

科普英语注释读物
《科学的演进》系列丛书

图灵和全能机

— 现代计算机的产生

Turing and the Universal Machine

— The Making of the Modern Computer

Jon Agar 著

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熊 纓 导读
向朝红 审定

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内容简介：

图灵被誉为现代计算机之父，曾为破译纳粹依尼格马密码做出过很大贡献。本书作者讲述了万能机如何从无到有的引人入胜的历史，图灵为解决当时的数学难题所设计“计算机器”以及后来他在人工智能方面的探索。但是，图灵并没能生前庆贺自己的成功，他被指控为同性恋，从而切断了与英国机要部门的联系。1954年，图灵可疑地自杀，成了冷战妄想狂的牺牲品。

本书以丰富的历史事件为背景，通俗易懂而又出色地讲述了计算机的发展过程。

《科学的演进》系列丛书简介

本系列丛书是以大学生和研究生为主要对象的科普英语读物。原书由在英国和新西兰著名大学讲授科学史的教师撰写，英国ICON 公司2002年出版。参照我国大学生的英语水平，本丛书为生词作了注释，并对有关的文化背景和语法难点作了简短的说明；在每一章前用英文提问，促使读者有目的地阅读；在每一章后用中文给出内容摘要，帮助读者准确理解。

本系列丛书从历史的角度，分析探讨了有关学科的发展进程，可以帮助读者以史为鉴，了解科学演进中的有关情况和问题，懂得科学的发展总是充满了矛盾和斗争，从而学习科学研究的方法，增强克服困难的信心和勇气。本丛书还有助于大学英语专业和其他人文学科的学生扩展科技知识，提高阅读科技文章能力；帮助理工学科的学生扩展知识面，提高英语的阅读水平；对英语水平较高的高中学生和广大英语爱好者也是难得的课外阅读材料。

Acknowledgements

I would like to thank Jon Turney and Bat for reading my manuscript and suggesting improvements. (Remaining errors, of course, should be blamed on me or on the universal machine that helped me write this book.)

序 言

美国政府在普及文化知识的过程中,曾实施了 RIF (Reading Is Fundamental),即“阅读是最基本的”计划。阅读不仅让我们获得各种各样的知识,也是培养、巩固和提高语言技能,特别是阅读理解能力的重要手段。

在外语学习中,阅读也受到普遍的重视。著名应用语言学家克拉申(Krashen)曾提出输入假设(Input Hypothesis):认为第二语言的习得必须有可理解的输入(Comprehensible Input);同时,语言输入还需要达到足够的量(Adequate Exposure)。在我国,阅读已成为绝大多数英语学习者学习英语的主要方式,教材是接触英语的主要媒介。众所周知,英语语言浩如烟海,要想把英语学好,光靠阅读教材是远远不够的,必须有足够的课外读物作为补充。目前,我国市场上的英语课外读物虽然琳琅满目,但科普读物较少,面向大学生和研究生的科普读物则更加匮乏,难以满足需求。《科学的演进》系列丛书正是在这种背景下引进的。

本系列丛书由在英国和新西兰著名大学讲授科学史的教师撰写,英国 ICON 公司 2002 年出版,共 13 册,内容涉及天文、地理、数学、计算机、医学、生物学、哲学



和历史学等领域。作者们通过讲述科学发展的历史,在让读者领略科学研究的乐趣、矛盾和斗争,增强人们战胜困难的信心和勇气的同时,也让读者学到了地道而实用的现代英语。

在保持原著原文不变的前提下,为帮助读者阅读和理解,本丛书以导读和注释的形式增添了三个部分内容:即 Guiding Questions(引导性问题),Footnotes(脚注)和 Reflection(反思)。Guiding Questions 置于一章之前,以调动读者的思维,激活读者大脑的认知图式(Cognitive Schemata),使读者在阅读过程中处于积极认知的状态;参照我国大学生的英语水平,Footnotes 为同页的生词注释了国际音标、词性和词义,并对相关的文化背景和语法难点作了简短的解释;章末的 Reflection 是对该章内容的小结,也是对 Guiding Questions 中部分问题的回答。读者可根据自己的需要,决定 Guiding Questions 和 Reflection 的阅读顺序。本系列丛书可作为大学生及研究生的英语课外读物,也是广大英语爱好者自学英语的理想材料。

最后需要说明的是,本丛书的内容仅仅是一家之言,如读者能由此而激起阅读的热情和对科学的兴趣,那就是我们最大的欣慰。另外,由于导读者水平有限,如有不妥之处,敬请批评、指正。

向朝红

2002 年 8 月

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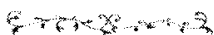
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1

Universal Machines

Guiding questions

- 1 *What's versatile machine?*
- 2 *Can you give some examples of the versatile machines and special-purpose machines respectively?*
- 3 *When was the first kind of universal machine built? What's the difference between it and the special-purpose machine?*



Take out a Swiss Army knife and have a good look at it. I have one here. It has the full range of gizmos^① and attachments. There is a pair of scissors,

①gizmo /'gizməʊ/ n. 小物件,小玩意



a retractable^① pen, a ruler, a magnetic Phillips screw-driver, some tweezers^②, a small blade and an emergency blade. There is even a 'cuticle^③ pusher' and a nail file, essential for any well-manicured^④ soldier. Nothing to get stones out of horses' hooves^⑤, but very handy nevertheless.

Swiss Army knives are versatile^⑥ machines: they can be put to many different uses. Other machines are far more restricted. A lawnmower^⑦, for example, can mow lawns, but not much else. It has been designed for a specific purpose, and the function of each part of it follows. The handle is there so that it can be pushed by an adult human. The engine will power the blades, which would be exhausting to turn by hand. The blades are set so that grass is cut to an inch off the ground, the height we like lawns to be. While the lawnmower can be put to other purposes — propping open a door, perhaps — it will usually not be very effective. No one tries to fly the Atlantic on a lawnmower. Flying requires different kinds of special-purpose machines.

①retractable /ri'træktəbl/ *adj.* 可收回的或撤回的,能缩进或缩回的

②tweezers /'twi:zəz/ *n.* 镊子,小钳子

③cuticle /'kju:tɪk(ə)l/ *n.* 表皮

④well-manicured /wel-'mænikjuə(r)d/ *adj.* 指甲修剪得很好的

⑤hooves /hu:vz/ *n. pl* 马、牛或鹿的蹄

⑥versatile /'və:sətəɪl/ *adj.* 有多种功用的

⑦lawnmower /lɔ:nməʊ(r)/ *n.* 割草机

Some devices are more versatile because they are simple. A sharpened stick, for example, can be used as a lever, or to cook a kebab^①, or to knit a sweater. Indeed, more uses can probably be found for a simple sharpened stick than for a Victorinox Pocket Size MiniChamp II — my top-of-the-range Swiss knife. Yet, despite their varying versatility, Swiss Army knives, lawnmowers and sharpened sticks are all a similar sort of machine. Even the knife and the stick are, in the end, *special-purpose machines*, and are radically^② different to an astonishing device built for the first time in the middle of the last century: a machine of *universal* application.

Reflection

瑞士军刀是一种多用途器械。一根削尖的棍子,用途更多。而割草机的用途就比较有局限了。但是不管它们的功用如何不同,瑞士军刀,割草机和削尖的木棒都属于同种机器。即使是瑞士军刀和削尖的木棒,都是为了一种特殊目的而制造的机器,它们都与上一世纪中叶首次制造的全能机有着根本不同。

①kebab /ki'baeb/ n. 以小木棒或叉串起的烤肉

②radically /'rædikəli/ adv. 根本地,彻底地



2

The Blue Pig

Guiding Questions

- 1 *How does the 'Blue Pig' look like?*
- 2 *What were the hymns performed by the Blue Pig?*
- 3 *What happened when the Blue Pig performed the last tune?*
- 4 *What else could the Blue Pig do?*
- 5 *What had disappointed the man who had achieved early fame proving another hypothesis wrong? What's his name?*



An early example could be found in Manchester in 1951. It filled a room, and broke down regularly.

A team of engineers tended^① it, replacing the valves^②— or vacuum tubes^③— as they blew. They called it the 'Blue Pig'. If you had £ 150, 000 you could buy one of these machines for yourself, although there would be a queue of military establishments and scientific laboratories ahead of you. Three years earlier, the first ever machine of this type had been built a hundred yards away. That one was an experiment, rows of electronic tubes and a tangle of gutta-percha^④- covered wires filling what resembled a set of bookshelves. The 1951 model gleamed — the valves hidden in banks^⑤ of metal cupboards, a shiny central console^⑥ with rows of switches and lights.

Late in the year, the Blue Pig had some visitors. They were from a children's radio programme, and had come to hear the Pig sing. The engineers prepared the machine, and, after a moment's hesitation, a gratingly^⑦ harsh but stately National Anthem^⑧ blared^⑨ forth. The radio pres-

①tend /tend/ *vt.* 管理

②valve /vælv/ *n.* (英)电子管,真空管

③vacuum tube /'vækjuəm tjub/ *n.* (美)电子管,真空管

④gutta-percha /'gʌtə'pɜ:tʃə/ *n.* 马来树胶

⑤bank /bæŋk/ *n.* 一排

⑥console /'kɒnsəʊl/ *n.* 机器、电器的控制台,仪表板

⑦gratingly /'greɪtɪŋli/ *adv.* 使人急躁地

⑧anthem /'ænthəm/ *n.* 国歌

⑨blare /bleɪə/ *v.* 高声发出



enter was delighted. The patriotic hymn^① was followed by 'Baa Baa Black Sheep' and finally the dancehall jazz of 'In the Mood'. The Blue Pig had trouble with the last tune; it improvised^② some notes of its own and then fell into silence. The machine, concluded the radio presenter, was not, after all, in the mood.

With the visitors gone, the engineers returned to another task, but with the same machine. The Pig could produce poetry, doggerel^③ love letters. Here's an example:

Darling Sweetheart,

You are my fellow feeling. My affection curiously clings to your passionate wish. My liking yearns to your heart. You are my wistful sympathy; my tender liking.

Yours beautifully,

M. U. C.

The Blue Pig could do mathematics too. Much faster than any human mathematician, it made calculation after calculation. What it searched for were moments when a certain function — the Riemann

①hymn /him/ n. 赞美诗,颂歌

②improvise /'ɪmprəvaɪz/ v. 即席创作,即时表演

③doggerel /'dɒɡərəl/ n. 拙劣的诗

Zeta function^① — took the value of zero. It was something of a fishing expedition, but if they were lucky and found an unexpected zero, then a famous mathematical hypothesis^② would be proven wrong. Despite the Pig's all-night efforts, none was found. This was a particular disappointment to a middle-aged man of awkward manner, who had achieved early fame proving another hypothesis wrong — and at the very same moment had come up with the idea now expressed in massive material form by the Blue Pig. This man was Alan Turing, and the renaissance^③ Pig — one machine producing music, poetry and mathematics — was MUC: the Manchester University Computer.

Reflection

早在1951年出现在曼彻斯特被称为 Blue Pig 的全能机是个庞然大物。尽管它时好时坏,它却已能做许多事情:诸如写诗,写拙劣的情书,做计算题等等。然而它不能如人们所期望的能证明一道数学假设,这使一位曾证明另一个数学假设的错误并因此成名的中年人感到尤其失望,他就是阿兰·图灵。这台会作曲,做诗,做数学题的机器就是 MUC(曼彻斯特大学电脑)。

①Riemann Zeta function 黎曼 Z 函数

②hypothesis /həi'pɒθəsis/ n. 假设,前提

③renaissance /ri'neɪsəns/ n. 复兴,再生