

Ei and Scientific Writing and Publishing

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The Process of Building a Database of Scientific Knowledge

- We have been doing this for more than 120 years.
- How do we do it?
- Collect, categorize, and disseminate engineering information.

Ei收录情况及Ei在中国的收录情况

- Ei收录5,100多个刊
 - 2,600核心刊
 - 2,500非核心刊
 - 17%会议论文
 - 175学科
- 中国期刊297
 - 111核心刊
 - 186非核心刊
 - www.ei.org.cn for more information

Ei in China — 在中国的发展

- 1998年在清华大学建立中国镜像点
 - Ei是第一家在中国建立本地镜像的数据出版社
- 1998年11月中国大学集团成立
- 至今已有近200多用户，包括130多所高校

Introduction to Engineering Village

- www.engineeringvillage2.com.cn
- Ei collection since 1970
- More than 7,000,000 records
- Fastest search engine in the world
- Updated weekly
- Full text link enable
- Chinese mirror site

Communicating in Science

Publish is the goal of scientific research

Importance of Scientific Writing

- *The Space Shuttle Challenger Accident*
- *Katrina Damages to the New Orleans Area*

Scholarly Communication

- By publication
 - Reports
 - Articles
 - Proposals
 - Web pages
- By Speech
 - Conferences
 - Lectures
 - Meetings
- Optimally do so in English

Scientific writing differs from other kinds of writing

- To inform
- To persuade

Publication

Writing a Scientific Paper

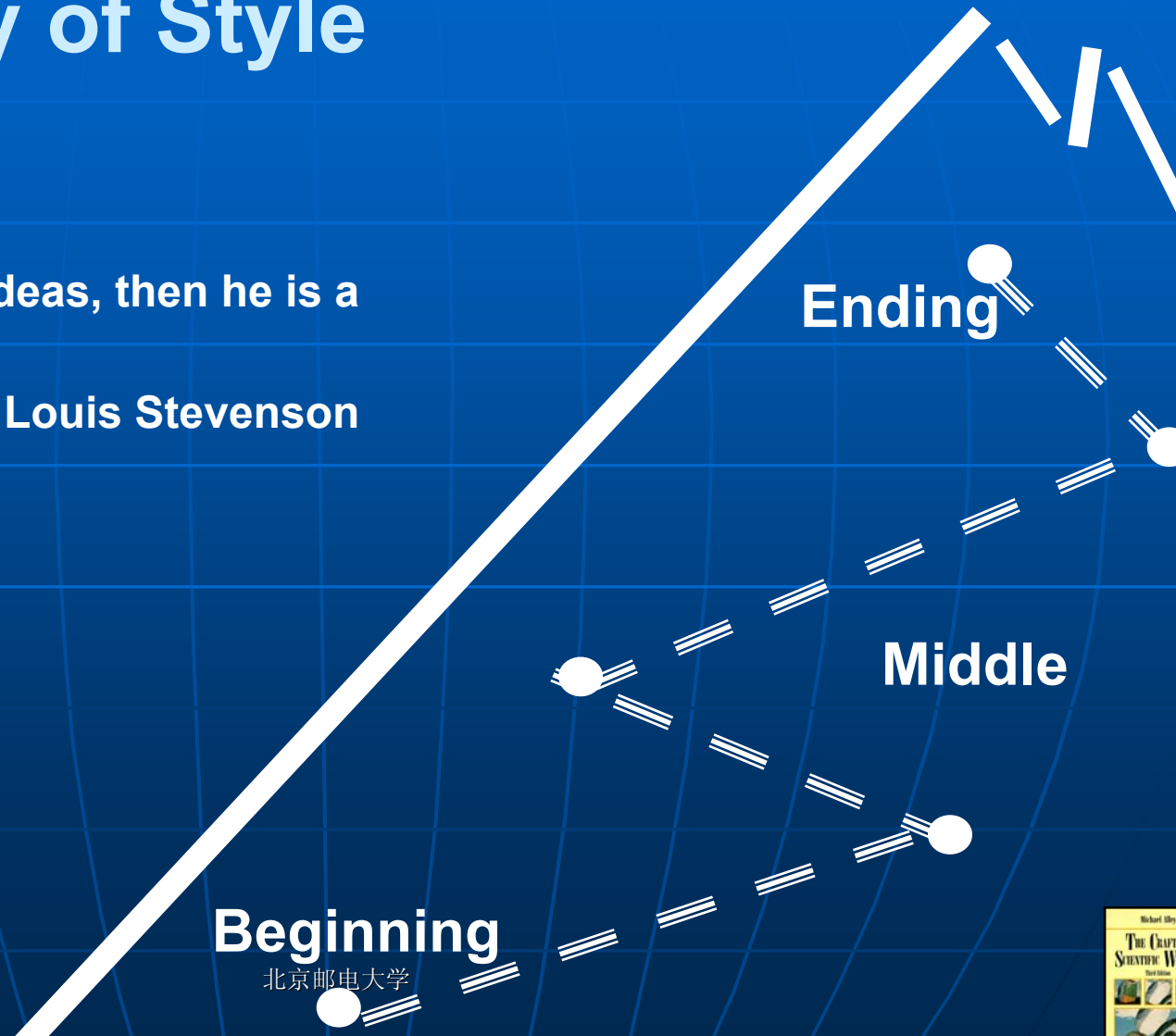
“The goal of scientific research is publication.” -
Robert A. Day

- Structure and protocol
- Language
 - Clarity
 - Precision
 - Objectivity

Structure: the Strategy of Style

If a man can group his ideas, then he is a
writer.

Robert Louis Stevenson



Beginnings prepare readers for understanding the work

Title orients readers to document



Summary tells readers what happens in document



Introduction prepares readers for the middle



A strong title orients readers to your area of work

**Effects of Humidity
on the Growth
of Avalanches**



**Effects of Humidity
on the Growth
of Electron Avalanches
in Electrical Gas Discharges**



A strong title also separates your work from everyone else's work

**Studies on the
Electrodeposition
of Lead on Copper**



**Effects of Rhodamine-B
on the Electrodeposition
of Lead on Copper**



Several names for summaries exist

Summary

Technical
Abstract

Informative
Abstract

Abstract

Descriptive
Abstract

Executive
Summary



Although several names exist for summaries, there are essentially two approaches

This paper describes a new inertial navigation system for mapping oil and gas wells. In this paper, we will compare the mapping accuracy and speed for this new system against the accuracy and speed for conventional systems.

Descriptive

This paper describes a new inertial navigation system that will increase the mapping accuracy of oil wells by a factor of ten. The new system uses three-axis navigation that protects sensors from high-spin rates. The system also processes its information by Kalman filtering (a statistical sampling technique) in an on-site computer. Test results show the three-dimensional location accuracy is within 0.1 meters for every 100 meters of well depth, an accuracy ten times greater than conventional systems.

Informative



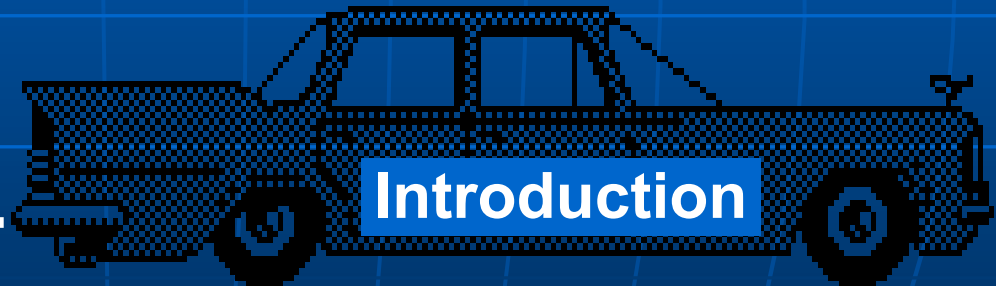
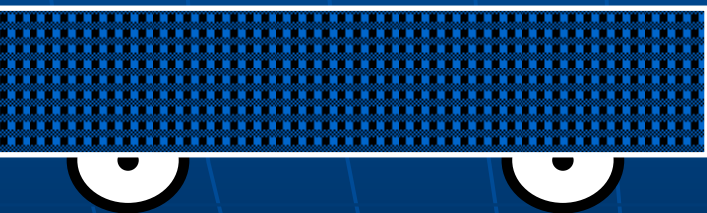
A document's introduction prepares readers for the discussion

Topic?

Importance?

Background?

Arrangement?



The introduction defines the scope and limitations of the work

Women may not experience the same effects

Medical histories not considered

scope

**Proposed Study
on Effects of Alcohol
on Life Expectancy**

**Three classes of drinkers:
non-drinkers
moderate drinkers
heavy drinkers**

Ten-year study

Men surveyed

Other effects, such as exercise, not considered

limitations



Many journal articles follow a set organization named IMRaD

Introduction

Materials and Methods



Discussion



In a strong ending, you analyze results and give a future perspective

Conclusions

Analysis of Results

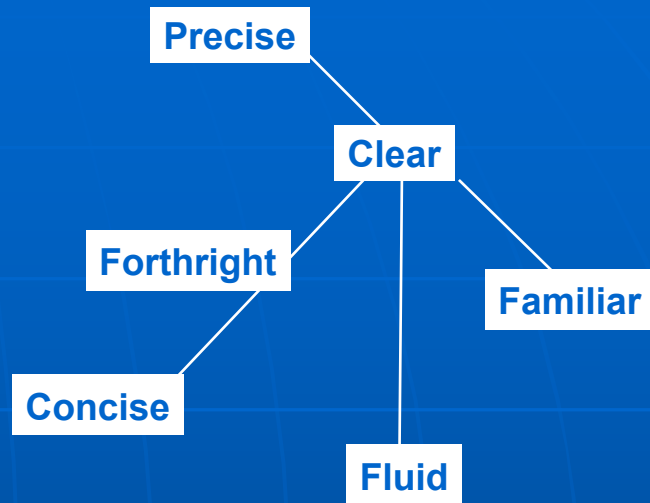
Analyze results from overall perspective

Future Perspective

*Several options:
Make recommendation
Discuss future work
Repeat limitations*



Language: the Way We Use Words



Short words are the best, and short words when old are best of all.

Winston Churchill



For precise language, you should avoid over-specifying details

The number of particular hydrocarbon combinations in our study is enormous. For example, the number of possible $C_{20}H_{42}$ is 366,319 and the number for $C_{40}H_{82}$ is 62,491,178,805,831.



The number of hydrocarbon combinations in our study is enormous. For example, the number of possible $C_{40}H_{82}$ is more than 62 trillion.



For precision, you must choose the appropriate level of detail

Operations at the plant stopped momentarily because the thermal storage charging system desuperheater attemperator valve was replaced.



Operations at the plant stopped for 1.5 hours so that a valve in the thermal storage system could be replaced.



Stacking adjectives before nouns swallows the idea

Solar One is a 10 megawatt solar thermal electric central receiver Barstow power pilot plant.

→ Solar One is a solar-powered pilot plant located near Barstow, California. Solar One produces 10 megawatts of electricity by capturing solar energy in a central receiver design.



One measure for the complexity of the writing is the Gunning Fog Index

In the index, the complexity of the writing depends on
(1) the lengths of sentences
(2) the lengths of words

Desired index values for scientific writing are 10-12:
New York Times (11)
Scientific American (12)

$$F_i = 0.4 \left((N_w / N_s) + P_{lw} \right)$$

N_w = number of words in a *typical* paragraph

N_s = number of sentences in the paragraph

P_{lw} = percentage of long words in the paragraph



Ambiguities occur for many reasons

The proposed schedule is discussed below for the next four years.

??????????

As light hydrocarbons evaporate the oil vapor pressure falls.

??????????

Although engineers realized the design flaws in the Titanic soon after its sinking in 1912, the reasons for the severe damage inflicted by the iceberg remained a mystery until its discovery in 1985.

?????



Pretentious diction often causes problems with tone

approximately

facilitate

implement

individualized

operationability

utilization

about

cause; bring about

carry out

individual

can operate

use



Conclusion

- Communication skill is essential for scientists and engineers
- Publication is the goal of research
 - Learn to inform and to persuade effectively
 - Learn to convey your idea clearly
- Scientific research is not complete until the results have been published
- The education of a scientist is not complete until the ability to publish has been established

Thank you!

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