

**培育科学素养， 创新科技文化**

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# 我的研究生生涯



与预期的差距好大哦 ! ?



# 时空中国



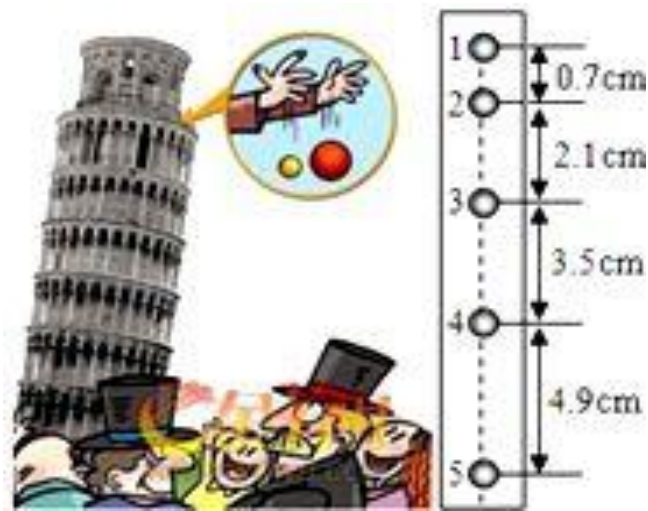
秦 汉 晋 隋 唐 宋 元 明

清



中国的科学为什么持续停留在经验阶段？……欧洲在十六世纪以后就诞生了近代科学，这种科学已经被证明是形成近代世界秩序的基本因素之一，而中国文明却未能在亚洲产生与此相似的近代科学，其阻碍因素是什么？”

（“李约瑟难题”——中国为什么没有发展出近代科学？）



古代中国不乏技术，也有科学，但普遍缺科学素养，更缺科技创新文化



现代科学

古希腊的形式逻辑体系

发端于文艺复兴的系统实验体系

奠基

# 当代国人的科学素养

中国大陆具备基本科学素养的公民 < 9 %



G. Bruno (1548-1600)

尊重事实、服从规律、批评怀疑、反对虚假、锲而不舍、勇于创新、坚持真理 ...

# 科学素养与中国文化

## 格物·致知

欲诚其意者，先致其知；致知在格物

——《礼记·大学》

真正的格物致知精神，不但是在研究学术中不可缺少，而且在应付今天的世界环境中也是不可少的。

希望我们这一代对于格物和致知有新的认识和思考，使得实验精神真正地变成中国文化的一部分。

——丁肇中



中国文化只有发扬和消纳科技创新文化，才具有可持续的强大生命力

# 近代中国人具备科学基因



西名	分劑	西號	華名
Carbon.	六	C.	炭
Kalium.	三九二	K.	鉀
Natrium.	二三	Na.	鈉
Lithium.	六九	Li.	鋰
Cæsium.	三三	Cs.	銻
Rubidium.	八五三	Rb.	鉍
Barium.	六八五	Ba.	鋇
Strontium.	四三八	Sr.	銻
Calcium.	二〇	Ca.	鈣
Magnesium.	一〇二	Mg.	鎂
Aluminium.	一三七	Al.	鋁
Glucinum.	六九	G.	銻
Zirconium.	二二四	Zr.	銻

448 NATURE March 10, 1881

that the slime-glands were much less developed in the males than in the females.

The structure of the female organs in our Caracas species agrees pretty well with Prof. Hutton's drawings (*Ann. and Mag. of Nat. Hist.*, iv. ser., vol. 18, pl. xvii., fig. 8); but I am not prepared to accept his interpretation. The following sketch will give an idea of what I saw.

Moseley's Fig. 1 on pl. lxxiv. is very different from the shape of the ovary in our species; nor can I well understand the existence of ova on the *outside* of the ovary as they appear in his drawing. The ovary in *P. Edwardsii* is rather long, and abundantly covered by fine tracheal tubes, with the exception of a narrow zone close to the branching out of the oviducts. I could not satisfy myself as to its being divided by a septum, nor could I find any ova in it; most likely it is not now the right time. At a very short distance from the beginning of the oviducts there is a kind of obtuse *caecum* on each of them, which is followed by a spherical body covered by tracheal tubes. These bodies are the organs described by Prof. Hutton as testes.

There is however in our species no trace of what he takes for *vasa deferentia*, the spherical body adhering directly to the oviduct. Its wall is of considerable resistance, and bursts only under great pressure, giving issue to an immense number of thin rod-like corpuscles, which soon after begin to move slowly in the surrounding water. They are of course spermatozoa which have lost their nuclei, and the spherical body can therefore be nothing else but a *receptaculum seminis*.

The oviducts of three specimens which I dissected contained very few embryos; in one there was only one in each oviduct, in the others there were two. They were fully developed, and

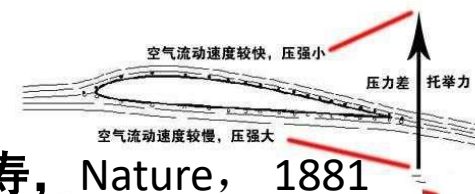
there. Cutting off half the tube, the remaining four and a half inches would not sound the octave; but by cutting off half an inch more, thus leaving four inches in length, the octave was sounded accurately. This experiment was tried on tubes of various lengths and diameters with a similar result, viz. that four-ninths of the length always sounded the octave more or less exactly. Looking at a foreign keyed flute I noticed the same principle carried out in the arrangements for producing octaves. I could not however see the reason why open pipes should not follow the same rule as strings and closed pipes.

"When I read the translation of Prof. Tyndall's treatise 'On Sound,' I was surprised to find the old Chinese idea strictly maintained. It says (p. 214): 'In both stopped and open pipes the number of vibrations executed in a given time is inversely proportional to the length of the pipe,' &c. According to this, as the octave of any note has to execute exactly double the number of vibrations in a given time, an open pipe ought to be exactly halved to make it sound an octave higher. This I have shown to be erroneous by my experiments.

"Fearing that I have misunderstood the English professor's meaning, I beg that he may be written to on this subject, and that my doubts may be thereby cleared up. What I want to know is the exact proportion in length that exists between any open pipe and a pipe of similar diameter sounding its octave higher. Also the exact proportions in length for each of the open pipes sounding the twelve semitones which form a scale of one octave. If the length forming the octave in open pipes does not agree with the length for strings or closed pipes, then the lengths of all the pipes giving intermediate notes must also differ. How are these lengths to be calculated? Can they be

对传统声律学定律“空气柱的振动模式”，提出质疑，并用现代科学矫正了这一古老的定律

$$\frac{1}{2}\rho v^2 + \rho gh + p = \text{const.}$$



徐寿, Nature, 1881

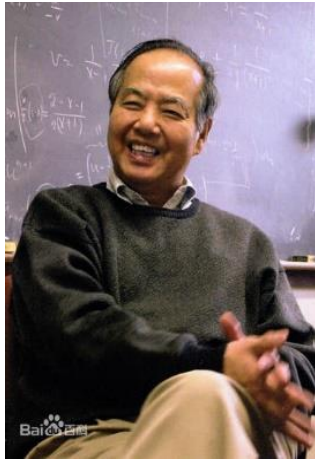


# 杰出华人科学家



精于科学  
长于办事

丁文江  
(1887-1936)



李政道  
Tsung-Dao Lee



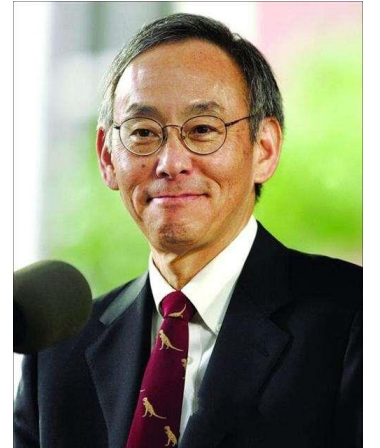
杨政宁  
Chen-Ning Yang



朱棣文  
Steven Chu



钱永健  
Roger Yonchien Tsien



崔琦  
Daniel Chee Tsui



屠呦呦  
Tu Youyou



高锟  
Charles Kuen Kao



李远哲  
Yuan Tseh Lee



丁肇中  
Samuel Chao Chung Ting

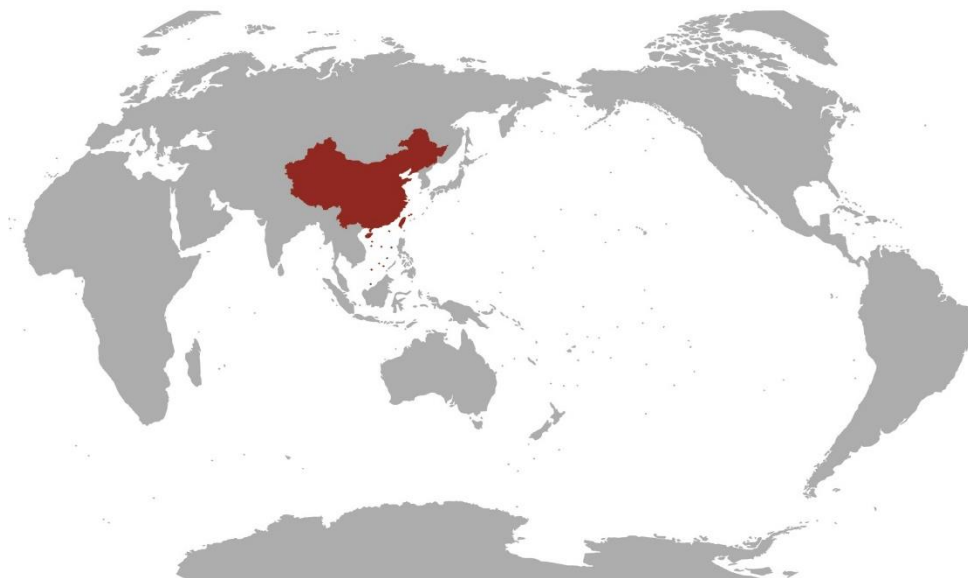


增强中国文化的自信力

# 当代研究生的历史使命

中国

能否成为全球科学中心？



- 意大利
- 英国
- 法国
- 德国
- 美国
- ??

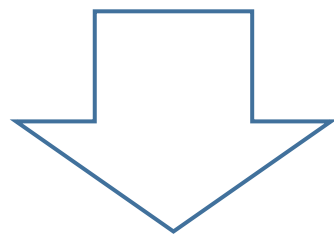


# 科学素养与科技创新文化

- 吸纳科学知识，掌握科学方法
- 具备科学思维能力和科技创新能力
- 养成良好科学素养
- 融合传统文化与科技创新文化
- 做中国新时代的文化人



创新自信



文化自信

寻找、提出、解决科学问题



# 什么是科学问题？

世界上最悲催的事情，  
莫过于与青年人倾诉肺腑之言

不明白哦，敢情不是我正在  
实验室玩的东东吧？



科学问题



这也是我苦苦求  
索的远大目标

读读历史伟大科学家的  
论述，再问问老师吧

