

韩礼德文集 5

Volume 5 in the Collected Works of M. A. K. Halliday

The Language of

科学语言

Science
Science

M. A. K. Halliday

Edited by Jonathan J. Webster



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总序

胡壮麟

由香港城市大学汉语、翻译和语言学系系主任 Jonathan J. Webster 教授主编的,并由英国 Continuum 公司自 2002 年陆续出版的《韩礼德文集》,总共 10 卷,已全部出齐。北京大学出版社获得 Continuum 公司的授权后,负责文集在中国境内的出版,并组织国内专家为读者撰写导读。这无疑是我国出版界和语言学界的一件大事。

就当代语言学研究来说,20 世纪下半叶一直表现为生成语言学和功能语言学的对峙,说得具体些,当乔姆斯基在 50 年代末一度以他的转换生成语法掀起一场革命,并成为国际上,特别是美国的语言学研究的主流时,能揭竿而起并与之抗衡的便是韩礼德的系统功能语法。^①如果说乔姆斯基的理论得益于后来成为他“革命”对象的美国结构主义,韩礼德则公开宣称他继承和发展了欧洲的弗斯学派、布拉格学派和哥本哈根学派。正是这两种力量的冲突、挑战和互补推动了这半个世纪精彩纷呈的语言学研究。

《韩礼德文集》在中国的出版还具有重要的意义,那就是韩礼德的成就除了受到欧洲语言学传统的影响外,也从中国语言学传统获得滋养。他早年师从罗常培先生和王力先生,在韩礼德的论著中不时绽放出这些大师的思想火花。^②《文集》的第 8 卷是最好的历史见证,在这个意义上,《文集》的出版是一次学术上的回归,为我国语言学研究如何实现全球化和本土化的结合提供了宝贵的经验。为此,北京大学出

① 胡壮麟、朱永生、张德禄、李战子,《系统功能语言学概论》,北京大学出版社,2005 年 9 月。

② 胡壮麟,《王力与韩礼德》,《北京大学学报·英语语言文学专刊》1991 年第 1 期,第 49—57 页。
收入张谷、王辑国编,《龙虫并雕,一代宗师——中外学者论王力》,广西教育出版社,第 200—216 页。

版社采纳了我们的建议,在出版 10 卷《文集》的同时,将第 8 卷全部译成中文,另行出版中文版,以供汉语界参考。

《文集》充分反映了韩礼德所走过的治学道路,其轨迹分见于各卷的主要内容。韩礼德首先研究现代汉语(第 8 卷),打好了音系学和方言调查的扎实基础。回英国后,进入对普通语言学的研究(第 1 卷和第 3 卷),继承、发展和建立科学的语言学研究的理论,把握前进的方向。为了在欧美学术界获得一席之地,韩礼德在此时期把英语作为研究分析对象(第 7 卷)。在研究方法上,他注意第一手材料的收集(第 4 卷),将语言学研究从句子层面提高到在具体语境中出现的语篇和话语(第 2 卷),因此他的研究是经得起实际的检验的。韩礼德特别注意语言学理论的价值在于它的应用,能否说明社会生活中的问题,并为社会服务,前者见之于第 10 卷的“语言与社会”,后者反映于第 9 卷的“语言与教育”。曾经有位学者向韩礼德提问,为什么转换生成语法在中国国内打不开局面,而系统功能语法却响应者众多?这两卷的内容有助于人们找到答案。20 世纪下半叶是现代科学技术,特别是电子技术,获得飞速发展的时代。韩礼德时年七八十岁,他能在自己的晚年,关注语言与科学技术的关系(第 5 卷和第 6 卷),这种活到老、学到老的精神令人钦佩不已。

最后,《文集》只概括了韩礼德 2002 年以前的主要论著和节选,因此有关韩礼德的学术思想和成就有待我们进一步挖掘和学习。其次,这几年韩本人一直是老骥伏枥,笔耕不辍,勤于思索。如 2006 年 3 月 26 日韩礼德教授在香港城市大学的“韩礼德语言研究智能应用中心”成立大会上,做了题目为“研究意义:建立一个适用语言学”的主旨报告。韩提出适用语言学(*applied linguistics*)的长期目标是为了建立语言的意义发生系统,其工作机制是以社会理据来解释和描写语义发生,可见韩礼德已经认识到语言学研究最终要解决对“意义”的描写。对这个问题,结构主义和生成主义学派是不研究的,系统功能语言学在功能语义学方面只是刚刚起步,这将是语言学界在新世纪为之共同奋斗的目标。

参加《韩礼德文集》导读编写者均为我国著名学府的学者,在系统功能语言学研究方面享有盛誉,仅在此表示感谢。

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- 第9卷 语言与教育/张德禄(中国海洋大学教授/博导)
- 第10卷 语言与社会/任绍曾(浙江大学教授)

导 读

杨信彰

本书为《韩礼德文集》的第五卷。韩礼德从各种不同的角度对科技英语进行了全面的探讨,论述了人类将常识转化为科学知识的过程,观察了人类从一致式的意义表达转变为隐喻表达的过程。

科学语篇关注的是“事物”,而不是品质、过程和关系。科学语言不是一种单一的语域,涉及了各个学科及其分支和参加者,包括了论文、课本、科普文章等。这些科学语篇扩大了人们某个科技领域的知识。在科学语篇的发展过程中,人们采用了组织语法的新策略。韩礼德把隐喻视做最佳策略。

韩礼德在本书的前言里说明了语法隐喻这个概念,阐述语法隐喻是人们认识世界的一个重要特征。他在书中指出,语言开始出现科学语篇时迈出的第一步是越过词汇进入语法,采用了名词化,把形容词和动词体现的“品质”和“过程”分离出来,用名词来表达这些意义。他认为这不是单词的变化,而是语法类别的变化。语法隐喻能创造虚拟的实体和过程,增强语言的抽象能力。

在阅读本书的过程中,我们需要理解以下几个方面的问题。

首先,语法能够构建经验。从概念功能看,语法的作用是把人类经验转换成意义,构建一个事物和关系的世界,建立人们观察现象的范畴。每一种语言的语法都包含着人类经验的理论,都能把经验成分范畴化为基本的现象类型,而经验通过语法系统以及体现语法系统的单词和结构转化为意义。人们在语法中把各种动作识解成动词,把各种物体、生物和人识解成名词,把一个事件识解成一个小句。但是,我们有时需要系统地组织知识,需要不变的现象。这时语法可将动词体现的动作转化成名词体现的实体。

从儿童成长过程看,当婴儿逐渐认识了周围世界以及自己与环境的关系后,他们形成了原始母语,有了初级的意识。随着年龄的增长,婴儿的原始母语转变成了语言,有了高级意识。这种后婴儿时期的语言具有层次化

的特征,即有了词汇语法层。韩礼德把儿童的成长过程分为概括(generalization)、抽象(abstractness)和隐喻(metaphor)三个阶段。儿童在第一阶段能把经验识解成意义,在第二、三阶段能用越来越理论化的方式识解经验。儿童上学后经历了第一次的经验重构,学习书面语。随着年龄的增长,儿童在学习专业知识时遇到了语法隐喻,经历了第二次的经验构建。儿童在接受教育过程中通过学习隐喻来提高自己的语言能力。在小学,儿童通过抽象的科技术语和书面语言进入语法隐喻。在中学阶段,学生通过充满隐喻的语篇进行学习。

第二,层次化是语法隐喻的基础。人类进化过程中产生的高级意识是符号意识,能把经验转换成意义。高级意识依赖语言演变的两个重要步骤,一个是元功能,另一个是层次化。低级的符号系统没有层次化,没有语法。语言是高级意识的符号,具有层次化的特点。它在意义层和表达层之间还有一层词汇语法。语义通过词汇语法来体现。层次化需要将意义投射到形式上,把过程投射到动词,把参加者投射到名词。但层次化的系统也可能重新投射,把过程投射为名词,小句也可能改写成名词词组。这时,经验得到了重构,经历了隐喻过程。隐喻转变涉及两种语法活动:一个是阶下移的活动,另一个是跨越功能/类别的活动。因此,语法隐喻是不同层次上的重组,把语义重新投射到词汇语法。正是由于有了语言的层次化,语法隐喻才得以实现。

第三,科学语言的出现是为了满足科学研究的需要,不仅记录和传播知识,而且创造了新知识。科学英语不仅具有大量的专业词汇,而且还有许多语法资源。韩礼德认为科技词汇和名词化语法是相辅相成的。以名词化为特征的语法隐喻的出现不是偶然的,而是为了满足科学方法、科学论证和科学理论的需要。从即时语境看,语法隐喻有助于论证的展开;从理论的长远语境看,语法隐喻有助于构建一个各个技术术语相互联系的框架,一个能浓缩大量知识、能非常抽象地运作的框架,在科学语篇起着提出论点的话语作用。

韩礼德认为科学理论的构建需要满足两个符号条件:一是技术性。语法需要创造出作为理论属性的技术意义。另一个是合理性。语法需要创造一种根据观察和实验进行推理,得出结论的话语形式。他从乔叟 1390 年写的《论星盘》观察到了名词化的两个初端:技术名词和带重复的短语一词组限定词的名词词组。乔叟喜欢用的过程有关系过程、物质过程和心理过程。牛顿 1704 年出版的《论光学》可看做是科学英语的开端。牛顿使用了被动结构、扩展小句复合体和投射句。牛顿还采用了名词化,用名词来指过程。韩

礼德认为牛顿采用名词化把复杂的现象包装成一个符号实体,并且在论证中发挥了修辞功能。因此,名词化这一手段不是任意的而是构建科学语篇的重要资源。到了18世纪60年代,普莱斯利出版了三卷本的《电学的历史和现状》。普莱斯利使用了许多electric的派生词和术语,同样也出现了名词化。由于语篇的压力,名词成分逐渐承担了表达整个语义内容的作用,由动词来表达名词化过程之间的关系。隐喻性的名词化把过程或品质重构为实体,抽象性不断提高,使其能够加入到其他的过程。其他科学家的语篇也表明,科学语篇也变得客观,个人的投射逐渐减少。名词化是隐喻过程的驱动力,因而成为科学语篇的重要特征。

第四,从功能语法的视角看,语法隐喻是小句识解到名词识解的转变。在功能语法中,语法指的是词汇语法,包括小句复合体、小句、短语、词组和单词。词汇语法属于语言的一个层,里头是一个系统网络。韩礼德把整个词汇语法视做一种能把经验转换成意义的资源。语法用图形(figure)来识解经验。图形是个复杂的语义单位,说明在我们的环境和内心的经验,包含了过程、参加过程的实体和环境等成分(element)。人们在识解图形时用的语法配置是小句,识解成分时用的是词组或短语。语法以一定的逻辑语义关系把若干个图形识解为序列(sequence)。这些序列、图形和成分都是语法构建的。语法把我们观察到的现象识解成一个包括过程、参加者和环境成分的配置。在日常语言中,语法范畴(如小句、词组等)和语义范畴(如图形、过程等)存在着一种有规律的关系。韩礼德把这种语法和语义的关系称做“一致式”。如果说日常语法把经验转换成意义,那么科学语言的语法是一种重新转换。这里最突出的模式是名词化(nominalization)。名词词组本来是个一致式结构,以名词为中心词向外扩展。名词识解实体本身。科学语言中的名词化使用名词词组来重新识解图形。

第五,科学语言的独特性应该引起教育工作者的注意。科学完全依赖于科学语言,完全用常识性的措辞来表述科学知识是不可能的。语法隐喻不是词汇的替代,而是语法上的变化。隐喻是语法的一个自然的历史过程。儿童要到了一定的文化水平后才学会用名词词组代替小句,掌握语法隐喻。

科学语言是一种变体、一种语域、一种面向专家的语言,但也容易引起歧义。一是成串名词连用,导致它们之间的语义关系不清;二是关系动词通常具有语义不确定性。科学语言对学习者来说是一个障碍。科学语言语法隐喻程度高,对专家并不构成问题,但对初学者却是一大麻烦,学生在中学之前会觉得很难理解。儿童在学习语言的同时也在用语言学习。两者都是学习过程,语法隐喻可能破坏这个学习过程。韩礼德认为,科学语言的特征

在于整个的词汇语法,读者遇到的问题是整个的话语模式问题,而且语法方面的问题比词汇问题多。词汇隐喻是用一个单词来代替另一个单词,而语法隐喻是用一个语法类别来代替另一个语法类别。此外,技术术语的问题不在于术语本身,而在于术语之间的复杂关系。因此韩礼德建议教师在讲授科学时向学生介绍科学语言的本质、语类结构、语法隐喻等。这将对学生很有帮助。

以上五个方面对于读者理解本书可能会有帮助。科学语言已经成为教育语言,成为解释人类生活的重要手段。韩礼德认为科学的发展也是科学语法的发展。他是这样解释的,科学的发展是思想的发展,而思想是语言构建的,语言的动力在于其语法。古希腊科学家早就借助把动词和形容词转换成名词的语法产生出许多的技术词汇,使用了扩展希腊语名词词组的语法资源,开创了技术话语,建立了科学。在从乔叟到牛顿的语言里,语法隐喻得到了大量的使用,体现过程的典型动词被重构为名词。这为技术术语的产生奠定了基础。韩礼德认为有两个方面将影响科学语言将来的发展。一方面是符号过程在人类生活中正变得越来越重要,另一个方面是人们正越来越多地用符号解释其他系统。在 21 世纪,科学语言将继续演变,满足信息社会的需要。可见,科学语言在人类生活中发挥着很大的作用,研究科学语言已成为当代语言学研究的一个重要课题。

PREFACE

ἐν ἀρχῇ ἦν λογος

The rate of glass crack growth depends on the magnitude of the applied stress.
'The fracturing of glass', *Scientific American*, December 1987

What about this quote identifies it to the reader as the discourse of science? How did these features evolve into what we recognize as scientific English? In the papers included in this volume, *The Language of Science*, the fifth in the series of his Collected Works, Professor Halliday looks at the language of science from various perspectives, from the historical to the developmental, as a language teacher and as a linguist.

This volume, however, is much more than a volume of papers on scientific language. It is about that most fundamental ability of humankind, the ability to theorize about ourselves and our world. It is about how we move from commonsense theories of everyday experience to technical and scientific theories of knowledge. It is about how our ways of meaning are evolving, from the congruent to the metaphorical, from the clausal to the nominal.

And God said . . . With an utterance, the world came into existence. The clausal origin of the universe, as told in Genesis, mirrors our own use of language to construe reality, and transform experience into meaning. Such is the reality-generating power of grammar, that it enables us to define 'the basic experience of being human'.

Over the course of history, as the need arose for more powerful and abstract theories of experience, humankind has relied on the

power of language 'to reconstrue commonsense reality into one that imposed regularities on experience and brought the environment more within our power to control'. Aptly titled *How Big is a Language? On the Power of Language*, Professor Halliday's introduction to this volume and the next makes clear that the source of that power lies in its potential for grammatical metaphor.

Grammatical metaphor, which is explored in detail in the first section of this volume, involves the junction of category meanings, not simply word meanings. Examples of grammatical metaphor include *length*, which is 'a junction of (the quality) "long" and the category meaning of a noun, which is "entity" or "thing"', and *motion*, which is 'a junction of the (the process) "move" and the category meaning, again of a noun'. With grammatical metaphor, the scientist can make the world stand still, or turn it into one consisting only of things, or even create new, virtual realities.

In the second section of this volume, Professor Halliday discusses how the features of scientific English have developed over time, evolving to meet the needs of the experts, giving them enormous power over the environment, but at the risk of alienating learners and turning science into 'the prerogative of an elite'. What can the language educator do to help those who have been shut out of scientific discourse? The language educator can only help the learner, if (s)he understands how the discourse works. Halliday makes a strong case for adopting the 'paradigmatic-functional' design of systemic grammar to accomplish this task.

Scientific discourse foregrounds things at the expense of qualities, processes and relations. Grammatical metaphor in scientific discourse is described as 'a steady drift towards things; and the prototype of a thing is a concrete object'. Thus he notes 'the interesting paradox: the most abstract theorizing is achieved by modeling everything on the concrete'. The nominalizing grammar of science results in a discourse that is ultimately just about things. The discourse becomes that which it creates.

και ὁ λογος γαρ ἐγενετο

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INTRODUCTION: HOW BIG IS A LANGUAGE? ON THE POWER OF LANGUAGE

1

In a paper appearing in the first volume of this series (Chapter 15) I had raised the question, how big is a grammar; the same question was brought up again in Volume 3 (Chapter 18), reformulated this time as ‘how big is a language?’ I asked this question because I wanted to foreground the power that a language has for making meaning. It seems to me rather paradoxical that, while so much is written about the creative effects of language (these used to be seen more as positive effects, as in literary stylistics; now they are usually presented as negative, e.g. in critical discourse analysis), descriptions of language don’t give this sense of its power. If anything, they stress its limitations, so that it becomes hard to understand how these effects are achieved. Somewhere I commented, in reacting to the now familiar motif that political authority is maintained and legitimized through language, that the language of power depends on the power of language; so surely as linguists we should try to bring this out.

Back in the 1950s, as a language teacher, I was already struggling with this anxiety – that we weren’t helping those learning a language to appreciate the nature of their task. I wanted to foreground the paradigmatic dimension, whereby a language appears as a meaning-making resource and meaning can be presented as choice. This paradigmatic principle had been established in semiotics by Saussure, whose concept of value, and of terms in a system, showed up paradigmatic organization as the most abstract dimension of meaning (1966, Part 2, Chapters 3–5, pp. 107–27 [French original 1915]).

The best exposition of Saussure's theoretical ideas is Paul Thibault's *Re-reading Saussure* (1997); see especially Part 4, pp. 163–207. The Saussurean project had been carried forward by Hjelmslev, at the level of a comprehensive general theory (1961 [Danish original 1943]); and more selectively by Firth, who made explicit the interaction between paradigmatic and syntagmatic organization, modelling these in the mutually defining categories of system and structure. Firth's formulation is worth quoting:

The first principle of analysis is to distinguish between *structure* and *system*. . . .

Structure consists of elements in interior syntagmatic relation and these elements have their places in an order of mutual expectancy. . . .

Systems of commutable terms or units are set up to state the paradigmatic value of the elements.

(Firth 1957)

Thus Firth introduced his category of *system* in theorizing paradigmatic relations; and it was this that I tried to follow in my own work. But I wanted to investigate systems in their association with one another, and at the same time to free the system from any constraints of structure (that is, to locate each system in its paradigmatic environment, irrespective of how it happened to be realized structurally); so I took the system out of its context in the structure–system cycle and ‘thickened’ it to form networks of interrelated systems. Matthiessen (2000) and Butt (2001) trace the history of the system network representation of the paradigmatic dimension in language. The system network enables the analyst to represent sets of paradigmatic options in their own terms, as they intersect with each other. The network, as Butt (2000) observes, is a form of argumentation, one which projects the view of a language as an open-ended semogenic resource.

What I was trying to suggest, in raising the question of how big is a language, was that when we do represent the grammar paradigmatically we get a sense of the scope of its total potential for meaning. The network is open-ended in delicacy: there is no point at which we can stop and say that no further distinctions can be made. But if we extend the systemic description to some point where it is still well within the limits of what speakers of a language can recognize as significantly different meanings, we have some idea of the scale of the options available. I gave the example of the English verbal group, bringing out between 50,000 and 100,000