo leaves are detached from stem

Modernism: Paint the essence of things
Su said that 800 years ahead of Paul Cézanne
Take Home Message

Art makes our life worth living
Science makes our life comfortable

Art is much more important than science!