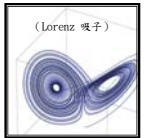
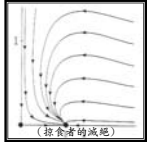


國內外期刊論文寫作 (自然科)

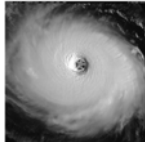
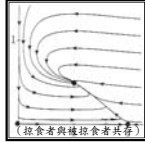


台北海洋技術學院

郭鴻基 教授

教育部國家講座教授
台灣大學終身特聘教授
中興大學講座教授
台灣大學大氣科學系

10/12/2009



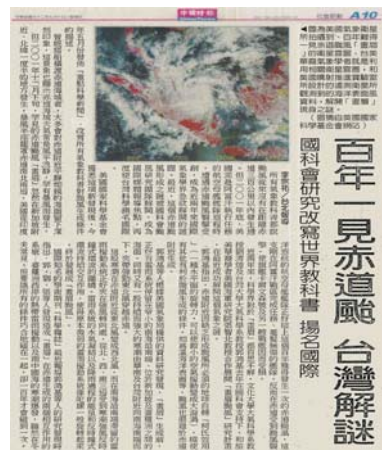
Politics are for the moment
An equation is for eternity



動力與模擬研究室

郭鴻基 教授

- 颱風與渦旋動力
Typhoon and Vortex Dynamics
- 數學建模、計算與科學研究數學
Mathematical Modeling, Computations,
and Scientific Research
- 地球物體流體力學
Atmospheric and Oceanic Fluid
Dynamics
- 兩度空間亂流
Two-Dimensional Turbulence



文學 Metaphor 隱喻

史記 水滸傳 (金聖歎的奇書)

遇洪而開 (洪水猛獸 風雨之不時 無世而不有)

王進 不墜父業 善養母志 (求忠臣於孝子之門)

高毳封相 108人來也 王進遠走 亂自上作也

王進教史進武藝 林冲夜奔 朝中無人

廣軍士大夫一軍皆哭, 百姓聞之 知與不知
無老壯皆為垂涕 史記李廣列傳 (李廣不候)

讀、寫、算

寫作是最高階的研究工作

謀篇布勢 規模遠大 綜理密微 文字精確

太史公以李廣不候為主旨寫李廣列傳,

『一軍皆哭, 百姓聞之, 知與不知, 無老壯皆為垂涕。』

水滸傳以高毳拜相、王進遠走開篇, 言亂自上也。

遠景 策略 價值觀

天行健、君子以自強不息-----個人
見群龍無首、吉-----社群
美成在久-----價值觀

形成重視學術的傳統，健全的不屈不撓的學風，它之存在與持續，是代表人類保障文明最好的希望。 ---耶魯大學校長

舊學商量加邃密
新知涵養轉深沉 朱子

學而時習之 習者，鳥學飛數數反覆

讀書譬之煎藥，須是以大火煮滾，然後以慢火養之 朱子



讀 算 寫

幾何
代數
微積分
電腦計算繪圖
數學建模/科學計算



學而不思則惘
思而不學則殆

寫作是高階層的思考
精確的文字圖形表達

Now we only see models,
like reflections in a mirror;
but then we shall see face to face.
Now I only know partially;
but then I shall know as fully as
I am myself known.

St. Paul, 1st letter to the Corinthians, 13:12

Models、經典、聖哲就如鏡子，讓我們看到自己，讓我們瞭解自己的侷限，更進而體會完整的人性。

「數學科學模式」幫助我們由片面觀察的自然界，統會瞭解共通完整的科學定律。

大學生基礎教育:重視學習系統的知識，讀別人整理、組織好的知識，教科書或課本講義的廣泛使用；

研究生須先有堅實的專業基礎知識，研究生更需要培養三種能力：

- (1) 檢索、篩選、組織知識的能力、
- (2) 對既有知識精確批判的能力、
- (3) 創造新知識的能力。

期刊論文閱讀與分析的能力
是一個研究生登門入室的最基本條件

知識爆炸的時代！

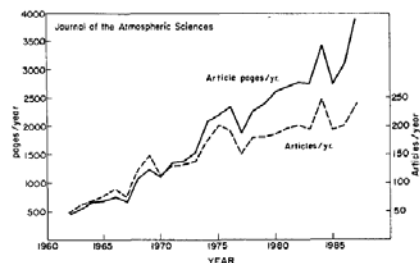
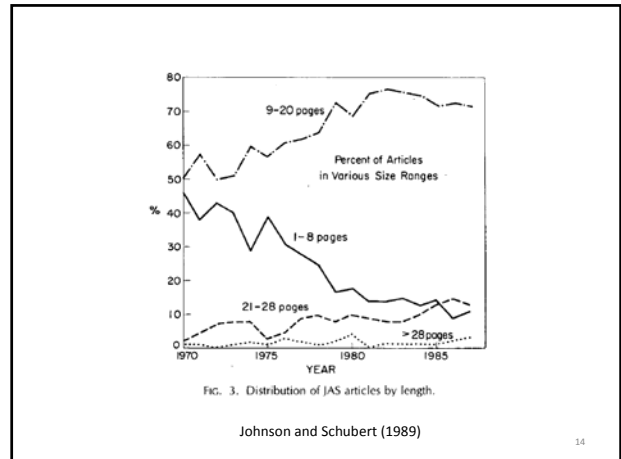
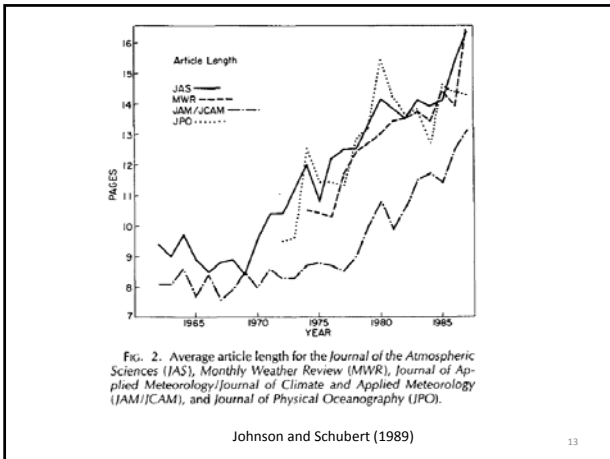


FIG. 1. Number of article pages per year and articles per year for the Journal of the Atmospheric Sciences.

Johnson and Schubert (1989)



SCI : Science Citation Index

The Institute for Scientific Information (ISI, Eugen Garfield 1958)

SCI 論定期刊 (經過整理的研究成果)

- 格式嚴謹
- 條理分明
- 方法精準
- 立論明確

Easily Found by Search Engines

15

Impact Factor (影響因子)
Total citations/Total papers (up to that year)

Highly Cited Paper

Journal Cited Half Life

Journal Immediacy Index

H index

學科差別很大 論文類型亦大不相同

16

“Six monkeys, set to strum unintelligently on typewriters for millions of years, would be bound in time to write all the books in the British Museum.” Huxley

君子致用在乎經邦，經邦在乎立事，立事在乎師古，師古在乎隨時。必參古今之宜，窮終始之要，始可以度其古，中可以行於今。通典

共49個字，假設中文常用字為1000字，共有 10^{147} 個選擇

地球歷史 10^{18} sec
 10^{10} 一百億隻猴子在打字，假設每秒鐘打一萬字 10^4 ，
 $10^{10} \times 10^{18} \times 10^4 = 10^{32}$
 $10^{32} / 10^{147} = 10^{(-115)} \sim 0$ 機率為零，不可能的巧合！

學問研究寫作是苦心孤詣的事業！不要人云亦云！

17

數學模式

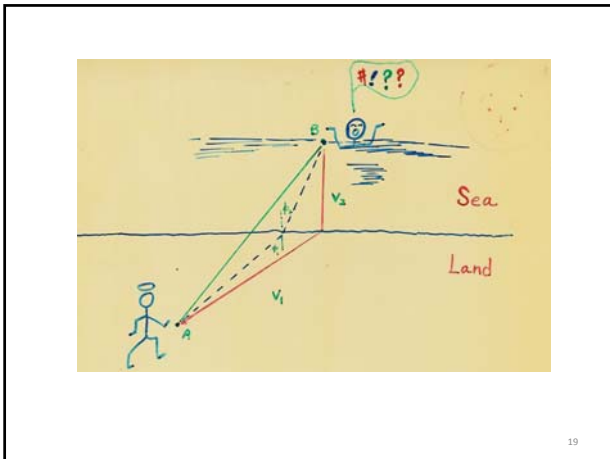
理論、觀點 Theory

False facts are highly injurious to the progress of science, for they often endure long; but false views, if supported by some evidence, do little harm, for every one takes a salutary pleasure in proving their falseness.
Darwin, The Origin of Man, chapter 6

解釋資料
Never trust an observation without a supporting interpretation

預測 準確性 預測能力
資料同化 利用科學數學模式整合有限的觀測，建構出較完整的資料

18



This is the Snell's Law.

一樣觀魚多樣情！

Normal
Apparent position
Actual position

FIGURE 5.13 The refraction of light as it passes from the water into the less-dense air causes a fish to appear closer to the surface than it actually is.

- (1) 魚快樂嗎？
- (2) 熱血沸騰，立志革命！
- (3) 折射定律，最小原理。

Occam

Wikipedia

(1285 ~ 1349)
English Philosopher

Occam's Razor:
"What can be accounted for by fewer assumptions is explained in vain by more."

以特殊事實為憑藉，逐漸推廣引伸，成立概念式定律的系統，以便籠罩更複雜廣泛的對象，科學家依據事實為前提來證明普遍的結論。 方東美

吾生也有涯，吾知也無涯，已有涯逐無涯，殆矣。
有限時空之觀察或有限資料去推導無限時空的科學定律。

問蒼茫大地誰主浮沉？
有物有則 因果律 為什麼？ 形而上學

有限事實 → 理想（數學）模式 → 解釋 驗證 預測

即使我們是天才或諾貝爾獎得主，也不可能一次就完成一篇完美無缺的論文。

撰寫論文是**研究活動**中一項非常重要的部分，而非研究計畫完成後一項額外的工作。

一個人文章論點寫得清楚，表示這個人頭腦也清楚。

增進自己寫作的品質，等於同時也訓練自己嚴謹和準確的**思考**習慣。

增進自己的**寫作能力**與**溝通技巧**，是培養自己成為專業科學家或工程師非常重要的一步。

- 撰寫論文的架構
- 清楚簡潔的英文
- 通順的句子
- 統一連貫的段落
- 提升論文的可讀性
- 避免字詞誤用

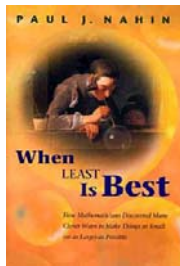
25

1. 選擇一個值得研究的題目
2. 熟悉相關的文獻
3. 明確論文提供給讀者的主要訊息
4. 擬定一個臨時標題
5. 選擇合適的期刊
6. 閱讀期刊的作者指南
7. 決定論文基本結構
8. 根據論文結構收集和整理資料
9. 圖表設計
10. 擬出論文各個部分的寫作提綱
11. 撰寫初稿
12. 即時改錯
13. 醞釀初稿
14. 修改及核對
15. 請人編輯英文
16. 請同行專家審閱初稿
17. 尋找可能的審稿人
18. 線上投稿與附信

26

論文標題

- 反映主題且簡潔具體
- 選詞準確
- 使用國際通用術語
- 引人注目



論文內容

0. Abstract

1. Introduction (Background + Purpose)
2. Method (Models, Analysis Technique)
3. Results
4. Conclusion (Summary; Concluding Remarks)
5. References

27

Abstract

1. Background
2. Purpose
3. Method
4. Results
5. Conclusion

注意：簡潔緊湊
多用過去時態及被動語法

28

A Possible Mechanism for the Eye Rotation of Typhoon Herb

HUNG-CHI KUO

Department of Atmospheric Science, National Taiwan University, Taipei, Taiwan

R. T. WILLIAMS

Department of Meteorology, Naval Postgraduate School, Monterey, California

JEN-HER CHEN

Central Weather Bureau, Taipei, Taiwan

(Manuscript received 9 January 1998, in final form 20 July 1998)

ABSTRACT

An elliptical eye that rotated cyclonically with a period of approximately 144 minutes in Typhoon Herb 1996 was documented. The elliptical region had a semimajor axis of 30 km and a semiminor axis of 20 km. Two complete periods of approximately 144 min were observed in the Doppler radar data. The rotation of the elliptical eye in the context of barotropic dynamics at three levels were explored: linear waves on a Rankin vortex, a nonlinear Kirchhoff vortex, and with a nonlinear spectral model. The linear wave theory involves the existence of both the high (potential) vorticity gradient near the eye edge and the cyclonic mean tangential flow in the typhoon. The propagation of (potential) vorticity waves in the cyclonic mean flow makes the elliptical eye rotate cyclonically. The rotation period is longer than the period of a parcel trajectory moving in the cyclonic mean flow around the circumference, because the vorticity wave propagates upward. The nonlinear theory stems from the rotation of Kirchhoff's vortex. Estimates of the eye rotation period from both linear and nonlinear theories agree with observations of the eye rotation period when the observed maximum wind from Herb is used. Nonlinear numerical computations suggest the importance of the interaction of neutral vorticity waves, which determine the shape and the rotation period of the eye. The calculations also support the rotation of the eye in approximately 144 min in the presence of axisymmetrization, vorticity redistribution, wave breaking, and vortex merging processes.

Introduction

General

First stage: General statements about a field of research to provide the reader with a **setting** for the problem to be reported.

Second stage: More specific statements about the aspects of the problem **already studied** by other researchers.

Third stage: Statements that indicate **the need for more investigation**.

Fourth stage: Very specific statements giving **the purpose/objectives** of the writer's study.

Specific

注意：
篇幅不宜太長
文獻不是越多越好且討論有直接相關的部分
“本研究前無古人”說法千萬不要

30

Method

Overview of Experiment
 Sample
 Restrictions/Limiting conditions
 Sampling technique
 Procedures
 Materials
 Variables
 Statistical treatment

注意：實驗對象及環境要描述詳細
 實驗設計和數據分析要恰當

31

Result

Element 1: a statement that locates the figures where the results can be found.

Element 2: statements that present the most important findings.

Element 3: statements that comment on the results.

Comment may:

1. generalize from the results;
2. explain possible reasons for the results;
3. compare the results with results from other studies.

注意：呈現有代表性的數據
 呈現數據方式要恰當：文字或圖表？
 用過去時態及主動語態

32

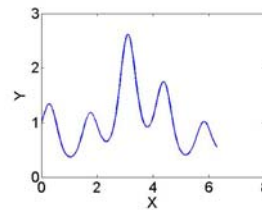
圖表的編制

- 自成一體解釋力強
- 標題說明（圖說）簡明完整
- 文字說明簡明完整
- 能用圖盡量不用表

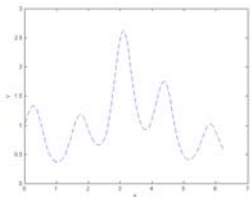
Error Free ?!

33

Clear figure

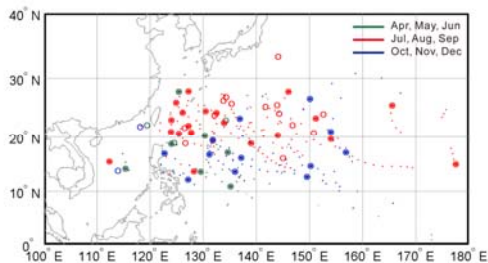


Obscure figure

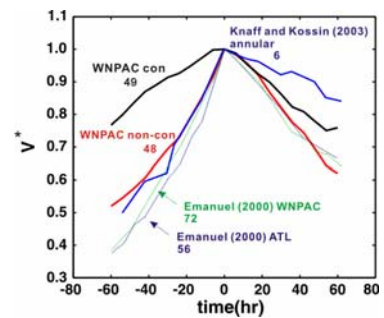


Labels are too small
 Line is not clear

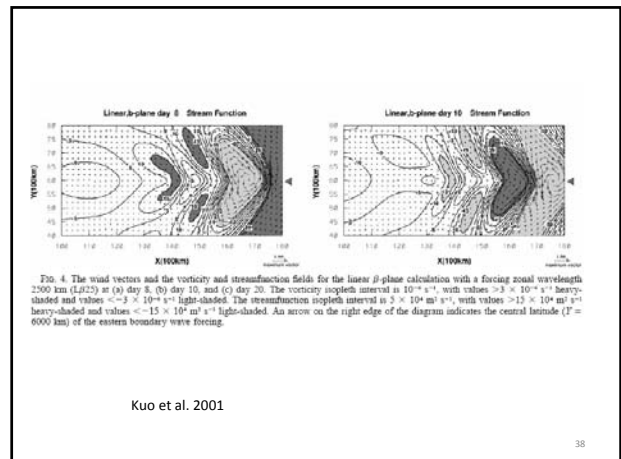
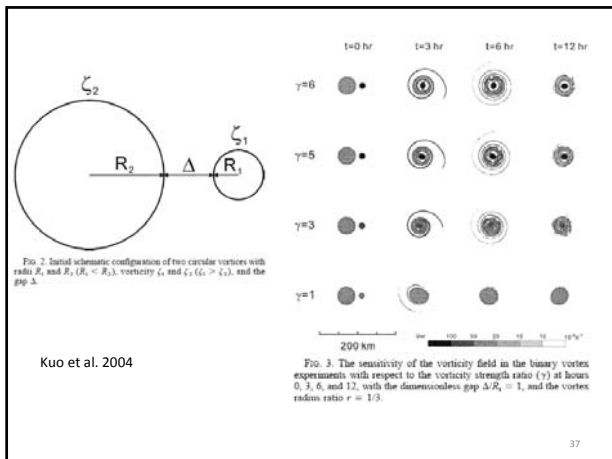
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35



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Uncertainty over weakening circulation

Barbara Gore Levi's Search and Discovery story (PHYSICS TODAY, April 2008, page 26) discusses evidence of weakening ocean circulation and its possible connection to global warming. The Atlantic Ocean circulation across 25° N latitude has been used as a benchmark.

Peter Chylek, *Original paper*
 Los Alamos National Laboratory
 Los Alamos, New Mexico

Bryden and Longworth *Nature* 2005

| | |
|------|-------------------------|
| 1957 | $22.9 \pm 6 \text{ SV}$ |
| 2004 | $14.8 \pm 6 \text{ SV}$ |
| Net | $8.1 \pm 6 \text{ SV}$ |

$1 \text{ SV} = 10^6 \text{ m}^3 \text{ s}^{-1}$

correct result. It is a mystery how such an error was missed by Levi and by the editors and reviewers of the original paper. The observed change of 8.1 Sv is well within the uncertainty of the measurement. The correct conclusion from $8.1 \pm 12 \text{ SV}$

Discussion

1. Original hypothesis
2. Finding
3. Explanation for findings
4. Limitations
5. Need for further research

注意：不要簡單重複結果部分的數據
 指出本研究結果的應用價值

回答審稿人意見技巧

- 按時完成修改任務，若需延期，盡早提出且說明具體時間。
- 組織研究小組成員研讀審稿意見，研究回復策略。
- 科學嚴謹且禮貌周到。
- 給編輯的cover letter中，報告回復情形，對審稿人共同關心問題說明，並表示願意接受必要的進一步修改，給編輯者好印象。

審查者的鼓勵

"The recent study by Kuo et al. (2001) has provided some valuable insights on tropical cyclone formation at the eastern end of the monsoon trough." **Elsberry**

"a new and interesting mechanism of "island trapping" is suggested, this is an important pioneer work." **Montgomery**

"The paper is clearly written, original, and make a genuine contribution to science." **Willoughby**

"this paper will make an important contribution to the literature examining the formation of concentric eyewalls, which remains as one of the major issues in understanding changes in hurricane intensity."

Manuscript number: DYNAT-D-09-00xxx
 REVIEW OF "Moist Dynamic Equation Under Mass Forcing"
Recommendation
Rejection
General Comments
 This paper examines a set of moist dynamic equations by taking into account of precipitation mass loss. The paper is motivated by the statement that "the feedback effects of mass loss to the original dynamic and thermodynamic equations are typically **not considered**" and "this effect of mass loss **has never been considered** in the momentum equation." The main point of the paper is to derive a proper set of moist dynamic equations in precipitating atmosphere.

The derivations, however, are **confusing** and **with errors**. Important vertical momentum exchange in the precipitating atmosphere **is not discussed**. The results in general **do not yield any new insight** to the problem. Important references such as **Ooyama (1990, 2001)** and **Hausman et al. (2006)** are not cited. It is recommended that the paper be rejected.
Major comments:

MWR-2850 (LR) Kuo
 Reviewer A
 03/19/09

Review of: "Western North Pacific Typhoons with Concentric Eyewalls" by Hung-Chi Kuo, Chih-Pei Chang, Yi-Ting Yang, and Hao-Chang Chiang

Recommendation: Accept after minor revisions.

General Comments: The revised manuscript is a significant improvement from the original, with improved descriptions of the concentric eyewall (CE) identification method, the physical processes associated with CE development, and the temporal relationship between CE and maximum intensity. Also, the revised analysis of the relationship between observed moat width and the theoretical moat width (related to rapid filamentation zones) are much improved. I feel that this revised manuscript is suitable for publication in *Monthly Weather Review* after the following few additional minor revisions and clarifications have been made:

10. Page 12 and Figure 6: Understand Figure 6 correctly. Should the R2 values reported in Figure 6c and 6d be -0.2 rather than the much smaller values reported?

11. Page 14: Given the large standard deviations of -1.5 hours throughout the composites, are the differences in mean intensity values at different time statistically significant. Some discussion of this is needed.

12. Page 15: I recommend constructing a Table that presents summary statistics of the SSTs and vertical shears associated with each group. This would provide convincing evidence that the differences between groups are unrelated to each environmental factor. In its current form, the brief comment is very weak and not satisfying. Also, the lack of such a table would suggest that you are not confident of those of Peng and Emanuel (2005).

13. Page 15: In the third line from the bottom, you may wish to clarify that "concentric" refers to CE, sometimes emerging from Category 2.5 rather than the PO, NP, PS, and NS groups. The current text is a little unclear.

14. Page 16: At the end of conclusion 6b, you may wish to add that the longer period of higher intensities for CE cases would suggest that Kuo's reparameterization process may be valid.

15. Figure 7: Please explicitly clarify in the caption what a negative and positive value represents (i.e. was CE before or after maximum intensity?).

16. Figure 7: 8, 10, and 11: The labels, "near" and "far" horizontal axes are too vague. Please clarify the time and time differences relative to a certain event, and include that event in the axis label.

MWR-2850 (LR) Kuo, Reviewer B
 11 March 2009

Evaluation

A previous review of "Western North Pacific Typhoons with Concentric Eyewalls" called for major revisions, but stated the observational work on concentric eyewalls presented in that paper is important and timely. Previous concerns regarded a lack of information on the methodology. In addition, there were some concerns regarding other minor aspects in the realm of clarification and figure improvement. In the revised version of this manuscript, the authors' have conscientiously addressed these concerns and the manuscript is now suitable and recommended for publication.

Below are some very minor comments that may be of interest to the authors before publication, although technical editors may just as easily capture these types of aspects.

Minor Comments

- On p. 1, first sentence: "particular" should be "particularly".
- On p. 14, top sentence: Should "these composite" be "these composites"?
- The 2008 QJRMMS paper of Rozoff et al. is no longer in press, but is published in Vol. 134, p 583-593.

即使我們是天才或諾貝爾獎得主，
 也不可能一次就完成一篇完美無缺
 的論文。

即使我們是天才或諾貝爾獎得主，
 論文也會被拒絕發表。

有許多重要的論文，經過相當長的
 時間才被人注意到。

Differentiation 分析

Integration 整合

蝴蝶效應 混沌人生 知其無可奈何而安之若命

天行有常 不為堯存 不為桀亡
 Adapt!

天爵自尊我自貴
 此生無怨亦無尤

山窮水盡疑無路
 柳暗花明又一村

長白又一村 自求多福 業精於勤荒於嬉

讀書(選career) 要找好老師好同儕
 做事找好老闆
 結婚找好伴侶

君子務本 本立道生

關鍵基礎能力 語文能力 能專精方能跨領域

誠不以富 亦祇以異

不同立場有不同地位 特色 專業水準

做自己有興趣且有長處的事業

It is easy to say!! 需要許多過程，自我追尋、自我瞭解、
自我訓練，才能找到自己的路。

十有五而志於學，**三十**而立，**四十**而不惑，
五十而知天命，**六十**而耳順，**七十**而從心所欲不踰矩。

十五歲到三十歲是養成關鍵期，
三十歲到六十歲是事業期，三十年一世。

49

The End

Thank you for your attention

50