Noam Chomsky: Politics or Science?

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NOAM CHOMSKY ranks among the leading intellectual figures of modern times. He has changed the way we think about what it means to be human, gaining a position in the history of ideas – at least according to his supporters – comparable with that of Darwin or Descartes. Since launching his intellectual assault against the academic orthodoxies of the 1950s, he has succeeded – almost single-handedly – in revolutionizing linguistics and establishing it as a modern science.

Such victories, however, have come at a cost. The "Linguistics Wars" (Harris 1993) began when, as a young anarchist, Chomsky published his first book. He might as well have thrown a bomb. "The extraordinary and traumatic impact of the publication of *Syntactic Structures* by Noam Chomsky in 1957", recalls one witness (Maclay 1971: 163), "can hardly be appreciated by one who did not live through this upheaval." From that moment, the battles have continued to rage.

"Command and Control"

How could a technical book on syntax have produced such dramatic effects? By his own admission, the author knew little about the world's different languages. Indeed, he outraged traditionalists by claiming he didn't need to know. Chomsky was not interested in documenting linguistic diversity. Neither did he care about the relationship between language and human thought or social life. As far as his opponents could see, he was not really interested in linguistics at all. He seemed to be more interested in computers.

By 1957, Chomsky's "Research Laboratory of Electronics" at the Massachusetts Institute of Technology had begun attracting the attention of the US military. It was not that they were disturbed about Chomsky's anarchist politics. Aware of his other activities, they were anxious to benefit from his ideas. Moreoever, they were in a position to pay. The preface to *Syntactic Structures* (1957: 1) concludes:

"This work was supported in part by the U.S.A. Army (Signal Corps), the Air Force (Office of Scientific Research, Air Research and Development Command), and the Navy (Office of Naval Research); and in part by the National Science Foundation and the Eastman Kodak Corporation."

Two large defence grants subsequently went directly to generativist – that is, Chomskyan – research in university linguistics departments – one to the Massachusetts Institute of Technology in the mid-1960s and the other, a few years later, to the University of California Los Angeles. *Aspects of the Theory of Syntax* (Chomsky 1965) contains this acknowledgment:

"The research reported in this document was made possible in part by support extended the Massachusetts Institute of Technology, Research Laboratory of Electronics, by the Joint Services Electronics Programs (U.S. Army, U.S. Navy, and U.S. Air Force) under Contract No. DA36-039-AMC-03200(E); additional support was received from the U.S. Air Force (Electronic Systems Division under Contract AF19(628)-2487), the National Science Foundation (Grant GP-2495), the National Institutes of Health (Grant MH-04737-04), and the National Aeronautics and Space Administration (Grant NsG-496)."

Several questions arise. Why did Chomsky – an outspoken anarchist and antimilitarist – take the money? Secondly, what did the military think they were buying? Both questions are sharpened by the fact that MIT at this time had no tradition in linguistics. This confronts us with a third puzzle: why didn't the investment of military funds go to an institution with a proven record in linguistic research?

Explaining his decision to choose MIT, Chomsky recalls that he felt in no mood to serve an established department of linguistics. He needed somewhere where original thinking could be freely explored:

"I had no prospects in a university that had a tradition in any field related to linguistics, whether it was anthropology, or whatever, because the work that I was doing was simply not recognized as related to that field – maybe

rightly. Furthermore, I didn't have real professional credentials in the field. I'm the first to admit that. And therefore I ended up in an electronics laboratory. I don't know how to handle anything more complicated than a tape recorder, and not even that, but I've been in an electronics laboratory for the last thirty years, largely because there were no vested interests there and the director, Jerome Wiesner, was willing to take a chance on some odd ideas that looked as if they might be intriguing. It was several years, in fact, before there was any public, any professional community with which I could have an interchange of ideas in what I thought of as my own field, apart from a few friends. The talks that I gave in the 1950s were usually at computer centers, psychology seminars, and other groups outside of what was supposed to be my field" (Chomsky 1988a: 15-16).

As for the military, they saw a practical value in Chomsky's theoretical agenda. In a 1971 interview (Newmeyer 1986: 85-6), Colonel Edmund P. Gaines explained:

"The Air Force has an increasingly large investment in so called 'command and control' computer systems. Such systems contain information about the status of our forces and are used in planning and executing military operations. For example, defense of the continental United States against air and missile attack is possible in part because of the use of such computer systems. And of course, such systems support our forces in Vietnam.

"The data in such systems is processed in response to questions and requests by commanders. Since the computer cannot 'understand' English, the commanders' queries must be translated into a language that the computer can deal with; such languages resemble English very little, either in their form or in the ease with which they are learned and used. Command and control systems would be easier to use, and it would be easier to train people to use them, if this translation were not necessary. We sponsored linguistic research in order to learn how to build command and control systems that could understand English queries directly."

Chomsky's followers were by then engaged in just such a project at the University of California Los Angeles, prompting Colonel Gaines to comment: "Of course, studies like the UCLA study are but the first step toward achieving this goal. It does seem clear, however, that the successful operation of such systems will depend on insights gained from linguistic research...." The colonel went on to express the Air Force's "satisfaction" with UCLA's work.

Versions of the Machine

On the eve of the computer age, Chomsky's *Syntactic Structures* (1957) excited and inspired a new generation of linguists because it chimed in with the spirit of the times. Younger scholars were becoming impatient with linguistics conceived as the accumulation of empirical facts about locally variable linguistic forms and traditions. Chomsky promised simplification by reducing language to a mechanical "device" whose design could be precisely specified. Linguistics was no longer to be tarnished by association with "unscientific" disciplines such as anthropology or sociology. Avoiding the obscurities of sociocultural or psychosocial studies, linguistics would be redefined as the study of a "natural object" – the specialised module of the brain which (according to Chomsky) was responsible for speech. Excluding social factors and thereby transcending mere politics and ideology, the reconstructed discipline would at last qualify as a natural science akin to mathematics and physics.

If a theory is sufficiently powerful and simple, said Chomsky, it should radically *reduce* the amount of knowledge needed to understand the relevant data. As he explains (Chomsky 1988a: 17): "In fact, the amount that you have to know in a field is not at all correlated with the success of the field. Maybe it's even inversely related because the more success there is, in a sense, the less you have to know. You just have to understand; you have to understand more, but maybe know less."

Syntactic Structures infuriated established linguists – and delighted as many iconoclasts – because its message was that much of the profession's work had been a waste of time. Why laboriously collect concrete, detailed observations as to how the world's variegated languages are spoken, if a simplifying short-cut is available? In an ice-cool, starkly logical argument that magisterially brushed aside most current linguistic theory, *Syntactic Structures* evaluated some conceivable ways of constructing the ultimate "language machine":

"Suppose we have a machine that can be in any one of a finite number of different internal states .... the machine begins in the initial state, runs through a sequence of states (producing a word with each transition), and ends in the final state. Then we call the sequence of words that has been produced a 'sentence'. Each such machine thus defines a certain language; namely the set of sentences that can be produced in this way" (Chomsky 1957: 18).

As his argument unfolds, Chomsky rules out this first, crude design for his envisaged machine – it clearly wouldn't work. By a process of elimination, he then progressively narrows the range of designs which – on purely theoretical grounds – ought to work. Thrillingly, Chomsky opens up the prospect of discovering in effect "the philosopher's stone": the design specifications of a "device" capable of generating grammatical sentences (and only grammatical ones) not only

in English but in any language spoken (or capable of being spoken) on earth.

Syntactic Structures itself, as it happened, proved unequal to the extraordinary task. Aware of this, Chomsky in his next book (1965) proposed a completely different design for his machine – variously known as the *Aspects* model or as the *Standard Theory*. This in turn, however, had to be abandoned when mathematical linguists Stanley Peters and Robert Ritchie (1969, 1971, 1973a, 1973b) demonstrated that the class of grammars described by the new model was so all-encompassing as to be vacuous. A device built in such a way, they showed, would be quite extraordinarily stupid. In fact, it would be unable to distinguish between (a) any conceivable list of strings of symbols (say, all the decimal places of π, divided into arbitrary sequences and enumerated by value of the products of their digits) and (b) a list of actual strings used by humans for expressing themselves in, say, English (Harris 1993: 179-80). As one critic put it (Bach 1974: 158), attempting to use Chomsky's new model would be like having "a biological theory which failed to characterize the difference between raccoons and lightbulbs".

Responding to all this in the early 1970s, Chomsky introduced a number of changes, offering what became known as the *Extended Standard Theory*, or *EST*. By the late 1970s, further changes seemed required, leading to the *Revised Extended Standard Theory*, or *REST*. Realising that this was still unsatisfactory, in 1981 Chomsky published his *Lectures on Government and Binding* (1981a), which swept away much of the apparatus of earlier transformational theories in favour of a much more complex approach. In its "Principles and Parameters" incarnation, the language machine becomes a box of switches linked to connecting wires:

"We can think of the initial state of the faculty of language as a fixed network connected to a switch box; the network is constituted of the principles of language, while the switches are the options to be determined by experience. When the switches are set one way, we have Swahili; when they are set another way, we have Japanese. Each possible human language is identified as a particular setting of the switches – a setting of parameters, in technical terminology. If the research program succeeds, we should be able literally to deduce Swahili from one choice of settings, Japanese from another, and so on through the languages that humans can acquire" (Chomsky 2000: 8).

Without abandoning this extraordinary dream, Chomsky has recently jettisoned most of the specifics in favour of yet another attempted solution – known as the "Minimalist Programme". It is hard not to suspect that should this in turn be discarded, the patience of even Chomsky's most ardent supporters may run out.

Linguistics as Physics

To his academic colleagues in the humanities and social sciences, Chomsky's programme has caused predictable astonishment, exasperation and even outrage. How could Chomsky imagine it possible – even in principle – to construct a "device" enabling scientists to "deduce" the languages currently or historically spoken across the world?

In replying to such critics, Chomsky accuses them of misunderstanding science. To do science, Chomsky explains (1979: 57), "you *must* abstract some object of study, you must eliminate those factors which are not pertinent ...". The linguist – according to Chomsky – cannot study humans articulating their thoughts under concrete social or historical conditions. Instead, you must replace reality with an abstract model. "Linguistic theory", Chomsky (1965: 3) declares, "is primarily concerned with an ideal speaker-listener, in a completely homogenous speech-community, who knows its language perfectly and is unaffected by such grammatically irrelevant conditions as memory limitations, distractions, shifts of attention and interest, and errors (random or characteristic) in applying his knowledge of the language in actual performance." In this deliberately simplified model, children acquire language in an instant (Chomsky 1976: 15). The evolution of language is also instantaneous (1998: 17). Semantic representations are not socially constructed but innate and preexistent (2000: 64-66). Humans speak not for social reasons, but in expressing their genetic nature (1976: 57-69). Speech is the natural, autonomous output of a specialised computational mechanism – the "language organ" – installed inside the brain of every human on earth.

In his capacity as a natural scientist, Chomsky (1976: 186) correspondingly sees people as "natural objects", their language a "part of nature". Linguistics "falls naturally within human biology" (1976: 123). However, this is not biology as normally understood. Discussing the evolution of speech, Chomsky suggests: "The answers may well lie not so much in the theory of natural selection as in molecular biology, in the study of what kinds of physical systems can develop under the conditions of life on earth ..." (1988: 167).

Language's features may be "simply emergent physical properties of a brain that reaches a certain level of complexity under the specific conditions of human evolution" (1991: 50). More recently, Chomsky (1998: 17) has speculated that "... a mutation took place in the genetic instructions for the brain, which was then reorganized in accord with the laws of physics and chemistry to install a faculty of language". Such appeals to fundamentally *physical* laws are a recurrent theme.

For Chomsky, linguistics can aspire to the precision of physics for a simple reason – language itself is a "natural object" (2000: 106-33). As such, it approximates to a "perfect system" – an optimal

solution to the problem of relating sound and meaning. Biologists, according to Chomsky, do not expect such perfection, which is a distinctive hallmark of physics. He explains: "In the study of the inorganic world, for mysterious reasons, it has been a valuable heuristic to assume that things are very elegant and beautiful." Chomsky (1996:30) continues:

"Recent work suggests that language is surprisingly 'perfect' in this sense.... Insofar as that is true, language seems unlike other objects of the biological world, which are typically a rather messy solution to some class of problems, given the physical constraints and the materials that history and accident have made available."

Language, according to Chomsky, lacks the messiness we would expect of an accumulation of accidents made good by evolutionary "tinkering". Characterised by beauty bordering on perfection, it cannot have evolved in the normal biological way.

It is easy to understand why computer programmers and engineers might find it useful to treat language as a mechanical "device". If, say, the aim were to construct an electronic command-and-control system for military use, then traditional linguistics would clearly be inadequate. Such engineers would need a version of language stripped free of 'meanings' in any human emotional or cultural sense, cleansed of politics – and stripped also of poetry, humour or anything else not accessible to a machine.

But military figures such as Colonel Gaines were not the only people hoping to benefit from the new approach. What of Chomsky's other institutional sources of support? And what about his own fiercely anti-militarist, anarchosyndicalist politics? How did anticapitalist revolution connect with the "revolution" Chomsky inaugurated in linguistics? Indeed, can the two sides of Chomsky's output be reconciled at all? Was the young anarchist tailoring his theories to meet the requirements of his military sponsors – forcing us, perhaps, to question the sincerity of his anarchosyndicalist commitments? Or did he believe he was taking the money – refusing to let this influence his scientific results – in order to secure the best possible position from which to promote the anarchist cause?

Chomsky's Politics

Born in 1928 in Philadelphia, Chomsky (1988a: 13) describes himself as "a child of the Depression". "Some of my earliest memories", he reminisces, "which are very vivid, are of people selling rags at our door, of violent police strikebreaking, and other Depression scenes." He recalls looking out from a trolley car window as it passed a textile factory whose workforce had set up a picket line:

"It was mostly women, and they were getting pretty brutally beaten up by the cops. I could see that much. Some of them were tearing off their clothes. I didn't understand that. The idea was to try to cut back the violence. It made quite an impression. I can't claim that I understood what was happening, but I sort of got the general idea. What I didn't understand was explained to me .... My family had plenty of unemployed workers and union activists and political activists and so on. So you knew what a picket line was and what it meant for the forces of the employers to come in there swinging clubs and breaking it up" (quoted in Rai 1995: 7).

Chomsky's politics, then, didn't have to be learned from books.

Between the ages of two and twelve, Chomsky attended the Oak Lane County Day School in Philadelphia. This was an experimental progressive school which sought to foster non-competitive creativity. Chomsky remembers that the teaching here produced "a lively atmosphere" in which "the sense was that everybody was doing something important". Each child "was regarded as somehow being a very successful student":

"It wasn't that they were a highly select group of students. In fact, it was the usual mixture in such a school, with some gifted students and some problem children who had dropped out of the public schools. But nevertheless, at least as a child, that was the sense that one had – that, if competing at all, you were competing with yourself. What can I do? But no sense of strain about it and certainly no sense of relative ranking" (Chomsky 1988a: 5).

On later entering a city high school, Chomsky was shocked to discover that none of this was considered normal. In other schools, apparently, competitive dynamics were encouraged and personal creativity suppressed. Chomsky (1988a: 6) comments:

"That's what schooling generally is, I suppose. It's a period of regimentation and control, part of which involves direct indoctrination, providing a system of false beliefs. But more importantly, I think, is the manner and style of preventing and blocking independent and creative thinking and imposing hierarchies and competitiveness and the need to excel, not in the sense of doing as well as you can, but doing better than the next person."

Chomsky here identifies the educational philosophy he would resist throughout his life. Chomsky's real education, however, came less from school than from a lively intellectual culture dominated by the radical Jewish intelligentsia of New York. It was, he recalls, a "working-class culture with working-class values, solidarity, socialist values, etc. Within that it varied from communist party to radical semi-anarchist critique of Bolshevism.... But that was only a part of it. People were having intensive debates about Stekel's version of Freudian theory, a lot of discussions about literature and music, what did you think of

the latest Budapest String Quartet concert, or Schnabel's version of a Beethoven sonata vs. somebody else's version" (quoted in Rai 1995: 8).

At an early age, Chomsky was affected by the outcome of the Spanish civil war. "The first article I wrote was an editorial in the school newspaper on the fall of Barcelona , a few weeks after my tenth birthday" (1988a: 13). He describes the defeat as "a big issue in my life at the time" (Barsky 1997: 16). Referring to events in Germany and Italy after World War I and in Spain in 1936, Chomsky comments:

"The anarchosyndicalists, at least, took very seriously Bakunin's remark that the workers' organizations must create 'not only the ideas but also the acts of the future itself' in the pre-revolutionary period. The accomplishments of the popular revolution in Spain, in particular, were based on the patient work of many years of organization and education, one component of a long tradition of commitment and militancy And workers' organizations existed with the structure, the experience, and the understanding to undertake the task of social reconstruction when, with Franco's coup, the turmoil of early 1936 exploded into social revolution" (quoted in Otero 1981: 38).

By his twelfth birthday, Chomsky had already rejected the politics of the Communist Party. Inspired by Barcelona's anarchists, he adopted their defeated cause and in subsequent years has never abandoned it.

Chomsky rejected not only Stalinism but also Leninism, which he associated with elitist attempts at indoctrination of the people. The Spanish anarchists, he felt, didn't try to educate the masses by imposing a rigid ideology from above. They believed in self-organization and everyone's capacity – once personally and politically liberated – to contribute to the revolutionary cause. "I do not doubt", Chomsky writes (1981b: 224), "that it is a fundamental human need to take an active part in the democratic control of social institutions." The "fundamental human capacity", in his view, "is the capacity and the need for creative self-expression, for free control of all aspects of one's life and thought" (1988b: 144). Contemporary capitalist society ensures rewards for the more selfish tendencies in human nature. "A different society", however, 'might be organized in such a way that human feelings and emotions of other sorts, say solidarity, support, sympathy become dominant" (1988b: 773).

Chomsky observes: "We may only hope that human nature is so constituted that these elements of our essential nature may flourish and enrich our lives, once the social conditions that suppress them are overcome. Socialists are committed to the belief that we are not condemned to live in a society based on greed, envy, and hate. I know of no way to prove that they are right, but there are also no grounds for the common belief that they must be wrong" (1988 [1976]: 192).

Chomsky and Academia

In 1945, Chomsky entered the University of Pennsylvania:

"I entered with a good deal of enthusiasm and expectations that all sorts of fascinating prospects would open up, but these did not survive long, except in a few cases..... At the end of two years, I was planning to drop out to pursue my own interests, which were then largely political" (1988a: 6-7).

While actively opposing the establishment of a Jewish state in Palestine, Chomsky met Zellig Harris, who was at that time campaigning for Arab-Jewish co-operation. According to Chomsky, Harris possessed "a kind of semianarchist strain to his thought". It so happened that he was also a charismatic professor of modern linguistics. Chomsky, in his own words, was at this time "a kind of college dropout, having no interest in college at all because my interest in a particular subject was generally killed as soon as I took a course in it". Just "to have something to do", however, he decided to study linguistics under his new friend Harris. Gradually, "I got interested in the field and sort of put it at the center of my concerns" (1988b: 119).

Although he "got interested", however, Chomsky felt by no means qualified. His father had been a noted Hebrew scholar, imparting to Noam a childhood interest in historical linguistics and mediaeval Hebrew grammar. But on attending college, Chomsky felt no enthusiasm for structural linguistics. Neither was he attracted by anthropology or current versions of psychology. Under Harris' influence, Chomsky instead took courses in philosophy and mathematics, "fields in which I had no background at all, but which I found interesting, in part, no doubt, thanks to unusually stimulating teachers" (1988a: 8).

As an anarchist, Chomsky naturally distrusted the state, large institutions in general, the university and all its functionaries. Disaffected intellectuals of this kind, according to one historian (Jacoby 1987: 96-7; quoted in Barsky 1997: 85-6) "are less vulnerable to the corruption of title and salary because their resistance is moral, almost instinctual". Chomsky respected science, especially mathematics and physics. By the same token, he was deeply suspicious of the so-called "social sciences", regarding them as patently ideological. Chomsky dreamed of ridding linguistics of such contamination. He would do this by detaching the discipline from its current institutional affiliations and rendering it purely formal – if possible, purely mathematical. Was it no more than a happy coincidence that this was exactly what the nascent computer industry – and its military sponsors – required?

The Behaviourist Background

Up until this time, speech had been allocated to "culture", in turn thought of as "learned behaviour". During the 1940s and 1950s, the standard paradigm in psychology had been behaviourism – championed in the United States most prominently by B.F. Skinner. Skinner's new book, *Verbal Behaviour* (1957), claimed to explain language as a set of habits built up over time. Rats, Skinner showed, can be trained to perform extraordinarily complex tasks provided two basic principles are followed. First, the tasks must be broken down into graduated steps. Second, the animal under instruction must be appropriately rewarded or punished at each step. This type of learning was termed by Skinner *operant conditioning*. Building on his work with rats, Skinner (1957: 3) argued:

"The basic processes and relations which give verbal behaviour its special characteristics are now fairly well understood. Much of the experimental work responsible for this advance has been carried out on other species, but the results have proved to be surprisingly free of species restrictions. Recent work has shown that the methods can be extended to human behaviour without serious modification."

Skinner accordingly treated human language in stimulus-response terms, identifying "meaning" with the habituated response of the listener to the speech-sounds he or she repeatedly heard. Language was conceptualised as structured like a chain, learned by associating one link – via appropriate approval or "reinforcement" – to the next.

This stress on "learning" was, of course, part of a much wider intellectual movement. It was closely linked to the notion of "culture" that had been central to anthropology since the beginning of the twentieth century. As I have described elsewhere (Knight 1991), Franz Boas and his students founded cultural anthropology in the United States by repudiating Darwinian and social-evolutionary traditions and by forcing a breach with physical anthropology. Their justification for ignoring "nature" was that humans can apparently learn virtually any conceivable cultural pattern given appropriate contact, needing external input because they lack the precise instincts of other animals.

In Britain, anthropologists such as Bronislaw Malinowski and A.R. Radcliffe-Brown later echoed these themes, arguing that man's evolutionary origins were unknowable and in any case irrelevant, breaking with evolutionary theory and instead recommending "functionalism" – a body of knowledge designed specifically to appeal to educators, employers and administrators. Radcliffe-Brown in particular helped redefine the discipline as an instrument of political coercion. "To exercise control over any group of phenomena", as he (1960 [1929]) explained, "we must know the laws relating to them. It is only when we understand a culture as a functioning system that we can foresee what will be the results of any influence, intentional or unintentional, that we may exert upon it."

What the colonial and other authorities needed was an applied science, a rule-book for dealing with indigenous peoples, enabling them to be governed in much the same way that a chemist or physicist can control and manipulate nature. Planners and social engineers – among them Stalin in the Soviet Union – welcomed behaviourism for similar reasons. Like the new anthropology, behaviourism in psychology seemed to offer enhanced techniques for mass education, pacification and control. Stimulus-response psychology, as one historian observes (Harris 1993: 55), encouraged industrialists in the belief that securing co-operative behaviour meant finding in the workforce which buttons to push – and pushing them. Or as Noam Chomsky (1988 [1984]: 131) puts it:

"Those who rule by violence tend to be 'behaviorist' in their outlook. What people may think is not terribly important; what counts is what they do. They must obey, and this obedience is secured by force."

The Language Instinct

Two years after publishing *Syntactic Structures*, Chomsky published a devastating review of Skinner's *Verbal Behaviour*. He had been wise enough not to take issue with, say, the school of child psychology pioneered in the Soviet Union by Lev Vygotsky (1987) or the subtle and fruitful approach adopted by the Swiss developmental psychologist Jean Piaget (1929). Despite major differences with psychoanalysis, these psychologists had echoed Freud in taking as read that humans, like other animals, must have deep-rooted instincts of some relevance to a study of the mind. Chomsky, however, refrained from acknowledging the existence of such scientists. By singling out behaviourism for attack and ignoring everything else, he succeeded in arranging the battleground to suit his own needs.

According to Chomsky, we must choose between one of two mutually exclusive theoretical possibilities. One is that language is "external" to the individual. If that were the case, the child acquiring language would need repetitive training and motivation through external punishments and rewards. Rejecting this, Chomsky's alternative is that language is "internal". The child's pre-installed, genetically determined knowledge of language can simply to be allowed to "grow".

Chomsky's review of *Verbal Behaviour* succeeded, it would seem, beyond its author's wildest dreams. Published in the journal *Language* and subsequently splashed across the front cover

of *The New York Review of Books*, the "case against B.F. Skinner" set in motion a tidal wave of revolt against a school of thought increasingly perceived as Orwellian in its project to shape and manipulate human life.

It was not difficult for Chomsky to associate traditional linguistics with Orwellian aims. Leonard Bloomfield was the major figure in American linguistics between the wars. In 1929, he told the Linguistics Society of America (Bloomfield 1970: 227):

"I believe that in the near future – in the next few generations, let us say – linguistics will be one of the main sectors of scientific advance, and that in this sector science will win through to the understanding and control of human conduct."

Following the Second World War, reviewing the undesirable conduct of large numbers of military personnel and insurgents worldwide, many of Bloomfield's professional colleagues in the United States saw themselves living "at a time when our national existence – and possibly the existence of the human race – may depend on the development of linguistics and its application to human problems" (McDavid 1954: 27-32). The wave of McCarthyite witch-hunting which swept North America during the 1950s was in part premised on the belief that critics of "the American way of life" must clearly have been brain-washed by "communists". In this bitter cold-war context, linguistics was seen as a crucial weapon in the world-wide struggle for ideological control.

Against this backdrop, Chomsky found it easy to present his antithesis as politically attractive and even liberating. Chomsky is withering in his response to the notion – still prevalent in left-liberal circles to this day – that a child must be taught its natal tongue through social pressure, training and example:

"Attention to the facts quickly demonstrates that these ideas are not simply in error but entirely beyond any hope of repair. They must be abandoned, as essentially worthless. One has to turn to the domain of ideology to find comparable instances of a collection of ideas, accepted so widely and with so little question, and so utterly divorced from the real world. And, in fact, that is the direction in which we should turn if we are interested in finding out how and why these myths achieved the respectability accorded to them, how they came to dominate such a large part of intellectual life and discourse. That is an interesting topic, one well worth pursuing ..." (Chomsky 1988: 137-8).

How can language be an ordinary acquired skill? What kind of "skill" is it when humans everywhere in the world "learn" it in basically the same way and in equal measure? Languages – Chomsky points out – are not like other cultural patterns. They are not more or less complex, more or less sophisticated, according to the level of technological or other development. While differing from one another grammatically and in other ways, every human language is an equally intricate, complex intellectual system; none can be described as more or less sophisticated or "advanced".

In all cultures, moeoever, people speak fluently regardless of social status, training or education. There is an innate biological schedule for language acquisition, specifying at what age a new language can easily be mastered and at what age the task becomes virtually impossible. While young children take quickly and easily to learning a new language, adults encounter immense difficulties, often making recurrent basic errors and revealing a permanent tell-tale accent even despite years of trying. Young children not only learn easily: in linguistically impoverished environments, they may creatively invent improvements, developing a language more systematic than any they have heard. It is as if they knew by instinct how a proper language should be structured, anticipating regularities and establishing them inventively where necessary (Goldin-Meadow and Mylander 1984; Gleitman and Newport 1995).

The human vocal tract is a complex arrangement – a combination of disparate structures whose original functions certainly had no connection with speech (MacNeilage 1999). But with its independently controllable parts, the tract as it now exists appears well designed to transmit strings of digitally encoded information accurately and at very high speeds. This, too – as Chomsky's colleague Lenneberg (1967) was among the first to stress – illustrates that there is such a thing as "human nature". No child needs to be taught to babble, any more than it needs instruction in suckling at the breast. The rhythmic lip and mouth movements are instinctive and enjoyable for their own sake. Given even a minimally loving and stimulating environment, the next transition – from babbling to mature speaking – occurs equally naturally. Like the transition from crawling to walking, it is just part of growing up.

The syntactical skills of children mastering a language, Chomsky points out, are acquired with extraordinary rapidity and in unmistakably *creative* ways. The child is not just assimilating knowledge or learning by rote: on the contrary, what comes out seems to exceed what goes in. Children hear relatively few examples of most sentence types, are rarely corrected, and encounter a bewildering array of half-formed sentences, lapses and errors in the language input to which they are exposed. Yet despite all this, they are soon fluent, creatively producing sentences never heard before, knowing intuitively which sequences are grammatical and which are not. In Chomsky's (1959: 57) words:

"The fact that all normal children acquire essentially comparable grammars of great complexity with remarkable rapidity suggests that

human beings are somehow specially designed to do this, with data-handling or 'hypothesis-formulating' ability of unknown character and complexity."

It is as if humans have an *instinct* for language.

Chomsky: Politics or Science?

In accepting military funding for his early language research, Chomsky risked accusations of political corruption. How could an anarchist do such a thing? As if fending off such attacks, Chomsky went out of his way to clarify his political stance. Showing unusual courage, he made speeches advocating civil disobedience in opposition to the United States' war effort in Vietnam.

As the political system is currently constituted, Chomsky (1985: 252) argues, policies are determined by representatives of private economic power. In their institutional roles, these individuals "will not be swayed by moral appeals" but can only be affected by the "costs consequent upon the decisions they make". Chomsky and his allies seemed vindicated when, after the Tet offensive of 1968, the joint Chiefs of Staff pointed out that the deployment of additional troops to Vietnam was being hampered by the need to ensure that "sufficient forces would still be available for civil disorder control" at home (Rai 1995: 115). During these and subsequent years, no American public figure did more to put the record straight on "the United States' invasion of Vietnam" than Noam Chomsky. Other left-wing intellectuals may not have felt quite the same need to deny personal culpability for their country's actions around the world. Chomsky experienced this need as intimate and morally inescapable.

But simply to explain his political stance was not enough. Chomsky's overall programme had to appear consistent. He could hardly afford to let his critics suggest that although his politics were progressive, his linguistic theories were clearly reactionary. His anarchosyndicalism and antimilitarism had to be constructed as consistent with his linguistics. Somehow, the corporately backed and financed "cognitive revolution" in psychology and related sciences had to be presented as *intrinsically* liberating and consistent with Chomsky's political beliefs.

He did not have to look far for a solution. Chomsky projected the "language device" of his electronics laboratory into the brain of the human child. In real life, the human brain is not composed of wires or switch-boxes of the kind a 1950s computer engineer might devise. But if Chomsky's electronic "device" could henceforth be conceptualised as a feature of the maturing human brain, it would nonetheless solve a number of pressing problems.

Central to anarchism is the celebration of spontaneity and self-organization. It must have occurred to Chomsky that a machine defined as autonomous – as freely controlling its own "creative" output – would fit into the anarchist scheme of things. Chomsky could now claim that his commitment to what looked like a box of electronic tricks had a deeper political significance. The commitment in reality was to a resistant and creative human nature. Children don't need to be taught language by external pressure or example because – thanks to the special "device" in their brains – they know the basics already. We "can know so much", as Chomsky (1976: 7) explains, "because in a sense we already knew it, though the data of sense were necessary to evoke and elicit this knowledge. Or to put it less paradoxically, our systems of belief are those that the mind, as a biological structure, is designed to construct".

If human mental nature is intricately structured and resistant, it must set limits to authoritarian control:

"If, indeed, human nature is governed by Bakunin's 'instinct for revolt' or the 'species character' on which Marx based his critique of alienated labor, then there must be continual struggle against authoritarian social forms that impose restrictions beyond those set by 'the laws of our own nature', as has long been advocated by authentic revolutionary thinkers and activists" (Chomsky 1976: 133).

Moving onto the offensive against his left-liberal critics, he explains (Barsky 1997: 208):

"For intellectuals – that is, social, cultural, economic and political managers – it is very convenient to believe that people have 'no nature', that they are completely malleable. That eliminates any moral barrier to manipulation and control, an attractive idea for those who expect to conduct such manipulation, and to gain power, prestige and wealth thereby."

In fact, according to Chomsky, revolution remains possible because of the deep-rooted human instinct to resist.

As we learn a language, according to Chomsky, we are anarchists – not social conformists. The child acquires linguistic fluency in order to express its individual creativity:

"If some individual were to restrict himself largely to a definite set of linguistic patterns, to a set of habitual responses to stimulus configurations ... we would regard him as mentally defective, as being less human than animal. He would immediately be set apart from normal humans by his inability to understand normal discourse, or to take part in it in the normal way – the normal way being innovative, free from control by external stimuli, and appropriate to a new and ever-changing situation" (1972: 100).

Celebrating a rebellious human "nature", Chomsky repudiates the pessimistic view that humanity's "passions and instincts" will forever prevent enjoyment of the "scientific civilisation"

that reason might create. He concludes instead that "human needs and capacities will find their fullest expression in a society of free and creative producers, working in a system of free association ...".

"Success in this endeavour", he continues, "might reveal that these passions and instincts may yet succeed in bringing to a close what Marx called the 'prehistory of human society'. No longer repressed and distorted by competitive and authoritarian social structures, these passions and instincts may set the stage for a new scientific civilization in which 'animal nature' is transcended and human nature can truly flourish" (1976: 134).

In Defence of Science

For Chomsky, so-called social science – premised on the idea that human nature doesn't exist – is irretrievably, hopelessly ideological and reactionary. Intellectuals embrace it not because it is true but, on the contrary, because it is a patent fiction required to keep people ignorant and confused. Writing of school education of the kind typical in the United States , Chomsky terms it "a period of regimentation and control, part of which involves direct indoctrination, providing a system of false beliefs" (Chomsky 1988b: 6). Other components of the system have the same basic function (Chomsky 1988c [1984]: 136):

"Over sixty years ago, Walter Lippmann discussed the concept of 'the manufacture of consent', an art that is 'capable of great refinements' and that may lead to a 'revolution' in 'the practice of democracy'. The idea was taken up with much enthusiasm in business circles – it is a main preoccupation of the public relations industry, whose leading figure, Edward Bernays, described 'the engineering of consent' as the very essence of democracy. In fact, as Gabriel Kolko notes, 'from the turn of the century until this day, [the public mind] was the object of a cultural and ideological industry that was as unrelenting as it was diverse: ranging from the school to the press to mass culture in its multitudinous dimensions'.

"The reason, as an AT&T vice president put it in 1909, is that 'the public mind ... is in my judgment the only serious danger confronting the company'. The idea was also taken up with vigor in the social sciences. The leading political scientist Harold Lasswell wrote in 1933 that we must avoid 'democratic dogmatisms', such as the belief that people are "the best judges of their own interests." Democracy permits the voice of the people to be heard, and it is the task of the intellectual to ensure that this voice endorses what far-sighted leaders know to be the right course. Propaganda is to democracy what violence is to totalitarianism.

"The techniques have been honed to a high art, far beyond anything that Orwell dreamt of. The device of feigned dissent, incorporating the doctrines of the state religion and eliminating rational critical discussion, is one of the more subtle means, though more crude techniques are also widely used and are highly effective in protecting us from seeing what we observe, from knowledge and understanding of the world in which we live."

For Chomsky, the only kind of knowledge which is free from such ideological contamination is genuine natural science. Chomsky disagrees passionately with those social theorists – including historians of science – for whom science itself is just another form of oppressive ideology. He admits that such suspicions have long found favour among his fellow-anarchists:

"Within the anarchist tradition, there's been a certain feeling that there's something regimented or oppressive about science itself, that we should break free of the oppressive structures of scientific thinking, and so on. I'm totally out of sympathy with that attitude. There are no arguments that I know of for irrationality. I don't think the methods of science amount to anything more than being reasonable, and I don't see why anarchists shouldn't be reasonable" (1988a: 22).

With the rise of postmodernism, Chomsky complains, science has become viewed as just another form of manipulative ideology. Whereas in the 1930s, he notes, progressive intellectuals were still running education classes for "the workers" and writing books with titles such as "Mathematics for the Millions", everything has now gone into reverse:

"Today's counterparts of these '30s left intellectuals are telling people, You don't have to know anything. It's all junk, a power play, a white male conspiracy. Forget about rationality and science. In other words, put those tools in the hands of your enemies. Let them monopolize everything that works and makes sense" (Chomsky 1998b: 128).

Chomsky passionately opposes the idea that ordinary people needn't learn anything but can think what they like. Instead of urging us to "break free of the oppressive structures of scientific thinking", he recommends respecting and upholding precisely those "structures". The compatibility between anarchist politics and science, according to Chomsky, is proven by numerous precedents, including the work of Pyotr Kropotkin, whose great book, *Mutual Aid* – a celebration of co-operative self-organization in nature – was "perhaps the first major contribution to 'sociobiology'" (1988: 21).

According to Chomsky, the nub of the matter is that while everyone acquires linguistic competence, not everyone is in a position to conduct scientific research. The difference between the humanities and the sciences, for Chomsky, is that scientists must co-operate with one another across

space and time and therefore be honest. In the humanities, by contrast – as in ordinary life – people are free to ignore one another and can claim whatever they please. In the humanities, scholars tend to feel threatened by science *precisely because* of its unrestrictedly co-operative nature. Equally, they feel threatened by ideas which are genuinely new. Such defects may also afflict disciplines within natural science. But at least "the sciences do instil habits of honesty, creativity and co-operation", features considered "dangerous from the point of view of society" (quoted in Rai 1995: 138). A student in a university physics department will hardly survive without being questioning; in the "ideological disciplines", by contrast, originality is discouraged. Chomsky (1975: 219) complains that in the "domain of social criticism the normal attitudes of the scientist are feared and deplored as a form of subversion or as dangerous radicalism". For Chomsky, the culture of science is the real "counter-culture" to the reigning ideology (Rai 1995: 138).

In recent decades, historians of science have clarified the social and political processes through which research agendas are set and "facts" correspondingly selected and constructed (Kuhn 1970; Latour and Woolgar 1979; Haraway 1989). For many social anthropologists, the concept of a monolithic, unitary knowledge-form known as "science" has yielded to a more pluralistic vision of multiple "sciences" fashioned for diverse social purposes. Western versions, it is widely argued, prevail over indigenous alternatives because their supporters can lay claim to disproportionate levels of economic and military power (Haraway 1989; Nader 1996).

Chomsky does not hold this view. Since Copernicus and Galileo, we have known that the earth is round and that it encircles the sun – facts which remain true regardless of anyone's tribal or religious beliefs to the contrary. For Chomsky, political pluralism doesn't license unqualified persons to intrude as they please into scientific debates. Those who have not mastered the relevant literature – internalising its concepts and terms – have nothing of interest to contribute and should therefore expect to be excluded:

"Look, in the physical sciences there's by now a history of success, there's an accumulated record of achievement which simply is an intrinsic part of the field. You don't even have any right to enter the discussion unless you've mastered that. You could challenge it, it's not given by God, but nevertheless you have to at least understand it and understand why the theories have developed the way they have and what they're based on and so on. Otherwise, you're just not part of the discussion, and that's quite right" (1988a: 16).

Not Part of the Discussion

According to Chomsky, the so-called "social sciences" amount only to political ideology, a defect extending naturally to sociologically conceived versions of linguistics. Consequently, it is right to exclude such perspectives from discussions within science. Those who fail to understand this clearly haven't mastered certain foundational concepts intrinsic to the field. For Chomsky, "society" is not a valid scientific concept. No natural language should be conceptualised as belonging to a social group. Neither should we imagine that in acquiring linguistic competence, children need *social relationships* – science cannot say anything about such phenomena. "Mind" has no necessary connection with "society". To study mental phenomena is to examine aspects of brain structure and function. Ignoring the so-called "social sciences", Chomsky's dream is to unify the sciences by integrating linguistics into an expanded version of physics:

"The world has many aspects: mechanical, chemical, optical, electrical and so on. Among these are its mental aspects. The thesis is that all should be studied in the same way, whether we are considering the motion of the planets, fields of force, structural formulas for complex molecules, or computational properties of the language faculty" (Chomsky 1996: 31).

Consistently with this project, Chomsky defines language as "an individual phenomenon, a system represented in the mind/brain of a particular individual" (1988: 36), contrasting this with the earlier view of language as "a social phenomenon, a shared property of a community". De Saussure (1974 [1915]: 14) wrote of langue: "It is the social side of speech, outside the individual who can never create nor modify it by himself; it exists only by virtue of a sort of contract signed by the members of a community." The problem with such usage, Chomsky (1988: 36-7) complains, is that it "involves obscure sociopolitical and normative factors" – about which science can have nothing to say.

Chomsky denies the relevance of social factors even when considering language acquisition by the human child. The infant's linguistic capacities, he explains, cannot be taught. Instead, they must be "allowed to function in the way in which they are designed to develop" (1988: 173). After briefly discussing this topic, he concludes: "I emphasized biological facts, and I didn't say anything about historical and social facts. And I am going to say nothing about these elements in language acquisition. The reason is that I think they are relatively unimportant" (1988: 173).

Superficial irrelevancies aside, Chomsky views language acquisition as independent of experience: "No one would take seriously a proposal that the human organism learns through experience to have arms rather than wings, or that the basic structure of particular organs results from accidental experience. Rather, it is taken for granted

that the physical structure of the organism is genetically determined ..." (1976: 9-10). Human mental structures develop in the same way.

"Acquisition of language", concludes Chomsky (1988: 174), "is something that happens to you; it's not something that you do. Learning language is something like undergoing puberty. You don't learn to do it; you don't do it because you see other people doing it; you are just designed to do it at a certain time."

Chomsky in Political Perspective

Let us retrace our steps. Consider Chomsky the young anarchist, faced with the problem of breaking into academia. Given his outspoken views, how was he to overcome the many obstacles that would naturally be placed in his way?

It would appear that Chomsky found a way of turning his apparent political handicap into an advantage. Financially and institutionally, the requirement – he knew – was for an agenda the precise reverse of anarchosyndicalism. The 1950s represented the dawn of the new computer age. Key intellectual and technical developments were being funded by the American military. These and other corporate forces required a new version of cognitive and linguistic science, having little in common with what they saw as Marxist-inspired versions of sociology or anthropology. What was needed was a psychology and a linguistics completely stripped of social content or political awareness – a version of these disciplines rigorously re-engineered and fine-tuned to serve the computer age in the name of "cognitive revolution". But how could the left's "natural" ascendancy in these disciplines be overturned? Corporate America needed someone of intellectual integrity and – preferably – of unimpeachable *political* integrity to act as its standard-bearer in organizing the necessary *coup*. Ideally, this person should not only be "left-wing" in an ordinary, run-of-the-mill sense. The perfect candidate would be *sufficiently* left-wing to outflank everyone else in the race. Chomsky in 1957 was the right person arriving in the right position at exactly the right time.

In the event, Chomsky forged an anti-behaviourist coalition linking much of the academic left with those corporate forces – including the military – who were underwriting the development of the nascent computer industry. It was an unholy alliance, and as such was destined to fall apart once the behaviourist enemy had been overthrown. Jerome Bruner (1990: 2-3) recalls:

"Now let me tell you first what I and my friends thought the revolution was about back there in the late 1950s. It was, we thought, an all-out effort to establish meaning as the central concept in psychology – not stimuli and responses, not overtly observable behaviour, not biological drives and their transformation, but meaning.... we were not out to 'reform' behaviourism, but to replace it."

"The cognitive revolution as originally conceived", Bruner (1990: 3) continues, "virtually required that psychology join forces with anthropology and linguistics, philosophy and history, even with the discipline of law."

Once behaviourism had been toppled, however, Chomsky clarified that this was not his vision at all. As Bruner (1990: 40) explains: "Very early on ... emphasis began shifting from 'meaning' to 'information', from the construction of meaning to the processing of information. These are profoundly different matters. The key factor in the shift was the introduction of computation as the ruling metaphor and of computability as a necessary criterion of a good theoretical model."

Information, as Bruner(1990: 4) points out, is a term designed to be *indifferent with respect to meaning*. In computational terms, information comprises an already precoded message in the system. Meaning is preassigned to messages. It is not an outcome of computation nor is it relevant to computation save in the arbitrary sense of assignment:

"According to classic information theory, a message is informative if it reduces alternative choices. This implies a code of established possible choices. The categories of possibility and the instances they comprise are processed according to the 'syntax' of the system, its possible moves. Insofar as information in this dispensation can deal with meaning it is in the dictionary sense only: accessing stored lexical information according to a coded address."

In integrating his new version of linguistics with computer science, Chomsky dispensed with concepts such as "intention", "context" and "meaning" in favour of an insistent and relentless focus on "syntax". It was Alan Turing's great discovery that machines can be designed to evaluate any inference that is "formally valid" – that is, valid *by virtue of the internal syntax of the pre-installed code*. No machine can genuinely talk, because speaking entails understanding what other speakers may have in mind as they draw on their memories and experiences of themselves and others on the biological, social, cultural, religious and other levels inhabited by human minds. Machines are and always will be hopeless at passing themselves off as humans. But, as Fodor (2000: 13) points out:

"... you can build them so that they are quite good at detecting and responding to syntactic properties and relations. That, in turn, is because the syntax of a sentence reduces to the identity and arrangement of its elementary parts, and, at least in the artificial languages that machines compute in, these elementary parts and arrangements can be exhaustively itemized, and

the machine specifically designed to detect them."

Such a system, however, cannot cope with vagueness, with polysemy or with metaphoric or connotative connections – in other words, with the stuff of human language. Consequently, Chomsky and his followers simply stopped talking of meaning – replacing the idea with "computability" instead. Linguists now spoke not of intention, belief or agency but of mechanical "inputs" and "outputs" – notions not too different, as Bruner (1990: 7) points out, from the "stimuli" and "responses" of the behaviourists who were supposed to have been overthrown.

Writing of Chomsky's overall scientific contribution, Geoffrey Leech (1983: 3) comments:

"It has the advantage of maintaining the integrity of linguistics, as within a walled city, away from the contaminating influences of use and context. But many have grave doubts about the narrowness of this paradigm's definition of language, and about the high degree of abstraction and idealization of data which it requires."

Child-language specialist Elizabeth Bates (1984) complains of the "scorched earth" policy deployed by Chomsky and his allies to keep the opposition at bay.

While the overthrow of behavourism was widely celebrated, the "revolution" intended by Chomsky's corporate sponsors had nothing to do with the establishment of a science of human meaning. As these forces championed Chomsky in steering the "cognitive revolution" along channels narrowly defined by their specific commercial and political goals, the intellectuals who had supported generativism "from the left" felt betrayed. Had they been able to unite, they might have comprised a formidable intellectual and political force. In the event, however, Chomsky's politics served him and his sponsors well. Left-wing resistance to Chomsky's science was always tempered by respect for his moral and political integrity. How do you attack an "enemy" who is on your own side? The ambivalence ended up simply paralysing the opposition, whose splits and disagreements left Chomsky with a free hand – which he used quite mercilessly. It is fair to say that most of those linguists and other creative thinkers whose contributions were excluded by Chomsky had political sympathies not vastly different from his own. Together, they could have mounted an impressive intellectual defence of the unity and autonomy of science. In the event, it was Chomsky's defection that sealed their fate. Alienated from the academic mainstream, this talented individual was in effect selected by corporate America to do an extraordinary double-act, playing the role of chief enforcer for the new corporate science at home – while using this very status to gain a hearing as the most eloquent academic critic of US policies elsewhere across the globe.

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