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Cross-Cultural Communication Theory: Basic English and Machine Translation at the Rockefeller Foundation

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Abstract

My goal in conducting research at the Rockefeller Archive Center (RAC) was to identify the ways in which both the Rockefeller (RF) and Ford Foundations (FF) conceived of the relationship between literature and computing in their programs at mid-century. This research is central to my book project, *Machine Talk: Literature, Computers and Conversation*. In what follows, I lay out the background of this project and a research context that has often highlighted the intertwined emergence of computing and communication theory—and ignored the contributions made by the humanities to the development of this concept. I turn specifically to the RF Humanities Division, outlining its role in supporting early research into theories of communication—particularly cross-cultural communication—which would prove vital to the post-World War Two development of communication theory in the sciences.

Machine Talk

My book project, *Machine Talk: Literature, Computers and Conversation,* examines two arenas that are often conceived in opposition to each other, namely literature and computing. This polarisation is visible in popular stereotypes around "nerdy" programmers and "purposeless" poets—and reinforced in national agendas that prioritise training in and funding of the sciences at the expense of the humanities, or in simplistic perceptions that arts students might bring "ethics" to a tech industry facing significant diversity and ethical problems. Such framings bolster C.P. Snow's infamous "Two Cultures" binary, put forward sixty years ago.[1]

Yet these framings elide the significant material and conceptual common ground that literature and computing share and an intertwined trajectory in the post-World War Two years that has shaped our contemporary digital world. The project redresses this omission by uncovering literature and computing's joint history—a history that is disciplinary, material, imaginary and intellectual. In doing so it offers new avenues of research for world literature scholars via its introduction of perspectives from communication studies and 'media archaeology' and for scholars of computing and digital culture via its provision of a longer historical perspective on contemporary debates.[2]

The project begins from the generally-acknowledged premise that, at mid-century, both literature and computing were heavily influenced by the emergence of communication theory. Conceiving of communication as any act of (statistically-analyzable) information exchange, this theory would underpin many of the earliest advances in electronic computing, while also prompting extensive social debates about the communicative function and value of literature. Yet, as N. Katherine Hayles and others have argued, this theory often conceived of communication in relatively frictionless and abstract terms—as the movement of immaterial information.[3] The project's intervention is to proffer "conversation," rather than communication, as an operative model for examining this joint history. A key term in historical discussions of human interaction—whether via the "art of conversation" or theories of the public sphere—conversation would

seem to have been supplanted at mid-century by communication. However, the two concepts are not isomorphic and, as the book will show, distinctions between them would play an important conceptual role in both disciplines. Crucially, conversation models an embedded activity, involving human speakers and listeners, formal qualities, social interactions and material systems. Attending to conversation forces us to consider material, as well as conceptual, questions—questions that communication theory has often sidelined.

My monograph will develop this theoretical intervention, demonstrating the surprising centrality of 'conversation' to both computing and world literature in the post-war years. It is notable, for example, that when in 1950 Alan Turing proposed his now famous 'Imitation Game' (often called the "Turing Test") which spurred interest in AI, he turned to conversation as a model.[4] Substituting the question of "can machines think?" with the problem of whether a human interrogator can differentiate between a computer and a person using technologically-mediated conversation, Turing promoted the idea that conversation is a uniquely human mode of interaction, yet one that might be rendered programmable in the future. As my book will demonstrate, for computer scientists attempting to automate translation during the Cold War, this contradiction would be operative. Meanwhile, in the arena of literature, we see conversation become an activating metaphor as international institutions attempted to reorient cultural relations in an era of decolonisation: at UNESCO or the RF, friendly conversation became a useful way of enthusing about cross-cultural contact and the "great conversation" world literature might facilitate, while eliding troublesome inequalities. As I argue, such shared terminology and modelling was not coincidental but the product of sustained cross-disciplinary engagement by individuals and institutions. Through attending to such engagement, the monograph will generate new understandings of the role that institutions and individuals have played in the global perpetuation of the "two cultures" binary, while also analysing the ambiguities, resistances, and overlaps that such a history reveals.

Rockefeller Foundation Support for Communication Theory

As a case study, I trace the RF's activities in the field of communication theory, before and after the advent of digital computing. In particular, I examine the role that officers played in promoting the nascent field, in particular via crucial internal conversations across the Humanities and Natural Sciences Divisions. I also sketch out the effects of the RF's shifting program priorities in the Humanities and Natural Sciences Divisions in an era in which hopes for the application of communication theory across cultures, notably via automated translation, were gaining traction in the US. Importantly, my early research into the archive demonstrates that, far from being "two cultures," literature and computing were mutually constitutive in this era.

Conversation was key to the RF's policy formation, grant development and dispersal, and internal communications. When travelling officers kept diaries summarising their schedules, discussions and impressions with advisors, grant holders and potential collaborators. Further, when officers arranged a meeting with an external individual (whether at the RF or further afield), they usually recorded the conversation in an "interview memo," offering a precis of the course of the discussion from the point of view of the memo writer. Such documents provide crucial evidence of the interpersonal networks and knowledge transfer that stimulated RF decision-making. They also capture a form of communication—conversation—that has been a vital paratext for literary studies (and the humanities more widely), but one that often remains ephemeral and outside the archive. These diaries and memos provide the researcher with unusual access to the specific form of communication, albeit print-mediated, that is often unavailable to later scholars and which, crucially, would prove vital to the development of world literature and computing in the postwar years. The RF's internal documentary practices testify to the importance of conversation within the RF to the development of policy, grant support and research itself—whether concerning communication theory or otherwise.

Cross-Division Conversation at the Rockefeller Foundation

The Rockefeller Foundation's role in supporting early basic and applied research into digital computing, in particular what would become communication (later information) theory, artificial intelligence, cybernetics and machine translation, is well known. The RF's crucial early interventions can be attributed to one man: Warren Weaver, a mathematician by training and head of the Natural Sciences Division from 1932. Aside from his main focus on agriculture and experimental biology for the RF, Weaver would work with academic, government and industry contacts (many forged during his WW2 work for the National Defense Research Committee) to facilitate the nascent computer sector. His interlocutors include a veritable who's who of pioneers in this area, including Norbert Wiener, Claude Shannon, Vannevar Bush, John von Neumann, Harold Aiken, John McCarthy and others. It was Weaver who would arrange for the RF to provide bridge funds for MIT's electrical differential analyzer project during the war.[5] He would co-author *The Mathematical Theory of Communication* (1949) with Shannon, a key text in popularising communication theory within the arena of cybernetics and computer research. He is also known as the 'father' of machine translation thanks to his now-famous "Translation" memo (1949), which proposed the use of digital computers to translate between languages, and, later his dispersal of RF funds in support of machine translation endeavours.[6]

This personal and institutional history is relatively well-known to historians of computing. However, what is striking when examining the RF's archives is the degree to which RF support for such computational applications of communication theory built on the groundwork of projects funded within the Humanities Division in the 1930s and 1940s. Rather than the emergence of digital computing and the popularisation of cybernetics in the late 1940s and 1950s leading to an interest in communication theory among humanities and social science researchers, RF records demonstrate that the influence worked in reverse.

Key to this would be Weaver himself. As well as being a scientist, Weaver was a polymath and a big supporter of conversations across disciplines. In particular, he supported the literary arts across his career. A notable collector of and authority on editions of the works of Charles Dodson (Lewis Carroll), Weaver published numerous works on the topic during his time at the RF. In 1964, he would author *Alice in Many Tongues*, a volume dedicated to examining the many translations of Carroll's classic work. In his professional life, Weaver regularly promulgated the value of reading poetry in speeches and articles ostensibly promoting the sciences. As he would point out, "man does not live by slide-rules alone."[7] He was sociable with a number of scholars, practitioners and bureaucrats working in the arts and a good friend of C. P. Snow, scientist, novelist and author of the famed "Two Cultures" doctrine. Weaver's copy of the work is heavily annotated and his files attest to his following the ensuing controversy closely.[8] When he introduced Snow at an event in May 1963, he began not with Snow's scientific credentials but with his literary achievements: in a move appropriate to the mixing of the Two Culture's methods, when lauding Snow's novel sequences Weaver married descriptive and numerical analysis of his style, commenting both that the narrative is "presented with refreshing and illusory simplicity" as more than 80% of Snow's words are monosyllabic, 15% two syllables.[9] In 1963, Weaver would propose his own version of a "Two Cultures" project to his friend, the poet Louis Untermeyer: "a dialogue… between a poet and a scientist …. consisting of a series of letters … [which] should develop as informally as a conversation, but somewhat more thoughtfully and responsibly than a spontaneous conversation would be likely to be."[10] Again—as was the case across the RF—conversation is perceived to be a vital model for the interdisciplinary development of ideas.

Weaver's interest in interdisciplinarity and the arts is also evident in Rockefeller Foundation's inter-office records. He was kept unusually apprised of Humanities Division projects, thanks in part to his good relationship with staff working in this area—David H. Stevens, director of the division from 1932-49, John Marshall, assistant (later associate) director from 1933, and Charles B. Fahs, assistant director (1946) and later director (1950) of the division. Weaver and Marshall were particularly collegial; they swapped literary quotations via inter-office memos.[11] It helped that Marshall himself was interested in theories of translation and the potential application of computing to the humanities more broadly. One

of the more tantalising documents held in the archive is Marshall's 1944 London diary which on its cover announces "Note: Many subjects, such as robots, are purposefully omitted."[12] Humanities staff would regularly turn to Weaver with queries on anything from documentation technologies to science education, and Weaver would send them copies of his latest arts publications. Such contact ensured that Weaver was unusually cognisant of the Humanities Division's efforts to support the study of communications from the 1930s onwards—efforts that would lay the groundwork for Weaver's own support for basic research into communication theory and its applications for computing, particularly machine translation.

Humanities Communication at the Rockefeller Foundation

Warren Weaver's association with the Humanities Division is significant because it allows us to reconceptualise received understandings of the emergence of communication theory. Far from responding to the emergence of cybernetics and communication theory in digital computing, the Humanities Division was actively funding projects in the 1930s and 1940s that would shape the RF Natural Sciences Division's support in the region of machine translation, artificial intelligence and cybernetics in the postwar years.

During his time as director, David H. Stevens produced a number of summaries of the Humanities Division's activities for the RF's trustees, which contain useful program overviews and policy rationale that testifies to this early interest in communication. In line with much postwar American liberal rhetoric, he makes high claims for the role of the humanities in ensuring freedom from oppression (whether political or technological): "More than once the humanist as interpreter of man's place in society has brought about the release of man as individual from the mechanical control of industry or from submission to political dictatorship."[13] Crucially, these reports outline a category of activities entitled "Communication and Interpretation." As Stevens explains:

> To communicate to other minds what one mind, by its interpretation, brings into form for understanding, has always been the work of the Humanities. Their vitality depends on the skill of this interpreter in using active mediums of communication after he has brought to bear on the ideas and experience of man his power of making understanding more humane through interpretation.[14]

Stevens' emphasis on communication speaks to a broad concern across the educated classes in the interwar period concerning the effects of new technologies of mass communication, advertising and propaganda on the citizenry. He and his division staff were unusually forward thinking in conceiving of the humanities as a joint exercise in interpretation and communication. Crucially, he casts communication as the movement of "understanding" between minds—a conception that while still a step away from Shannon's notion of communication as an exercise in statistically-analysable information transfer, does frame the activity, and thus the humanities, in terms amenable to staged analysis. Stevens further notes that, while the majority of university research has hitherto focused on interpretation, "For the Foundation, concerned with human welfare, success in reaching minds is a primary consideration."[15] Following this rationale, across the 1930s and 1940s the Humanities Division would provide funding for projects that explored efficacy in communication, in particular cross-cultural communication.

Before 1939, the projects that the Humanities Division supported included a number of language teaching and cultural exchange projects, aimed at "promoting this world-wide movement toward better understanding through improve means of communication".[16] These included support for experiments with film, radio and public opinion analysis, for Latin American and Far Eastern Studies, and "English for World Communication", which I discuss below.[17] With the outbreak of war, "unusual opportunities appeared to study processes of communication. At the same time, it was clear that the spread of the war would create urgent needs for knowledge of modern practice in communication."[18] During this period, the division would support some of its most influential projects, such as Listening Centers at Princeton and Stanford, Columbia University's Office of Radio Research, exploration of opinion polling at Princeton and projects to analyse

totalitarian communication at the Library of Congress and the New School. Many of these projects and their personnel would be submerged into government initiatives during the war, while also producing seminal findings that would galvanise social science research in the 1950s. The significance of these pilot projects for research in fields outside of the traditional humanities was recognised: in the 1942-1947 report, Stevens describes "the end of a chapter" in the division's support for what he now titles "Mass Communication", which will in future be funded via the RF's dedicated program in the social sciences.[19]

Yet this did not lead to a neglect of the relationship between the humanities and communication; rather, the Humanities Division became increasingly outward-looking on this front. Projects that supported cultural exchange would dominate in the years immediately postwar: for example, support for "microfilm as a means of international communication," for area studies—led ably by Fahs, a former recipient of the RF's first fellowship in Japanese studies and employed by the Office of Strategic Services during the war—and for language training and translation support.[20] It would be the latter that would provide the most fertile ground for overlap between Weaver and the Humanities Division.

Basic English and Cross-Cultural Communication

Support for international communication, language training and translation would form a vital part of the Humanities Division's activities in the years after World War Two, but it started a decade earlier. One particular set of projects would prove fruitful both for the RF's understanding of humanities communication and for Warren Weaver's postwar conception of machine translation. These projects were concerned with Basic English and in particular the efforts of one of its central proponents, the eminent British literary critic I. A. Richards.

Basic English—British American Scientific International Commercial—was an *a posteriori* artificial language consisting of 850 words and designed to improve cross-cultural communication. It was invented by Richards' close collaborator, C. K. Ogden, developed out of their joint work on the seminal volume of literary and linguistic analysis, *The Meaning of Meaning* (1923), and enthusiastically supported by Richards in the 1930s. With its restricted vocabulary, including only 18 verbs, Basic aimed to support international communication by providing an auxiliary language which was simple to learn. In this, Basic was similar to other artificial and universal language movements of the late 19th century and early twentieth, including Esperanto and Volapük, that often envisioned a post-Babel world whereby shared language would guarantee world peace.[21]

The RF would provide financial assistance to Basic English across the 1930s via support for its administrative organ, the Orthological Society of London, of which Ogden was director and Richards closely associated. Specifically, the RF would contribute to projects that were designed to expand Basic English teaching activities into Japan and China onwards (and later into South America), with the rationale that such activities would ensure "the improvement of international communication."[22] With grants totalling almost $71,000 between 1931 and 1938, RF support enabled Ogden and Richards to oversee the establishment of the Orthological Institute of China and campaign for Basic's uptake in a country experiencing rapid modernisation and, in the wake of the May Fourth Movement, profound linguistic transformation. Richards, who had a pre-standing interest in the country and culture having spent time in China in 1929 as a visiting professor at Tsing Hua University, led the project. With RF funding, he would spend time in China in 1936 and 1937-38, promoting Basic and the Institute. These efforts seemed to be bearing fruit with government sponsorship of a nationwide educational programme in Basic tentatively agreed; unfortunately, the Manchurian War and its political fallout would effectively scupper such plans.

Nevertheless, the RF's Basic project in China would shape their understanding of communication—in large part thanks to their collaboration with Richards. As early as 1933, Richards' interest in Basic had developed beyond that of its use as an auxiliary language. As he would explain, "Basic is at some places an almost automatic method of analysis, of taking complex ideas to bits."[23] This justification

of Basic as an interpretative process with a potentially objective basis would find its way into RF internal documents. John Marshall would become enamoured with the possibilities that Basic might offer for science communication and a decade later, as Stevens summarised the RF's historic support for Basic, he would emphasise that in addition to offering a "medium of communication" and a "solid basis of further study of English," it "provides also training in clear thinking by exact definitions of meaning."[24] Richards' involvement with Basic in China would be key for the RF as it was he who would provide the conceptual link between communication and interpretation that, as we have seen, was so central to the Division's priorities in the 1930s. Crucially, he would also position this link within the context of cross-cultural communication.

This link is perhaps best summed up in a 1944 memo Richards sent to Marshall entitled "Objectives of a General Education in a Free Society". Here he describes, in contrast to the "wasteful" nature of many texts, the efficiency of communication toward which Basic aims. [25] He then turns to consider the problem of "Intercultural Communications," noting that:

> Communication within one tradition is hard enough. Communication, equal and reciprocal, between members of different traditions is far harder. The future, however, inexorably, requires us to achieve it. We can only do so by ruthlessly pruning each tradition of inessentials to make the growth of the new conceptions as unencumbered as may be. But since the chief vehicle of each tradition is a literature in which form is almost as important as content, we cannot do this by abstracts and secondary treatments...
>
> This presents a new challenge to scholarship – the preparation of new types of text attempting far more drastically than ever before the separation of what is essential to communication from what is not.[26]

For Richards, efficiency in communication will enable a kind of cultural universalism.[27] Although literature (in contrast to science) might appear to offer a stumbling block to such an endeavour, thanks to its conveyance of meaning via form, in fact it merely offers a challenge in the form of interpretative clarity. His assessment is remarkably upbeat: even Plato's *Republic* can be made translatable

and abridgeable "once the purpose and conditions of maximum general communication have been clarified."[28]

Conclusion: Communication from the Humanities to the Sciences

In Richards' view working within Basic demanded a kind of interpretative "pruning", a movement towards communicative efficiency which could have significant import for international understanding. Such a view offered a humanities-derived theory of communication, which might account for the import of form and cultural-difference while also being amenable to scientific and mathematical modelling. In the late 1940s, the Humanities Division would begin to invest in various language projects that utilised frequency counts, punch card technologies and stylostatistical methods, drawing confidence from Richards' prior theorisations.

At the same time, Warren Weaver would circulate his field-defining "Translation" memo. This memo would cite Basic English very explicitly as a provocation for exploring the mechanisation of translation. In correspondence with cybernetics expert Norbert Wiener, quoted in the memo, which proposes the use of computers to automate translation, Wiener notes:

> I frankly am afraid the boundaries of words in different languages are too vague and the emotional and international connotations are too extensive to make any quasi mechanical translation scheme very hopeful. I will admit that basic English seems to indicate that we can go further than we have generally done in the mechanization of speech, but you must remember that in certain respects basic English is the reverse of mechanical and throws upon such words as 'get,' a burden, which is much greater than most words carry in conventional English.[29]

As Lydia Liu has noted, Wiener here proffers Basic as a semantic system; to which Weaver counters with a statistical understanding:[30]

> The difficulty you mention concerning Basic seems to me to have a rather easy answer. It is, of course, true that Basic puts multiple use on an action verb such as 'get.' But even so, the two-word combinations such as 'get up,' 'get over,' 'get back,' etc., are, in Basic, not really very numerous. Suppose we take a vocabulary of 2,000 words, and admit for good measure all the two-word combinations as if they were single words. The vocabulary is still only four million: and that is not so formidable a number to a modern computer, is it?[31]

Weaver's emphasis on the statistical aspects might seem to suggest a certain disinterest in semantics on the part of the father of machine translation. In fact, as we have seen, Richards' conception of Basic, with which Weaver was extremely familiar, was one that very explicitly engaged with meaning—and the import of form and cultural context on meaning. Here Weaver glossed over the stage of interpretative pruning that communication in Basic necessitates, but recognition of the importance of this stage (or process) was a crucial outcome of his close conversations with RF Humanities Division staff over the previous decades. As my future work on these archives will demonstrate, such recognition would shape his support for RF grants for machine translation and computational research projects in the years that follow.

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[1] C. P Snow, *The Two Cultures and the Scientific Revolution. The Rede Lecture, 1959*. Cambridge: Cambridge University Press, 1959.
[2] Jussi Parikka, *What Is Media Archaeology?* Cambridge: Polity Press, 2012.
[3] N. Katherine Hayles, *How We Became Posthuman: Virtual Bodies in Cybernetics, Literature, and Informatics*. Chicago: University of Chicago Press, 1999.
[4] A. M. Turing, 'Computing Machinery and Intelligence', *Mind* 59, no. 236 (1950): 433–460.
[5] Entries from his diaries across 1937 and the war years testify to close involvement in the project's financial situation across a number of years.
[6] "Translation", July 15 1949, Warren Weaver, "Reprints: Warren Weaver, 1949", Warren Weaver Papers, series 8, box 53, folder 476, Rockefeller Archive Center (RAC).
[7] Letter to Louis Untermeyer, Nov 27 1963, Warren Weaver, "Two Cultures", Warren Weaver Papers, series 8, box 43, folder 419, p. 1, RAC.
[8] "Two Cultures", Warren Weaver Papers, series 8, box 43, folder 419, RAC.
[9] "C. P. Snow", May 28 1963, Warren Weaver, "Two Cultures (C. P. Snow)", Warren Weaver Papers, series 8, box 43, folder 419, p. 2, RAC.

[10] Letter to Untermeyer, p. 3.
[11] e.g. "Kipling on the East" June 2 1952, John Marshall, "John Marshall, General Files", Warren Weaver Papers, series 1, box 3, folder 41, RAC.
[12] "London", John Marshall, Aug 1 1944, "John Marshall, General Files, Diaries – London, England", John Marshall Papers, series 1, box 1, folder 7, RAC.
[13] "The Humanities Program of the Rockefeller Foundation: A Review of the Period 1934 to 1939", David H. Stevens Papers, series 2, box 3, folder 12, p. 3, RAC.
[14] ibid, p. 23.
[15] ibid.
[16] ibid, p. 30.
[17] ibid, p. 29.
[18] "Review of Humanities Program 1939-41", David H. Stevens, RF series 2, box 3, folder 12, p. 4, RAC.
[19] "The Humanities Program of the Rockefeller Foundation: A Review of the Period 1942 - 1947", David H. Stevens Papers, series 2, box 3, folder 12, p. 32, RAC.
[20] ibid, p. 36.
[21]Andrew Large, *The Artificial Language Movement,* Oxford and New York: Blackwell, 1985.
[22] "Orthological Institute – Basic English in the Far East", Dec 11 1935, "Orthological Institute – Basic English 1930-32" RF, record group 1.1, series 401, box 59, folder 780, RAC.
[23] "Memorandum on Basic English Conference, July 20-24, 1933", M. P. Boothman (quoting Richards), "Orthological Institute – Basic English, June- Dec 1933", RF, record group 11, series 401, box 59, folder 782, p. 5, RAC.
[24] "Assistance of the Rockefeller Foundation to the Orthological Institute (London) – Basic English", June 23 1949, David H. Stevens, "Orthological Institute – Basic English, 1942-57", RF, record group 1.1, series 401, box 59, folder 790, p. 2, RAC.
[25] "Objectives of a General Education in a Free Society", I. A. Richards, "Harvard University – Richards, Ivor A., (English Teaching) 1944", RF, record group 1.1, series 200, box 234, folder 2792, p. 3, RAC.
[26] ibid, p. 5.
[27] Such a position clearly develops out of Richard's 1929 trip to China, an experience which, as scholars Rodney Koeneke and Q. S. Tong have argued, demonstrated to him the interpretative misunderstandings that arise in situations wherein a common culture is not shared. One of his first attempts to express this problem in writing was *Mencius on the Mind: Experiments in Multiple Definition* (1932). This collaboration with colleagues L. T. Hwang, A. C. Li and Lucius Porter, reflected on the problems inherent in translating the works of the philosopher Mencius into English. Rodney Koeneke, *Empires of the Mind: I. A. Richards and Basic English in China, 1929-1979,* Stanford: Stanford University Press, 2004; Q. S. Tong, 'The Bathos of Universalism: I. A. Richards and His Basic English', in *Tokens of Exchange: The Problem of Translation in Global Circulations* edited by Lydia H. Liu, 331–354. Durham, NC: Duke University Press, 1999.
[28] "Objectives of a General Education in a Free Society", p. 5
[29] "Translation", p. 5.
[30] Lydia H. Liu, *The Freudian Robot: Digital Media and the Future of the Unconscious,* Chicago: University of Chicago Press, 2010, pp. 85-86.
[31] "Translation", p. 5.