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C.P. SNOW AND THE STRUGGLE OF MODERNITY

John R. de la Mothe

**A Thesis
in
the Faculty
of
Arts and Science**

**Presented in partial fulfillment of the requirements
for the degree of Doctor of Philosophy at
Concordia University
Montreal, Quebec, Canada**

October, 1989

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ABSTRACT

C.P. SNOW AND THE STRUGGLE OF MODERNITY

John R. de la Mothe
Concordia University, 1989

In order to understand the work of C.P. Snow and its historical significance, one must place it in the context of his struggle with modernity. By modernity, we mean the crisis of individuality which has been produced by the schism between science, technology and culture. This study takes the form of an intellectual biography, and takes into account his entire corpus of work. These deal principally with three primary elements of modernity -- literature, science and politics. The methodological strategy is essentially one of critical interpretation. The study's task is both historical and constructive. The examination begins with an outline of modernity and of Snow's involvement in it and is then followed by: an historical discussion of the context for Snow's intellectual development; a deconstructive analysis of his 'two cultures' hypothesis; and a critique of his realist's framework which treats literature, science and politics as important vehicles for individual self-development and the re-humanization of the modern urbanscape.

**Who else is going to give you a broken arrow?
Who else is going to bring you a bottle of rain?
Here we go. Moving across the water.
There you go. Turning my whole world around.**

**This work is dedicated to
D.M. Thompson, F.H. Knelman and my parents.**

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Studies of this sort tend not to be the result of pure library research. Instead they seem to need sustained input from many diverse sources: knowledgeable and supportive people, the stimulation of a larger environment, and the agitation that comes with excess (such as too little sleep and too much coffee). This study is no exception. But if one activity privately signified the development of this work for me, it was tennis. This thesis was first conceived of on the tennis courts of Westmount, Quebec. Its basic parameters were first sketched out at the Players Open (Canadian Championship) in Montreal. Major theoretical difficulties were overcome in conversations which took place on the train from London to Lewes, Sussex following Wimbledon, in the tennis bubble at the University of Sussex, and on the grass courts of Oxford. Textual refinements to the introduction were suggested and discussed at the Elmdale Tennis Club in Ottawa. To all of my partners, your patience did not go unnoticed, and I hope that my 'match chatter' did not prove too distracting. Of course, many other factors also promoted the completion of this manuscript.

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and Café Deluxe, my sincere thanks.

JdlM, Cambridge MA - Ottawa, Ont.
September, 1989

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- Figure 6a** C.P. Snow at home in London (1966) standing in front of Sidney Nolan's Kelly. Reproduced with the kind permission of Mark Gerson.

In me, past, present, future meet
To hold long chiding conference.
My lusts usurp the present tense
And strangle Reason in his seat.
My loves leap through the future's fence
To dance with dream enfranchised feet.

In me, the cave-man clasps the seer,
And garlanded Apollo goes
Chanting to Abraham's deaf ear.
In me the tiger sniffs the rose.
Look in my heart kind friends, and tremble,
Since there your elements assemble.

Sigfried Sassoon

SECTION 1
INTRODUCTION

CHAPTER ONE

LITERATURE, SCIENCE AND THE MODERN MIND

The whole is a riddle, an enigma, an inexplicable mystery. Doubt [and] uncertainty....appear the only result of our most accurate scrutiny....But such is the frailty of human reason....

David Hume

We all carry within us our places of exile....but our task is not to unleash them on the world: it is to fight them in ourselves and others.

Albert Camus

The discourse of modernity is comprised of a cacophony of voices, the interpretation of which can only be described as a struggle. Some of these voices may seem, at the present time, to be those of academic social critics who are involved in the fashionable professional debate over the distinction between modernism, 'High Modernism', and post-modernism.¹ But the voices to which I refer are, more importantly, those which breeze down the streets of our modern urban landscapes and formatively (if unconsciously) reach our ears at the level of economy, fashion and tradition. Each of these voices vies for authority and attention. Each voice offers us but a fragment of that mosaic which is our total identity. And in so doing, each operates within a larger cultural environment which is most known perhaps for its Renaissance dream of unity and for its current condition of rupture.

The struggle of modernity ultimately derives from modernity's tendency to revolt against the normalizing functions of tradition. The modern experience is the experience of rebelling against all that is normative. Its 'task' seems to be to keep us, as individuals, on the edge of meaning and understanding. Thus it should not be surprising that our aspiration to more precisely delineate the parameters of this struggle has become the paradigmatic idea of our age.

The signs of the struggle of modernity are well known to us.² It is signified daily through the images of the crowd and by the perpetual shock of the new. Anonymity and exile are its watchwords. Its central site is the Metropolis and those institutions which - as Max Weber has noted - are most affected by the processes of modernity such as the government department, the university, the law office, and the research lab. The science of modernity (from administration and genetics to particle physics) provides a constant recasting of our physical space and of our role in it. The literature of modernity describes those transformations that are taking place in the public world and in its associated consciousness. It is concerned with city life and (predominantly) with the experience of men.³ The 'heroes' of modernity are no longer sole romantic adventurers but are now the professional custodians of instrumental reason - the scientists, administrators and lawyers. They are those for whom anonymity in the crowd is assured and found in the tacit norms and codified behaviours afforded to them by their profession. They move freely about the modern urbanscape, observing and being observed. But

they are reluctant to develop as individuals for, as they know or sense, the modern world is one in which one can never feel entirely at home. It is a world which presses in on us daily, making demands and forcing choices. It is a world in which both history and our possible futures confront us on every street corner. In such a world which is both foreign yet familiar, the only 'natural' persona which we can seek to develop is one which is both stranger and brother.

While alienation and the disenfranchised individual are among the keywords of our period, we intuitively remind ourselves that to seek out totality or a comprehensive self-identification which is balanced between our private and public experiences is, in fact, the only 'heroism' which may be left to us in the late twentieth century.⁴ Social theorists have said as much. Emile Durkheim, for example, speculated that the idea of totality is reflected in the group nature of society itself. Georg Lukacs contended that it is "crucial that there should be an aspiration towards [such] totality." And Lucien Goldman has claimed that there is a "fundamental need for coherencewhich characterizes all human, social life".⁵ But striking such a balance has become increasingly problematic given modernity's destabilizing inner logic.

The time consciousness that is active in modernity is not ahistorical or anti-historical, but it uses our sense of the past in a way which not only changes our pre-view of the future but also which also undermines our perceived value of the present. As a result, our modernity characterizes the present as little more than a transition period that is consumed in the

awareness of speeding-up and in the expectation of the differentness of the future. Each immediate moment loses its unique meaning as it gives birth to the new. And as the present increasingly understands itself as standing at the horizon of the modern age, it recapitulates the break brought about with the past in a process of continuous renewal.⁶

The myriad dynamic concepts which emerged out of this new temporal understanding gave rise to new terms with which to handle the new meanings of experience. Words such as progress, revolution, innovation and crisis all became key.⁷ Phrases like 'the new civilization', 'the new society', and 'the new world' all came naturally. 'New' was clearly a keyword of the emerging age of modernity. There was Art Nouveau, the New Novel of Zola, the New Drama of Ibsen and Shaw, the New Music of Wagner, the New Journalism of Newnes's Tit-bits, and the New Women of the feminist movement. Moreover, any consumer article in search of a buyer found it expedient to call itself 'new'. Progress was the one quality that was demanded from novelty in art, literature, politics, and morality. While some - like Max Nordau - could sadly observe (in Degeneration, 1895) that "our epoch of history is unmistakably in its decline....Things are suffered to....fall because....there is no faith that is worth an effort to uphold them", others - such as H.G. Wells - could sense new hope and progress in the air. Wells's books, such as New World for Old, A World Set Free, Men Like Gods, and The Shape of Things to Come all express this. But nowhere does he declare his sense of a break with the past so baldly as when his time-traveller excitedly exclaimed that "I have

discovered the future" and "I flung myself into futurity". Modernity came to realize that it must create normality out of itself, and that it must come to terms with its desire to escape itself. The struggle of modernity thus has become a struggle to find meaning and value within a time that is, by definition, a time of the fleeting and of the contingent. The pressure and interpretive difficulty which this has come to imply for the individual who is in search of a comprehensive self-definition within the context of mass society cannot be underestimated.

This is most serious for, as Daniel Bell has argued in his insightful book, The Cultural Contradictions of Capitalism, once past and future became perceptually separated then modernity's 'will to power' was effectively able to 'flood into the void' - pervasively penetrating the values of everyday life on every level.

The pursuant ambiguity and uncertainty which this has entailed has resulted in the widespread 'dehumanization' of the life-world and the demise of the integrated individual personality. The rapid shift towards this status can be easily seen by contrasting contemporary treatments of individual character with those of earlier periods. In early realist literature, for example, individual characters were presented with highly structured personality features and developed their individuality through a life of social interaction. More recently, however, writers have felt unable to do so. "Character, for modernists like Joyce [and] Woolf", Irving Howe has written, "is regarded not as a coherent, definable and well-structured entity, but as a

psychic battle-field, or an insoluble puzzle, or the occasion for a flow of perceptions and sensations. This tendency to dissolve character into a stream of atomized experiences....gives way....to an opposite tendency....in which character is severed from psychology and confined to a sequence of severely objective events."⁸ This hegemonic aesthetic tendency (which is also discernible in music and in the visual arts) is by no means caused by the failure of the literati, or of literary techniques more generally. It is instead a stark reflection of the contemporary 'crisis of individuality' which is evident not only in the arts and in society (witness, for example, the growing distance between the general public and 'the cult of experts'), but in politics as well.

Whereas classical liberalism once held the dichotomy between the private and public spheres for the simple and useful purpose of circumscribing the legitimate areas of possible government intervention in the lives of its citizens, the distinction has today been distorted to the point that, as Michael Walzer has noted, the private sphere of modernity is no longer a privileged space associated with self-development, artistic creation, and self-expression. Instead, the private and public spheres have collapsed so that individuals in liberal society are now "twice alienated".⁹ Under the 'old' liberalism, the public sphere has become an all inclusive category that refers not only to government institutions and its officials, but to the workplace and all areas of everyday life where social cooperation or the cash nexus are present. In this 'collapse of the spheres', the hegemonic value of individualism and of the individual's right to totality have become secondary to the

systemic imperatives of a homogenizing mass capitalistic society. Contrary to the elitist and neo-conservative strategies of Allan Bloom, Ed Hirsch and other ideologues of the New Right, the modern culture of narcissism is not necessarily a culture in which moral constraints have collapsed. Instead, it is that cultural ground which mediates between our private and public worlds that is threatened with disintegration.¹⁰

Fueling this disintegration - through their sheer cognitive, 'logical', and political will to power - is science (which changes our conceptions of ourselves) and technology (which changes relationships with Nature and society). They have become our deepest languages - fostering what is fast becoming a post-literate world. Indeed they have come to pervade our politics and economy, our literature and aesthetics, and even our fashion and desire. They condition the 'iron cage' that is our urbanscape and, together, they constitute our frontiers. In so doing, they contain both a moment of danger and opportunity: 'opportunity' in so far as they perpetually encourage us to rethink the relationships between technique, society and the individual; 'danger' in so far as they too are driven by the inner logic of modernity. As such, and as Daniel Bell and Jurgen Habermas have suggested,¹¹ not only have our public and private personas become threatened with decoupling but - underlying this - as culture and society have become separated, so too has the overt communicative potential been threatened between modern primary discourses. Luckily, there remains considerable covert or buried communication between such important 'voices' as literature and science. The

difficulty is to interpret this deeper level discourse in a way which is useful to developing our own individual senses of totality.

Well before Hugh Kenner, Harry Levin, or Irving Howe¹² were inclined to artificially seal off the period of 'modernity' for the purpose of study,¹³ the work of critics as different as F.R. Leavis and Georg Lukacs was already structured by a shared presupposition that modern literature - and the modern condition generally - acts out of the loss of something primary which it wishes to regain.

Lionel Trilling's crisp designation of the 'will to modernity' as a redemptive search for a realm 'beyond the reach of culture' remains as clear a definition as we have on what is axiomatic in our literary assumptions about the struggle for modernity. To be sure, for Trilling and others, an exemplary 'High Modernist' such as James Joyce stands as that exactly because he fully represents "this intense conviction of the existence of the self apart from culture".¹⁴ But this notwithstanding, modern literature could not resist being a part of the scientific and technological character of the new age.¹⁵

By 1921, when Albert Einstein visited the United States, he - and 'the physicist' in general - had become the new cultural hero and the new physics had become front page news. The models of science presented by Werner Heisenberg, Max Planck, and Albert Einstein (to name but three prominent participants in the second scientific revolution) were dramatically different from those of the nineteenth century, and they appealed directly to modernist politics and literary aesthetics.

For example, Einstein's original formulation of the special theory of relativity in 1905 stated that whereas an event viewed from two separate moving observers may appear different to each, neither observer would be wrong or encounter contradictions if he or she used the same basic laws of physics. The speed of light is a constant. This could lead to apparent contradictions since one person observing the light beam might be moving faster than the other person observing the same beam. What happened, according to Einstein, was that the nature of time and space is altered by motion while the laws of physics remain unchanged. Einstein's later work on a general relativity extended his ideas to cover curved time and gravity.

Max Planck's work also concerned light and motion, but he focused on sub-atomic phenomenon. In 1900, Planck proposed that electrons absorbed or emitted light in quantum units. He also found that there was a constant by which to measure the value of such energy exchanges. These findings required the abandonment of the older notion of a continuum of energy. Einstein later showed that Planck's findings suggested that light was in fact composed of particles which behaved, or could be treated, as a wave.

Werner Heisenberg's 1927 work on the uncertainty principle built on the work of Einstein and Planck and proposed that the error in position measurement multiplied by the error in momentum measurement can never be less than one half of Planck's Constant - or, said another way, that both the position and the speed of an atomic particle cannot be simultaneously known.

The new physics effectively broke down the framework of classical physics, suggesting that space and time were fluid, and that phenomenon changed depending on how they were observed. As the old edifice of certainty was eroded, most physicists agreed that the difficulty in defining light or measuring sub-atomic wavicles was not due to the failings of scientific instrumentation but was rather due to the actual, ambiguous nature of the physical universe. This ambiguity appealed to, and underscored, the ambiguities of the Metropolis and of struggle of modernity itself. Snow understood this. As he put it,

it doesn't need saying that there are some objective reasons....why sensible people in the cities should behave as though they were in a state of seige. The modern city, the city of the last third of this century, is not an entirely reposeful place to live in.¹⁶

Literature drew on the growing authority of science and technology. Foreseeing Lionel Trilling's observation that "in an age of science, prestige is to be gained by approximating the methods of science",¹⁷ and driven by an angst and the will to escape culture at all costs, modern literature both accepted and emulated the images of science and technology. "In an age of transparent technologies, the modernist literature evolved, for itself, a set of parallel technologies. These were both difficult and obscure. *Et ignotas animus dimittit in artes*, the epigraph to James Joyce's A Portrait of the Artist as a Young Man, claims the sponsorship of the fabulous tech-

nologist and warns us not to expect the kinds of books that we've been used to. Arcane skills, "ignotas artes", such as those which enabled the Wright brothers to triumph at Kitty Hawk, have gone into its fashioning. Their machine had nothing to hide - you could see every moving part, just like Joyce's prose - and yet it challenged comprehension. They first flew it in December 1903 and by January 7, 1904 Joyce had effectively adopted the persona of Daedalus."¹⁸ Like the technology of its time, literary modernism sought, as evidenced by books like Ulysses and poems like Ezra Pound's The Cantos, to share in the authority of science and technology, and to become itself deeply technological. This occurred at all levels of experience.

As Hugh Kenner has already articulated, "the internal combustion engine altered our perceptions of rhythm....X-rays showed us transparent planes of matter....[and] the wireless superimposed voices from twenty countries on top of one another (Finnegan's Wake)....Words moved on wires. Distant voices sounded in our ears."¹⁹ And under a rigorous scrutiny, both the text and ourselves began to dissolve. Science began to publically erase the anthropocentric view of cosmology. Technology began to increasingly re-define both the role of words and of ourselves in relation to the text and to Nature. It simultaneously embodied and promoted an aesthetic and a worldview. The 'gear and girder' technologies of the early twentieth century totally displaced the then still dominant Romantic view of a natural, spiritual world. When Henry David Thoreau wrote in 1844 that "poetry....is a natural

fruit", he presumed a very different world from that of the twentieth century poet, William Carlos Williams, who called a poem "a machine made of words".

It has been said that "every old master has his own modernity" in so far as he captures the look of his era. However if this was simply true, then the idea of modernity would be emptied of all its weight and concrete historical content. We must be grateful, therefore, to Charles Baudelaire who - building on this notion - insisted that the first categorical imperative of modern life must be for the true master - for the sensitive individual - to orient him - or herself towards the primary forces of modernity.²⁰ In so far as literature, science and politics can legitimately be seen as constituting powerful primary forces of our most recent past, then C.P. Snow must be seen as one of our masters. Indeed, perhaps nowhere can the struggle to find a comfortable median between our public and private persona, and to achieve a totalizing personal view of this different world, be more significantly seen than in the fiction and non-fiction work of Charles Percy Snow (1905-1980). What distinguishes C.P. Snow as a participant in the struggle of modernity is not his urge to escape culture. It is instead his wish to fully participate in culture - in the authoritative discourses of modernity - which presents him as

a unique and powerful figure. His participation comes through an aggressive realism which attempts to embrace three major dispositions of the modern mind: these being literature, science, and politics. The *raison d'être* behind Snow's work is to illustrate the grounds upon which a mediation between public and private spheres can be realized, and as such his work amounts to a highly individual attempt to reconstitute modern culture as a cognitive and meaning-generating enterprise. His writings were consumed by an awareness of the alienation and angst that can be found in the Metropolis. But to this he brought an understanding of the influence of science and technology on our perceptions of the individual and on our notions of rationality, an understanding of the profound influence that is (often) latent in literature, as well as an appreciation of the fundamentally political quality of modern life. He refused to isolate these dispositions from each other, seeing them instead as being intimately linked. His writing was relentlessly in search of means through which to strike a balance between the necessities of social institutions and the needs of individuals. Indeed, Snow saw Man's fulfilment in modernity as lying, not in withdrawal and despair but, in his or her participation in society. Those who choose to hide from, or ignore, social life were, in Snow's schema, anomalies who could never find a fully functional self-definition at either the aesthetic, cognitive, or political levels.

While clues as to the exact character of Snow's overt interests in modernity are not readily evident, they can be found in a variety of places. For example, his concern with the mediation between spheres is symbolically

suggested in his heraldic device. Designed by himself and his wife on the occasion of being made Lord Snow of Leicester in 1964, it depicts crossed pen and telescope which represent the relationship between art and science. It also depicts a motto which typifies Snow's approach to the struggle of modernity par excellence: *Aut Inventiam Viam Aut Faciam* ('I will either find a way or make one'). (See Figure 1)

Snow's interests in the loneliness of the individual condition are highly visible in the cover which he chose for his 1978 book, The Realists: Portraits of Eight Novelists. (See Figure 2) The selected painting by Louis Anquetin, La Place Clichy (1887) admirably displays the anonymity of the crowd, the world at dusk, the capitalist world of the shopkeeper, the Metropolis, and the world of fashion.

And closely related, Snow's interest in 'man alone' is quietly evident in his use of three works by Australian artist Sidney Nolan on four dust jackets.²¹ (See Figures 3, 4 and 5) Each - like the Nolan work which hung above Snow's home mantlepiece - demonstrates the hero of modernity. (See Figures 6 and 6a) The hero is anonymous, lonely and yet invincible. The figure of 'Kelly', for example, which was a prominent figure in Nolan's work, rides "in the armour of self-containment across the desolation of the wasteland". In so far as Kelly represents Nolan and modernity's hero, he also represents the efforts of Snow to mediate between the public and private spheres, to "invade the landscape, so the landscape....[can] invade him".²²

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Figure 1



Figure 2

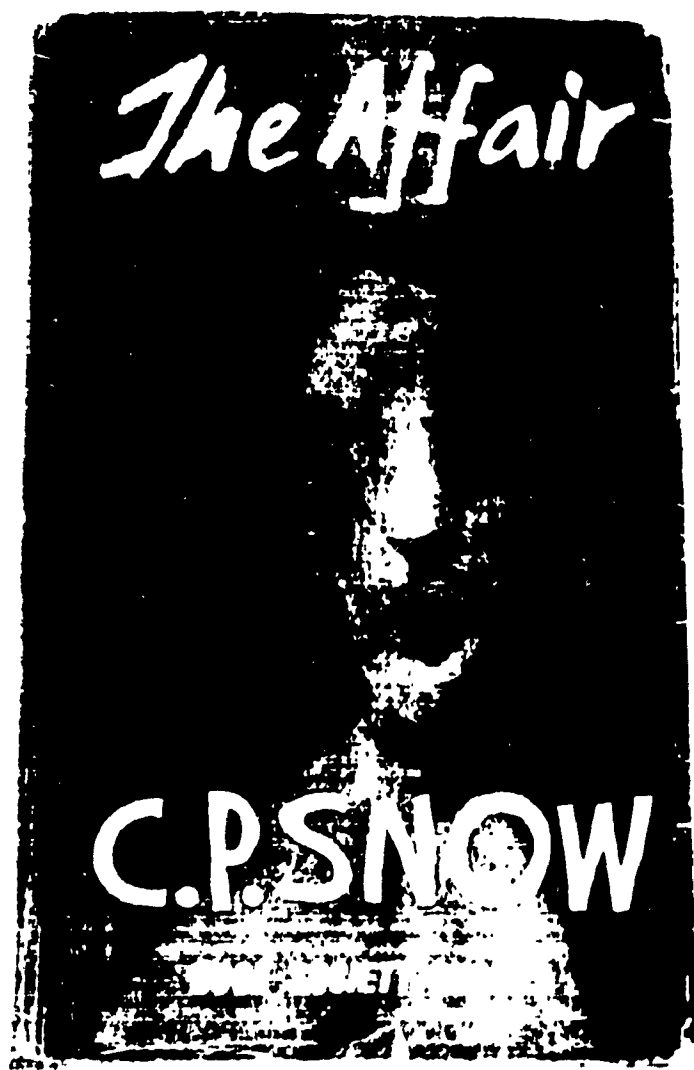


Figure 3

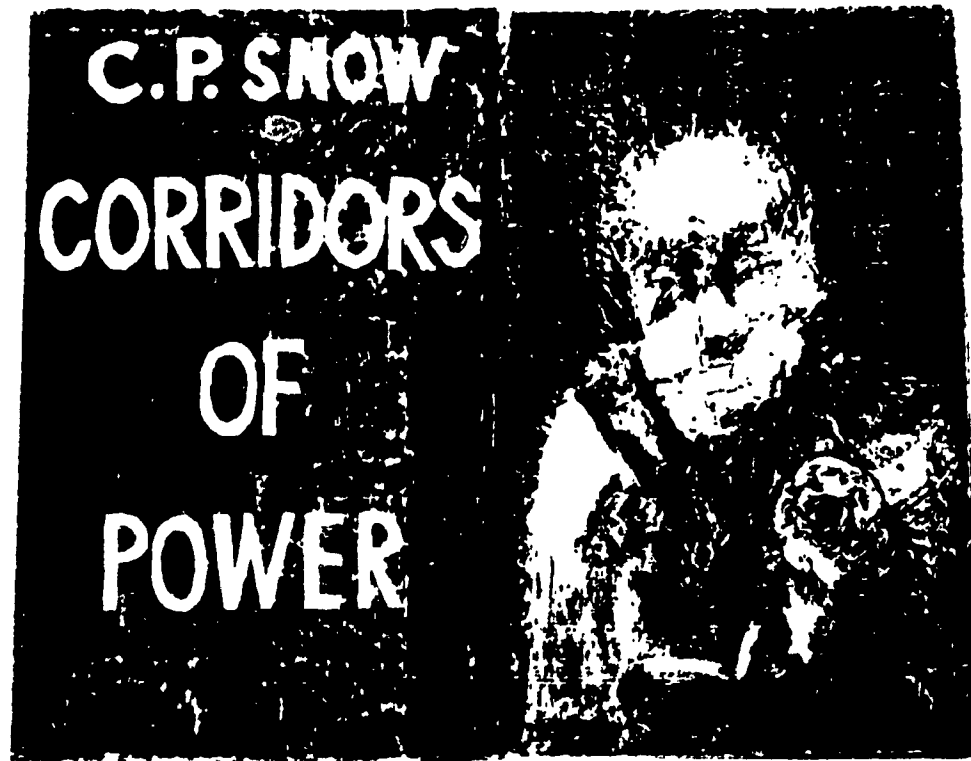


Figure 4

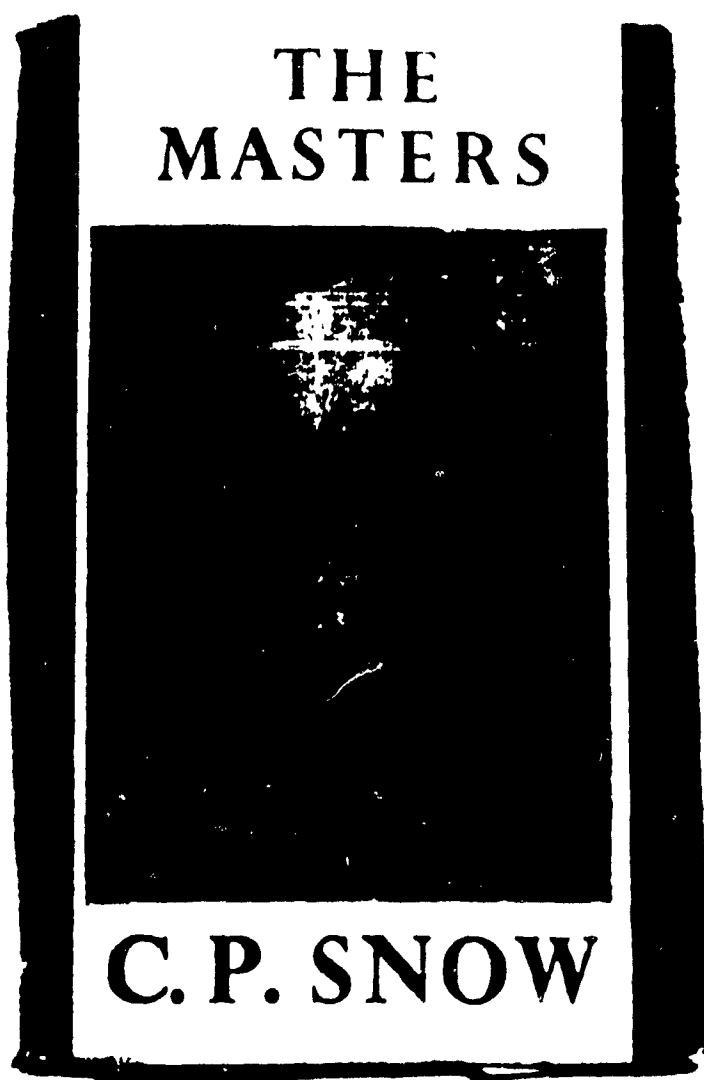


Figure 5

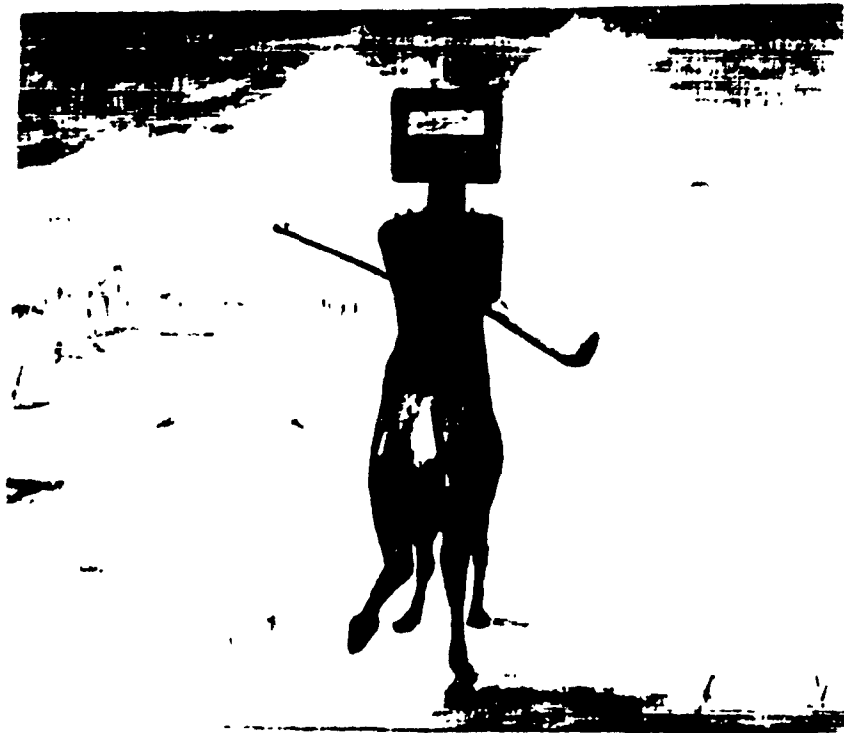


Figure 6



Figure 6a

Other, less visual clues, are also apparent in Snow's writings. Throughout Snow's fiction, his heroes are modern professionals: they are either scientists, lawyers, and administrators, or they are politicians and industrialists. Together they represent the revolutionary 'new men' of modernity on whose back the promise of social change and progress is born. They are reflective in their lives, but progressive in their rationality. Snow's fictional sites are all universities and laboratories, offices or government departments, and as such he attempts to use these settings in order to show us the motives and ambitions of 'revolutionizing' professional men at a time when science and technology were actively re-defining the modern world and the modern mind.

And yet, despite these clues, the relationship between Snow and modernity has not yet been made. The exact nature, quality, and significance of Snow's efforts has largely gone unrecognized. Certainly since his death on July 1, 1980,²³ as Robert Fulford has said, "the waters have seemed to have closed above Snow's head, with both the humanist and scientific communities acting as if he hadn't existed".²⁴ Indeed to risk an only slight overstatement, since his death, Snow's contribution to our understanding of the struggle of modernity has run the risk of being lost altogether.

In part this has been due to the sheer weight of modernity in its tendency to maintain a fragmented perception of reality and of discourses. As a result, literary assessments of Snow's work have focused almost exclusively on his literary style, plot lines and character building - almost to

the total exclusion of the importance of science and politics in his conceptual schema. Indeed literary assessments have (with the rare exceptions of Saguna Ramanathan's most sensitive introduction and Frederick Karl's articulate - if now dated - analysis) attempted to 'cage' Snow either as a late-nineteenth century realist or as a "crass Wellsian".²⁵ Those who have focused on the political dimensions of Snow's work have ignored the evidence of his literature and have tended to inaccurately portray Snow as an ideologue. And the central importance of science in Snow's thought has been totally ignored, treating his own scientific background and themes as if they were simply cute, unimportant, or meaningless in terms of his literature. Indeed, to date, assessments of Snow's work have behaved as if the barriers between what Snow called 'the two cultures' of the arts and sciences were in fact real and impenetrable. As one prominent literary academic revealingly phrased it during an interview with Snow shortly before his death, "can you tell a dummy like me what crystallography is?"²⁶ Surely, if we are to understand modernity as a complex but structured totality, then we must move beyond such barriers to understanding. Fearing the unknown discourses of modernity - or refusing to confront the sources of authoritative imagery in our own individual worlds - will only freeze our actions in a continuous present and negate any prospect for future progress. Equally it will relegate us to living with an impoverished legacy of C.P. Snow.

The basic biographical details of Snow's life are, by now, well known. He was born on October 15 in 1905 in the provincial city of

Leicester, England. He was the second of four sons in a lower middle class family. He received his B.Sc. in 1927 and his M.Sc. in 1928 from what is now Leicester University. He took his Ph.D. in Physical Chemistry in 1930 from Cambridge University. He was Fellow (1930) at Christ's College, Cambridge, was made Tutor (1935-1945) and was Editor of the popular science journal called Discovery (1939-1942). He became Commander of the British Empire (CBE) in 1943 for work which he carried out during the war as the Technical Director at the Ministry of Labour, a post in which he recruited scientific personnel during World War II. In 1943, his name appeared twice on Himmler's Special Search List of individuals the Gestapo thought should be 'dealt with' immediately.²⁷ In 1944, he became Director of Scientific Personnel for the English Electric Company (a post that he held until 1964). He was Civil Service Commissioner from 1945-1964 and book reviewer for the Financial Times (1949-1952). In 1950 he married the novelist, friend of Augustus John and the ex-fiancee to Dylan Thomas - Pamela Hansford Johnson. He was knighted in 1957 and made Lord Snow in 1964. He took on the post of Junior Minister of Technology in the House of Lords under the Minister of Technology, Frank Cousins, in the Labour government of Harold Wilson (until 1966). He again became a regular reviewer for the Financial Times in 1970, and died at the age of seventy-five in 1980.

During his life he collected numerous awards and prizes including 31 Honorary Doctorates from universities in the U.S., Canada and Great Britain. He was at one time generally thought to be a serious contender for

the Nobel Prize in Literature and for a Fellowship in the Royal Society of London - both awards which he would have cherished. But in the end, both awards eluded him.

He is most remembered, perhaps, for his controversial 1959 Cambridge lecture on The Two Cultures and the Scientific Revolution and for his 1960 Harvard lectures on Science and Government. But it is in his literary output that he is most memorable. Some of Snow's novels are among the best in print. Among these I include The Search, George Passant, The Masters, The New Men, and The Affair. However, others are decidedly mediocre, as is New Lives For Old. Nevertheless, between the publication of his first novel in 1932 and his last book of non-fiction (published posthumously) in 1981, Snow offered the world what is perhaps the most sustained and intelligent assessment of our times than has ever been attempted. In so doing, Snow authored 17 novels, 12 non-fiction books, 9 plays,²⁸ and literally hundreds of book reviews, articles, chapters, or lectures. The largest component of Snow's fiction is comprised of a series of 11 large novels, written between 1940-1970, and known collectively as Strangers and Brothers.²⁹

What this study offers is not a literary critique which deals with each of Snow's novels - nor is it intended to be a biographical assessment of Snow. Instead, the task of this study is both historical and constructive. It's purpose is to recover the significance, meaning and limitations of C.P. Snow's struggle with modernity by directly focusing on the three major

dispositions of modernity which comprise his realist framework - literature, science and politics. In so doing, it seeks to demonstrate both the relationships and tensions which made Snow, like ourselves, an intimate part of our culture. The method of this study is essentially one of critical hermeneutics in which Snow's life, fiction and non-fiction all become texts and forms of discourse to be topographically levelled and evaluated against the contours of his specific historical context.³⁰ As such, I assess what Frederic Jameson calls 'the political unconscious' - that is, those links which exist between narrative and history, between form and substance. The organization of this study leads section two (Chapters 2 and 3) to examine the historical context in which Snow developed with a particular reference to these literary and scientific reactions to the modern age which were to be formative for Snow. It also attempts to provide a critical distance between ourselves and the dominant readings of Snow's most notorious text (The Two Cultures and the Scientific Revolution). Section three (Chapters 4, 5 and 6) focuses expressly on literature, science, and politics in Snow's work and in so doing attempts to construct an understanding of the totality of Snow's framework. In the end, it is the purpose of this work to have evaluated the contribution that Snow has made to our understanding of ourselves and to the struggle of modernity.

Two major premises inform this study. Firstly I believe that the distinction between the 'two cultures' has been so overquoted that it has lost all of its meaning. Our ability to view Snow in toto has suffered as a result.

Secondly I hold that understanding C.P. Snow's totality can teach us about our own strategies for interpreting the world around us. It can help us to understand our surroundings and it can tell us something about reading various forms of discourse which vie for our attention and which combine to make up our realities.

A word of caution is in order, however, for in the 'Snow' I present there is no 'movement'. There is only an individual - a story-teller for an atomic age - who has lived in privileged spaces and who wanted to relay something about our condition to us. In many ways, his was the voice of hope. He was a defender of modern Man and of our individuality. He was a defender of our consciousness, our choices and of our ability to reason. He was the prototype of potential, a man in touch with the dialectical frontier of the struggle of modernity. And whether we like it, or not, that frontier is where we are all going.

SECTION 2
CONTEXT AND DISTANCE

CHAPTER TWO

STRANGERS AND BROTHERS AGAINST THE GRAIN

Science has become self-conscious.

J.D. Bernal

a nervous and haunted imagination

Duncan Grant on Ulysses

The period into which Snow was born was a decidedly modernist one of change, vitality and contradiction which exerted a powerful and lasting influence on the development of Snow's individualist's framework. His social migration from lower-middle class provincial Leicester to the intelligentsia of Cambridge and the bureaucracy of London made him acutely aware of the tensions between public and private life. It paralleled many of the transformations that were implied in the emergence of the Metropolis.¹ His cognitive perspective powerfully reflected the convergence of responses - that were carried within - and between - the radical science and literature of the period. And his unique synthesis of political insights underpinned both his social hope for totality and his ultimate collapse under the weight of modernity into a disconnected 'darkening' vision² reveal the extent to which Snow himself was trapped in the tensions that are modernity. However, this having been said, it would not be a profitable exercise to discuss and assess the significance of Snow's complex triptych of literature, science, politics without first achieving

an understanding of the context and debates which shaped Snow's sensibilities, and in which Snow participated. Approaching such an understanding is the purpose of this chapter.

The years surrounding the birth of Charles Percy Snow on October 15, 1905 were years in which the Victorian spirit of optimism continued to hold considerable sway in English thought, politics and social practice. As Snow himself said, he "was a man of [his] time", and nowhere else would the young Snow receive clearer signals of this than from his own lower-middle class family and the provincial city of Leicester.³ He grew up in a building - purchased in 1898 - which was once part of the Victorian Liberal Club.⁴ His great grandfather, who moved to the Midlands with the Industrial Revolution, was illiterate and a self-taught engine fitter - a fact that Snow was very proud of.⁵ The Snow family library included many of the typical readings of the Victorian 'self-help' movement including The Discoveries and Inventions of the Nineteenth Century, The Penny Magazine, The Illustrated London News, and John o'London's Wide World.⁶

Snow's father, who was an organist and Fellow of the Royal College of Organists (FRCO), moved to Leicester in the late-1890s "to go where the money was"⁷ and to become a clerk in a boot and shoe factory. Despite the fact that the Snow family endured the social disgrace associated with the father's involvement in bankruptcies - two with firms he was employed by and one when he was in business on his own -⁸ the fact that Snow's father was

'a FRCO' was made to give Snow an early, overt and strong sense of class as well as a clear idea of what some of the 'markings' of successful people were.

Leicester, at the time, was growing quickly. The population between 1851 and 1905 more than tripled - rising from 60,642 to 226,547⁹ - while the city became increasingly industrial and oriented towards satisfying London's expanding consumer demand. The city's employment in the footwear industry, for example, rose from 1,393 to 25,978. This reflected a number of converging factors - all of which were discernible, even to a young boy like Snow - ranging from the expansion of the rail lines from London, the diffusion of mechanized technology, and the growth of London as both a hub of politics and as a source of cultural ideals.

At a deeper level, the period of Snow's youth was an age of rapid transition in which, with the decline of liberalism and the growing momentum of socialism, the legitimacy of the old patterns of authority was repeatedly challenged.¹⁰ It is not surprising, then, that Snow defined a 'sane society' as one which embodied "liberal-socialist attitudes". The transition was manifested in myriad and unexpected ways, and implicated not only longstanding political traditions but cognitive and creative patterns as well.

Underlying this shift was a clustering of moods and events which could not go unnoticed. The growing pessimism of the *fin de siècle* and the void caused by the collapse of *la belle époque*, together with the unprecedented slaughters on the battlefields of the First World War, the equally 'bloody' scientific revolution which turned our physical understanding on their

head, the Russian Revolution of 1917, and the economic crises of the 1920s and 1930s, gave rise within the creative communities of Britain to a potent mix of revulsion against the existing society and faith in the possibility of its transformation. The net effect of this broad-based renegotiation was a blurring, and at times a complete erasing, of many traditional boundaries which had existed in the stable 'pre-modern' society between politics and culture.¹¹

Two of the most powerful expressions of this came from the scientific and literary communities through a re-consideration of their function in this 'modern world'. The titular head for both was Cambridge, and both sets of reaction were to be formative in the development of Snow's own outlook. In both, Snow was to be first an observer and later an active participant. His involvement in the scientific community came through several levels. For example, he was a researcher at Cambridge (1928-1935) in one of the most revolutionary fields of science.¹² He was a colleague and friend of those who forged the debate on the modern social function of science between 1914 and 1945 including J.D. Bernal and G.H. Hardy (who appear as characters in the Strangers and Brothers series of novels). And he was a Tutor and Editor of the Cambridge-based popular science-journal Discovery (1937-1940). While Snow developed his scientific credentials, it became increasingly necessary and unavoidable for him - as a budding serious novelist, to observe and respond to the dominant literary reactions to change which were shaping the novel form, its language and its implied political

sensitivities. Among those who played an active part in these literary transformations were Virginia Woolf, James Joyce, Wyndham Lewis, and Richard Aldington.¹³ Their voices could be heard from the Gordon Square home of the Bloomsbury Group which was in many ways an extension of the Cambridge Society of Apostles,¹⁴ and from such *avant-garde* magazines as Blast and transition.¹⁵ Neither group mixed socially -¹⁶ indeed Snow would later cast this simple observation in his controversial terms of 'two cultures' - and yet both communities were inexorably linked through the charged climate which they shared. To paraphrase both Walter Benjamin and Snow, they were strangers and brothers who struggled against the grain.¹⁷

For some within these communities, it was a time of great opportunity which was signified by new forms of conception and action. For those who were caught up in the energy of the period, as were both J.D. Bernal and Richard Aldington, the many social contradictions of the age served to solidify their commitments to liberal causes while at the same time entrenching their fears of repressive governments. In their view, the tensions of the period could be effectively used to increase the political momentum of then marginal elements of society - including both science and literature.¹⁸ To them, political and aesthetic marginality was seen as becoming the *avant-garde* for effective social progress and transformation.

For many others, however, it was a time between time - a period that was conceived of as being an epistemological and social 'No Man's Land' of despair, angst, and lost meaning. From their perspective, the past was

unrecoverable and the future offered no hope. Their emergent awareness of change, coupled with a growing consciousness of their marginality was to lead, not to progress and social transformation but, to psychological and social collapse - as it did in 1915 for Virginia Woolf. For those who shared this view, the rise of political reactionism at this time was the result of a reversal in values which itself was grounded in the ashes of positivism.¹⁹

Between these poles of reaction, no clear set of concerns is discernable. The political and cultural attitudes of the involved scientists and literati were often marked by as much contradiction, ambivalence and electricity as the age itself. Thus, exactly where the distinction lies between a dominant modernist centre seen to be reactionary and a more marginal political liberalism fighting for more progressive social change is not at all clear. However what is clear of this period is that cultural innovation and revolutionary politics were powerfully drawn together. Moreover, each reaction was tied - as it would be with Snow's reaction - firmly to the social sphere; *engagé* with the urban struggle for modernity and ranging across a broad frontier of tense confrontations - from the style, form and content of literary expression²⁰ to the social responsibility of science,²¹ and ultimately, to the very frontiers of liberal ideology itself.²²

Prior to 1914, in a time often associated with both the 2nd phase of *la belle époque*²³ and the growing crisis of British capitalism,²⁴ Britain was still clinging to the polite and gay facade of a permanent and stable society. In so far as this is true, however, the dominant imagery of the age must be

seen as being highly problematic. The arts were flourishing, as were the dance halls and galleries. Following the now-famous 1910 London exhibition which was sponsored by the Cambridge Apostles Roger Fry and Clive Bell, Impressionism was giving way to the achievements of Picasso and Gauguin. Debussy and Wagner were establishing musical styles. Both the formidable Sarah Bernhardt and Maurice Chevalier, with his bowler hat and cane, were entertaining the gentile classes of London and Paris. While the fiction of the Continent was becoming more varied and distinctly bohemian,²⁵ the fiction of Britain responded to the increasingly pervasive urban experience by attempting to recover a mythical past, complete with dominant values and imagery of the affluent country gentlemen and home, thus forcing the novel form to become comfortably rural in its character.²⁶

At the same time, deep economic and political instabilities in Britain were becoming pronounced and increasingly apparent.²⁷ The antiquated paradigms of financial and industrial management which had become dominant in Britain over a century of successful overseas trading had left British firms, and the British domestic economy generally, technologically obsolete, uncompetitive, and at increasingly odds with its labour force.²⁸ The Snow household experienced some of this tension in a direct fashion. The political and trade union arms of the labour movement had grown in numbers, strength and militancy, so that between 1910 and 1914 a wave of major strikes which were augmented by record high unemployment had clearly

signalled to the world that Britain was in serious political and industrial trouble.²⁹

Thus, the proliferation of strikes and plant closures, the economy's decreasing productivity and the arming of Europe all combined with a facade of social and artistic gaiety to create an environment in Britain and throughout Continental Europe which was electric with stress and contradiction. What is clearly discernible beneath this cultural and economic veneer is a panic state in which there was an unconscious, yet widespread, yearning for the mythical stability of earlier years. Much of the fiction, poetry, drama, and music³⁰ was, in fact, trapped in a time warp of the pre-war years in which a timid and stylized version of the past dominated. Chevalier's hat and cane were nothing more than lingering anachronisms. Art, literature and politics were still firmly grounded in the ideas of the 19th century. And although life seemed affluent, stable and peaceful, traditional society was nonetheless crumbling.³¹ The ideas which were coming to dominate the creative communities and which were to be formative for Snow represented a deep splintering of the Victorian tradition.

The traumatic event that punctured the past was the outbreak of World War I. As Gertrude Stein put it, "the world collapsed on August 1, 1914" with the mobilization of troops in France. "It was then that the twentieth century began". D.H. Lawrence agreed and observed that, to him, "the old world [had] ended....[and was replaced by] a vortex of broken passions, lusts, hopes, fears and horrors...."³² Henry James was able to echo aggressively

that his was "the imagination of disaster" in which life became "ferocious and sinister" before he finally conceded that he stopped writing novels because

the social aspect of the world changed so much. I had been accustomed to write about the old - fashioned world with its homes and its family life and its comparable peace. All that went, and though I think about the new world I cannot put it into fiction.³³

Virginia Woolf, as well, chronicled the fundamental meaning of a world in turmoil. She noted along with everyone else that "human character changedAll human relations [had] shifted....And when human relations change there [would be] at the same time a change in....politics, and literature. To many of the literati, the new or emerging (as yet unclear) conditions of life were confounding. Old styles of writing now seemed inadequate. Old subjects of writing were dusty or no longer existent. And old relationships, ranging from friendships and family units to the once-felt 'security of knowing one's place' in a rigid social class system, were suddenly inverted or collapsed; once private lives were thrown into the streets of the Metropolis. In response, writers such as Henry James advised other would-be writers that

there is one word - let me impress upon you - that you must inscribe upon your banner, and that word is Loneliness.³⁴

It is little wonder then that literature developed the dominant themes of exile and isolation, especially given that the social mood of the time embodied - as Ruth Benedict phrased it - a doctrine of despair.³⁵

This acute perception of social and cultural instability was in many ways fuelled by the profound sense of loss which the war delivered through the powerful legacy of the 'lost generation'. At the same time the conflict which arose between the generation too old to fight (but who were still able to 'manage' the carnage), those who supported the war-effort or who fought in the trenches, and those who conscientiously objected to the war gave rise to a profound questioning and reorientation of post-war politics. These tensions were poignantly felt at Cambridge.

The support for the war effort of those attending Cambridge was clear. This was a matter of national loyalty that extended even to the scientists.³⁶ Indeed many accounts of the war years reveal a veritable stampede of dons and undergraduates who were eager to sign-on for active duty. And yet to fight as an officer (as many Cambridge enlistees would) meant probable death, mutilation, or injury. Of those who graduated in the five years between 1909 and 1914, more than a quarter were killed and more than half were wounded. Indeed, in many ways, what the war amounted to was nothing less than a massacre of a class that expected to rule. At one time during the fighting, the survival time for a lieutenant at the front was estimated at six weeks. A privileged birth and an education seemed to have somehow become a privilege in death and extinction. The impact that this

had on revising a once hopeful sense of future was deeply felt. As the 1st Viscount of Norwich, Duff Cooper, wrote to Lady Diana Manners in 1918,

our generation becomes history instead of growing up".³⁷

Never before had there been such a total decimation of the country's future leaders and genius, and the impact of this realization on those who remained was profound. As J.B. Priestley, who himself was a lieutenant in the war and later an undergraduate at Trinity Hall, Cambridge, wrote:

those of us who are left know that we are the runts.

Although the legend of 'the Lost Generation' was numerically only a legend, the effect on English political and intellectual life was staggering. Nevertheless the numbers and quality of the dead were somewhat exaggerated, partly because those who had survived carried with them a deep sense of disorientation and guilt. Of the 700,000 British combatants who died, 375,000 were officers. There had been five million males between the ages of twenty and forty before the war, but there were the same number three years after. The weapons of death which had included machine-gun fire, artillery bombardment, mines, aerial bombing and gas were random and were not targeted against the elites of Cambridge. Thus, an entire generation had not, in fact, been killed, though many of its promising members had been.³⁸

The lasting emotional impact of the slaughter and horror of the war was profound, even on Snow. Even though he was only a boy of 9 when the war began, and despite the fact that Snow's father was too old to join the armed forces while his brother Harold was underage when he joined and thus was never sent abroad to see action, the signs of war were all around Snow. For example, regularly, he would see troop and hospital trains filled with heavily bandaged soldiers on the viaducts of Leicester. And in 1926, while still in uniform and when Snow was 21, Snow's oldest brother, Harold, died suddenly of a complicated pneumonia which he had contracted during the war and which had been aggravated during damp, late-night guard duty. This

event suddenly made Snow the eldest of the three remaining sons and thus bestowed on him a mantle of responsibility and courage which he took very seriously. In many ways, it is significant that he responded in this way for a generation of writers against whom Snow would later react recognized that the war had taught "us courage, extravagance, and fatalism; [it] made us fear boredom more than death [and] it instilled into us what might be called a spectatorial attitude."³⁹ This was to become imbued into the works of such emerging writers as James Joyce, whose Ulysses and Finnegan's Wake stood language on its ear. To others, including Noel Annan, these works of energy and imagination only proved that the old political and cultural values had been wrong and had probably been responsible for the catastrophe.

However, the growing disenchantment was not simply a result of the horrors of war, nor, indeed, was it associated solely with the guilt of coming to terms with the 'lost generation'. Instead it was the direct result of the final social collapse of the old order signalled by the disillusionment with the political and economic terms of peace. John Maynard Keynes, whom Snow recognized at Cambridge as being "brilliant" and who was a leading member of the Bloomsbury group and the Cambridge Society of Apostles, was the chief representative of the Treasury at the post-war negotiations in Versailles. He shared many of the anti-war views of his friends and wrote in a polemic called The Economic Consequences of Peace that the punitive reparations that had been exacted from Germany, coupled with the self-interested land exchanges of the victorious powers would only lead to the

financial ruin of Europe and to yet another world war. "Vengeance", he predicted (echoing the views of many), "will not limp". In this ultimate conflict, "the progress of our generation" would be destroyed.

This was to become something of the governing attitude for many of the leading scientists and literati. The feeling of utter betrayal that many felt towards the old generation governing them was acute. In exchange for unquestioning support in the war effort, the country had been repaid with slaughter, unemployment, and political revolutions in Europe. Oswald Moseley later phrased it directly: in his view, the 'old men' had

muddled my generation in the crisis of 1914, ...into the crisis of 1931....[and had] laid to waste the power and the glory of the land.⁴⁰

Clive Bell echoed this sentiment and noted⁴¹ that "no longer was democracy the only form of government conceivable. Socialism (in a vague and undefined way), [had become] the hope of the 20th century".⁴² The myth of the lost generation had helped to produce a bitter dissatisfaction with the society to which the survivors of the carnage returned. They were determined never to allow the repeat of the slaughter or unemployment. With this conviction, the mood of post-war Britain had a wedge driven into it. Gone was the neat and stable pre-war Britain divided simply into the governing and governed classes.

The sentiment of post-war Britain was distinctly anti-authoritarian. The 1920s and 1930s became an era of revolt against all manifestations of the assertive will. Lord Acton's dictum that 'absolute power corrupts absolutely' became a popular symbol for an entire generation. The temper of the age, as it would be with the novel, was distinctly anti-heroic. The 'hero' of this period was a person to whom things happened rather than someone who exercised his will on life. The whimper had replaced the bang. The future had been dissolved in the mud and blood of the trenches and in the political turmoil of social reconstruction. Even at Cambridge, where entry had once been the sole preserve of the powerful bourgeoisie, scholarships were now beginning to bring middle- and lower-middle class students who would traditionally never have had the opportunity to gain either a Cambridge education or a higher education. Snow was to be one such student.

Neither writers nor the public could ignore the manic energy of post-war tension. "The war", wrote Wyndham Lewis, "was like a great new fashion: Everything had become historical; the past had returned."⁴³ To W.H. Auden, the period was one of the "lowest and [most] dishonest"⁴⁴ during which time the greatest enemy of all was politics. And for Cyril Connolly, the ultimate "political problem [was] how not to get killed."⁴⁵

Politics and social awareness were unavoidable for anyone at this time. The Depression of the 1920s-30s; the collapse of Labour in the election of 1931, the rise of Fascism and Communism in the late 30s, the September Munich crisis of 1938....all of these salient events signalled just

how much the public sphere had come to matter for the private self.

Connolly knew exactly what the writer must do:

He has to be political to integrate himself and he must be political to protect himself. Today, the forces of life and progress are raging on [the] one side, those of reaction and death on the other.⁴⁶

But at the same time, the consumer of the writer's work - the reading public - also reacted, but not in a way which helped the literati. "The reading public panicked with the fall of France and their literary curiosity, [which was] dependent on a background of security and order, vanished over night."⁴⁷ People returned their books to lending libraries en masse. Publishers had no idea what was going to happen. Just when the need was greatest for a literary 'counter voice', all fell silent. There was a great slaughter of journals and magazines. In the war-time frenzy, many literary journals of new writing such as Criterion, New Stories, New Verse, Seven, Twentieth Century Verse, and The Writer's Own Magazine were all closed.

Writers began to voice their complaints about the general stagnation of cultural life as it was becoming impossible to support oneself, let alone to create art. As George Orwell wrote in his diary:

The money situation is becoming completely unbearable....Wrote a long letter to the Income Tax people pointing out that the war had practically put an end

to my livelihood while at the same time the government refused to give me any kind of job.⁴⁸

Snow registered his own recognition of both this situation and the character of the age by noting, in George Passant that

Money is desperately short again. The trickle from the agency is lessening. I shall have to borrow. What does it matter in this fin de siècle time? ⁴⁹

The gravity of this widespread situation was suggested by Cyril Connolly who, playing on the symbol of high literary culture, no longer wrote in an ivory tower but in an 'Ivory Shelter'⁵⁰ and said that

as human beings artists are less free now than they have ever been; it is difficult for them to make money and impossible for them to leave the country.⁵¹

Mrs. Robert Henley reiterated these themes in an article on "The Liquidation of the Free Lances (By One of Them)". She wrote that

No young writer or artist, after this war is over, will ever dare to be without a safe job....When the freelance is finally liquidated, our art and literature will all be produced by little men in striped trousers, Anthony Eden hats and rolled umbrellas, who are punctual at their offices and incapable of dangerous thoughts.⁵²

These shifts were carefully monitored by a sociological organization called 'Mass Observation' which was set up by the anthropologist, Tom Harrison and the poet Charles Madge. Mass Observation used hundreds of volunteers to register the variety of activities and opinions of the war-time population. In its study, War Begins At Home, they concluded what everyone already knew, that the Black-Out was having the greatest impact on people's, including writer's, lives. All regular outings and activities, from walking the dog to attending political meetings, declined, while staying in and going to bed early increased. The word 'Black-Out' itself became a synonym and a symbol of a shut down on all intellectual life. The air war, as Snow himself noted in a Discovery editorial entitled "A New Means of Destruction"⁵³ had blacked out civilization.

Indeed there was an inhibiting and self-isolating awareness that this was 'a period' which was cut off from the both the past and future. Pre-war experience was no longer valid material for the writer, while the present was too close to communicate. And yet, it was tremendously difficult to conceive what post-war life would be like. As Mass Observation noted:

One very vital effect of the air raids is the blurring of the future. There is a tendency for people's whole outlook to be foreshortened, so that life exists from day to day.⁵⁴

Self-alienation reached a symbolic extreme in R.D. Marshall's 'A Wrist Watch and Some Ants', in which a soldier cuts off his own arm after being wounded and then lies looking at it abstractedly, a part of his own body no longer part of him.

Expressing this same sense of alienation within the darkening noon of politics and culture, George Orwell - in his essay Inside the Whale - expressed his deep fear that

the autonomous individual is going to be stamped out of existence....The literature of liberalism is coming to an end. As for the writer, he is....merely an anachronism, a hangover from the bourgeois age,from now onwards the all important fact for the creative writer is going to be that this is not a writer's world.⁵⁵

Virginia Woolf's novel Between The Acts conveys this strain and menace in imaginative terms. In the oppressive atmosphere of a hot day close to rain in June 1939, the owners of a small country house play host to the village pageant. Everywhere there is the feeling of suppressed violence: a snake chokes trying to swallow a toad; animal blood splashes a man's shoes; the newspapers talk of a rape, the falling franc and the uncertain news from Europe. The pageant is interrupted by low flying planes. Its climax, 'The Present Time', is a jangled collage of the past, becoming vicious as the players turn mirrors on the audience, who see nothing. The imagery clearly implies the tensions felt by many aware of the struggle of modernity - a loss of

connection with the past; a loss of individual control over our lives; a loss of interpretative meaning as to our place in the world.

In Between the Acts the disintegration of modernity is symbolic, while in Leonard Woolf's Barbarians at the Gate the disintegration is at a political level. And while German and Russian totalitarianism posed an external threat, equally dangerous are the internal weaknesses of liberal civilization and culture. The barbarians are at the gate, but the more insidious peril is the collapse of values within.

Thus, the collapses of the inter-war years were to have a decisive effect on literature. Bloomsbury itself, in both figuratively and literal terms, had ended. The literary *avant-garde* as a vehicle of progressive social reform had been defused and denied a public. The Daily Mail could write that "there is no such thing as culture in wartime".⁵⁸ The political and cultural prospects which had been hoped for all seemed to be only collapsed into a new disorder. As E.M. Forster put it (perfectly understating the enigmatic character of the age) this was not the best time to start a literary career.

But of course, many did start literary careers. In response to the tensions of the period and the pressures on private life, many writers discussed the function of literature and art in the emerging society as well as the social role of the intellectual. Among the most influential expression of this came from the Bloomsbury group and its associated elite Society of Apostles in the 1910s and 1920s. Its membership featured many of the most prominent intellectuals at Cambridge including Leonard Woolf, Lytton and

James Strachey, E.M. Forster, Bertrand Russell, G.H. Hardy, G.E. Moore, and John Maynard Keynes.

In many ways, the Bloomsbury Group were cultural and sexual rebels - elitists whose views were to influence an elite. They had no direct mass appeal and their preaching of personal values and disenchantment with the inter-war world through their Cambridge friends was to spread only slowly to the undergraduates. And yet, the Group was responsible for important changes in the dominant artistic and literary tastes. Examples abound. Two Bloomsbury-sponsored post-Impressionist exhibitions in 1910 forced the London art-world to redefine its perceptions in the images of Matisse, Van Gogh, Gauguin, and Picasso.⁵⁷ By 1914 both Roger Fry and Clive Bell had become regular visitors to the Saturday evening salons hosted by Gertrude Stein in her Paris flat where their influence on discussions on the merger between art and literature was rivalled only by Stein herself who was then trying to become a 'cubist of letters' in response to her own discussions with Picasso, Fry, and Bell.⁵⁸ Other attendees who were part of this circle and who helped to diffuse these new ideas were Augustus John and Wyndham Lewis. In addition, many of the leading literary and political papers of the day were controlled by friends of the Bloomsbury Group and by relatives. Desmond MacCarthy was at the New Statesman and Leonard Woolf was at the Nation. Thus, reviews and wide circulation of the work, ideas, and opinions of the Group was assured. As a result, a formidable younger group of soon-to-be influential writers and critics fell under the spell of Bloomsbury. They

included Harry Nicholson and his wife Vita Sackville-West, Roger Stenhouse, and George Brenan. To many, Bloomsbury seemed to be unforgivably successful - particularly as they possessed their own means of (re)production, the Hogarth Press, which published T.S. Eliot's unsettling The Waste Land. Thus, in idea and in fact, the Group seemed to dominate literary tastes and styles of the times.

Under the dominant moral philosophy of G.E. Moore and as a reaction to the distasteful developments of the period, the Bloomsbury Group drew on classical Greek ideals, focusing its attentions on conceptions of beauty and 'pure aesthetics'. In so doing they developed and re-stated the ideal of 'art for art's sake' which had been heard in France and in the work and rhetoric of Oscar Wilde at various times since the 1870s.

The argument implied in this line of reasoning involved an attempt to justify art and literature purely in terms of its own aesthetic values.⁵⁹ As such, they must be seen as being separate from society in moral or political terms, and their aesthetic value was discerned only with reference directly to the work in question.

Proponents of this view did not ignore the world around them, but developed the central image of a vehicle for social transformation consisting of a class of people who would act as custodians for the arts. They would promote and encourage the arts, even in the face of a hostile society. This class would be committed to the pursuit of artistic standards of excellence, and the provision of the necessary atmosphere in which the artist could

flourish. Clearly, Bloomsbury and the related Apostles saw themselves as being a living laboratory for this new class, even though after the war some members were to reject the isolation of art from society as an ideal while maintaining their commitment to the aesthetic and political power of the arts. However, during this period their ideas were often carried to such extremes that accusations of dandyism could justifiably and regularly be made. These criticisms - many of which were published in Bloomsbury-controlled periodicals - came from writers such as D.H. Lawrence and Wyndham Lewis, who accused the Bloomsbury Group of launching an irreverent and indiscriminant assault on all values.⁶⁰ In The Apes of God, for example, Lewis portrayed the *l'art pour l'art* Bloomsbury Group as being a diabolical lab for the inauthentic self in which there could be no art.

In a symbolic rebuttal of these attacks, some members of the Group attempted to further isolate themselves from society - intending to demonstrate their commitment to their principles. But this was hardly a difficult strategy for any of them to follow as all of them came from either aristocratic or acceptably middle-class backgrounds which gave them both the education and the financial means to support themselves in isolation - if only barely.⁶¹ But even this could not deflect the more deeply problematic aspects of Bloomsbury. In many ways, the efforts of the Group represented an attempt to transfer the intellectual vitality of Cambridge to a non-institutional home in London. But in so doing there was a strong element of over-

cultivation which ultimately gave their artistic and critical claims a shrill shallowness.⁶²

Whether as immoralists (to use Keynes' own self-description) or as hyper-aestheticists, the Bloomsbury Group which formed a self-conscious 'High Culture' movement was, ultimately, unable to sustain their convictions in the face of an active *avant-garde*. For Bloomsbury, the problematic relationship of the intellectual to society was never to be resolved or successfully renegotiated. As Michael Holroyd has written:

For all of their elegant and ingenious tinkering, most of the Bloomsbury writers and artists were unable finally to sever the umbilical cord joining them to the inherited traditions of the past. Theirs was a tenuous transitory mood, largely barren and inbred, a suspension bridge that now forms our authentic link back to the solid cultural traditions of the nineteenth century. They modified, romanticized, avoided those traditions with varying degrees of success. But rather than being the real founders of a new and originally conceived civilization as Virginia Woolf supposed, they were, in the words of Roger Fry himself, 'the last of the Victorians'.⁶³

This realization of the Bloomsbury's own historicity came to be one which was seized upon and bitterly reacted against by the more aggressive *avant-garde* movements of the period. In October 1913, Wyndham Lewis and others complained that Bloomsbury was "nothing but a kind of backwater" which clung to "a typically Cambridge sort of atmosphere" and featured "a sort of aesthetic playing around" in which "the Idol [was] still

Prettiñess with its mid-Victorian languish of the neck".⁶⁴ The break that was to result from this clash of sensibilities was fundamental to the development of a modern literary response and was to be felt throughout the literary community.

In 1914, Wyndham Lewis had published nothing more than a few stories, but had become known as a revolutionary visual artist. His work, which showed the strong influence of Cubism, was praised by fellow critics and artists including Augustus John and Roger Fry. However, in the closing months of 1913, Lewis and Fry quarrelled bitterly, ostensibly over a commission which Lewis felt had been dishonestly diverted from him to Fry's Omega Group. More importantly, however, the quarrel was over Bloomsbury's version of Post-Impressionism and Cubism which often confused art with decoration. In March 1914 Lewis founded the Rebel Art Centre in direct opposition to both Bloomsbury and the Omega Group, and all the work and ideas which they represented.

Immediately there was support from a small number of writers and artists. Ford Maddox Ford argued that what contemporary literature [needed most was] intolerance, and not the mawkish flap doodle of culture".⁶⁵ A flurry of activity swelled around the more radical ideas between January and July of 1914. The journals Blast and Egoist were launched, while the anthology Des Imagistes appeared. All of these carried contributions by Richard Aldington and his wife, H.D., as well as by James Joyce, Ezra Pound, Ford Maddox Ford and T.S. Eliot. In these pages, the various positions of 'the

new art' were articulated, including the work of the Vorticists, the Imagistes and the Futurists.⁶⁶ Lewis published (in the Egoist) a passionate defence of the new directions which were being taken in Vorticism and Imagism in an essay called "The Cubist Room".⁶⁷ These were vigorously expanded upon by Lewis, Pound and T.E. Hulme in lectures delivered on January 22nd at the London Quest Society on "Modern Art and Its Philosophy". Each speaker bitterly harangued the aesthetist's polite involvement in social reform and asserted that the artist had been fed out of the hand of bourgeois society too long. As a result

"the arts have grown dull and complacent....We are sick to death of the general acquiescence of artists, of their agreement to [exhibit] perfect manners, and to mention absolutely nothing unpleasant." If 'real' social and artistic progress is to be made, then what is needed is a manifest hostility to the social order, and now "the artist has at least been aroused to the fact that the war between him and the world is a war without truce...." "The artist has been at peace with his oppressors for long enough. He has dabbled in democracy and he is now done with that folly."⁶⁸

Thus, in a sense, Pound and others struck out with Lewis to forge what was effectively a position as anti-democratic as that of Stirner and Nietzsche.

The strongest - even belligerent - expression of this attitude came in Blast. Vorticism appealed "TO THE INDIVIDUAL"; it was a popular art, but it had nothing to do with 'The People' or the homogenized and fashionable

tastes of the masses. As such, art could allow no involvement with popular progress or social reform, nor could it depend on a fidelity to Nature.

We want to leave Nature and Men alone; We believe
in no perfectibility except our own.

Moral constraints dropped away as there could only be "one truth, ourselves."⁶⁹ The fundamental and recurring principle throughout this *avant-garde* philosophy and art was of the self-sufficiency of the artist. In the extreme, this led not only to antagonism between art and society, but between art and tradition as well.

This latter point was the preoccupation of Futurism which at the time was the dominant *avant-garde* sect. Under the leadership of Filippo Marinetti, Futurism dedicated itself to the pursuit of a 'new beauty' which was derived strictly from contemporaneity:

Power under control, speed, intense light, happy
precision....the conciseness of effort, the molecular
cohesion of metals....the simultaneous concurrence of
diverse rhythms....⁷⁰

all of which implied a complete break with previous art.

Futurism was highly visible on the London scene from 1912 to 1914, with lectures and performances attracting crowds as well as the attention of the press. In the June 7, 1914 edition of The Observer,

F.T. Marinetti announced his desire "to cure English art of that most grave of all maladies - passeism". With characteristic sweep he attacked "sentimentality", "sham revolutionaries", "the conservatism of English artists" and the "worship of tradition". He then gave the Futurist cheer: "HURRAH for motors! HURRAH for speed! HURRAH for lightning!" and called upon the English public to "support, defend and glorify" futurist tendencies in culture and the "advance-forces of vital English art".⁷¹

Ford Maddox Ford, T.E. Hulme, Wyndham Lewis, and Ezra Pound all utterly rejected the cult of technology, speed and machinery that was advocated by the Futurists, but they all shared - with Marinetti - a strong sense of renaissance and a hostility towards certain forms of art and literature which have a legitimacy sanctioned simply by tradition and long use. To the extent that they shared an awareness of the new, they were, in the words of Pound, "all Futurists".⁷²

But the far-reaching effects of this period were by no means restricted to the world's art and literature. Indeed its impact on the social status, organization and outlook of science in Britain was equally profound. This was a second area which would fundamentally influence Snow.

Prior to 1914, the relationship between science and politics was remote. Not only did government not have a strong interest or involvement in scientific education or research, but the leadership of science worked hard to maintain their longstanding social and political apathy.⁷³

Several factors contributed to this fusty conservatism among scientists. Class background was among the most significant. Most had come from the economically privileged strata as the sons of upper and middle class families. This conservative tendency was only to be reinforced by such institutions as Cambridge where the meeting of a pre-industrial town, a pre-capitalist university and an aristocratic conception of science together forged a powerful cultural bond.

Augmenting this 'natural' conservatism was the fact that the training ground of 'High Science' - research which scientists held in the greatest esteem - was Cambridge. As Gary Werskey has pointed out, 'High Science' in twentieth century Britain had the following characteristics. It was undertaken for purely intellectual - not utilitarian - reasons. It was both 'hard' and 'experimental' - which implied a bias towards the techniques, theorizing and problems of the physical sciences. To a degree, High Science was also research of outstanding promise or continuing excitement. And it was, above all else, the work of 'first rate' practitioners.⁷⁴

Without question, the locus for High Science between 1914 and 1945 was Cambridge where the research teams under Sir Ernest Rutherford at the famous Cavendish Laboratory and the Dunn Institute of Biochemistry

with Sir Frederick Gowland Hopkins. During this period, an affiliation with Cambridge was practically mandatory for anyone with thoughts of a bright career in scientific research. Nowhere else in Britain was there such an abundance of human and physical resources to devote to disinterested research. Its researchers were, quite 'naturally', the big men in their chosen fields, and by sitting on important government and research committees both inside and outside of Cambridge, they were effectively able to determine the style, ethos and direction of pure science in Britain.⁷⁵ Thus it is not coincidental that the leaders of the scientific community and their brightest students were involved with such organizations as the Royal Society, and that a high proportion of Fellows of the Royal Society (FRSs) of this period came from two of the most revolutionary and exciting subjects - physics and biochemistry - at Cambridge.⁷⁶ As Snow learned from his father, the designation of FRS was a social distinction reserved for 'Great Men'. It was to be highly prized and sought after.

But there was far more to becoming 'a Cambridge man' than simply studying a branch of physics or biology. One had also to acquire the culture of Cambridge High Science. As Gary Werskey put it:

Once admitted into this ancient university, your research interests were woven into a way of life and a set of attitudes which you were expected to uphold. The values generated from this culture were surprisingly elitist....Among the most prized virtues were loyalty to your lab and dedication to your work. Political commitments were your own affair, as long

as they did not impede your full participation in the activities of your chosen research community.... [However,] any overt preoccupation with them was bound to cast some doubt on your 'soundness'.⁷⁷

Cambridge science clearly transmitted to its students a deeply hierarchial view of what science was, how it worked and how it related to society. Thus, once inside the labs, researchers at Cambridge were exposed, in unrelenting ways, to the norms and values of High Science.⁷⁸ The overwhelming majority of scientists at Cambridge were socially and financially well-off males, with women representing less than 5% of the students. Few at this time entered, as Snow did in 1928, through scholarships from the lower middle classes. Interest in politics or in carrying out industrial research was seen as being clearly at odds with the interests of High Science. As a result, they were both intellectually and morally suspect. This view was exemplified by all of Cambridge's scientific leaders. The mathematician G.H. Hardy wrote that industrial work was dull and "only fit for second rate minds".⁷⁹ This was emphasized by Hopkins, Rutherford, and Lowry (the Director of the Physical Chemistry Labs at which Snow worked) who had no interest whatsoever in technical problems or in technology. Indeed, they seemed to nurse prejudices against them.⁸⁰

That Cambridge scientists had what could be described as a powerful and coherent culture at this time is clear. As Snow himself wrote in 1933, the cultural cohesion of Cambridge was, in part, based upon the scientists' knowledge that "this was the golden age of science"⁸¹ and that Cambridge was its centre. But in the years ahead, there was much which came to test this cohesion.

Although scientists were, collectively, far from being politically astute, the social pressures for political reform were such that the scientific community could no longer avoid responding in some way. The war brought with it a dramatic increase in government support for science⁸² and many scientists at Cambridge, revealing their support for the war effort generally, reciprocated by clamouring to take part in weapons, operations and tactical systems research. This included work on poison gas and the development of both the tank and fighter aircraft. As well, the Battle of Jutland is said to have been acted out on the banks of the Cam by groups of Cambridge scientists.⁸³ The once avowedly apolitical character of scientific research was beginning to change rapidly.

The net effect of these shifts were far reaching and included a rapid increase in demand from industrial and government labs for individuals with scientific training, the acceleration of the professionalization process amongst scientists, the initiation of a much closer and formal relationship between science, government and industry,⁸⁴ and the first attempts by scientists at forming their own trades union.

Among the responses that came from within Cambridge was the establishment in 1918 of the National Union of Scientific Workers (NUScW).⁸⁵ This organization represented a variety of interests and groups, principal among which were the pro-Soviet socialist cells which were becoming increasingly vocal at Cambridge. Active in the formation of the NUScW were Maurice Dobb and Roy Pascal (both Marxist scholars from Pembroke College),

C.P. Dutt (a member of the Communist Party), the crystallographer J.D. Bernal, and the eclectic mathematician from Trinity College, G.H. Hardy.

In some ways, Hardy's involvement in the NUSCW may seem out of character. He was, after all a staunch and vocal supporter of the intellectual rigour of High Science. But within the British context of post-war science and society, Hardy had been deeply impressed by a statement made in April 1920 by Oxford physics Professor Frederick Soddy who declared that if "the world is to be made safe for democracy, scientific men must at all costs make themselves masters in their own house without delay."⁸⁶ For Hardy, this sentiment was intensified by the many criticisms which had been made of government's exploitation of scientists during the war. Sir Frederick Gowland Hopkins, a colleague of Hardy's, arranged for some preliminary meetings to discuss both the criticisms and the idea of founding a professional organization of some kind.

The NUSCW was the first scientists' trade union anywhere in the world and was in many ways an unusual sort of organization for scientists to join. But many did join, and if some scientists kept aloof from it, it was largely because of its radically left-wing, pro-Soviet views. The Union made many rhetorically savage attacks on government and the War Office for its immoral use of science in the war effort. It was concerned about support for the Bolsheviks and the revolution in Russia. Indeed Hardy, with the support of at least one other Apostle, urged that the Union seek cooperation with the U.S.S.R. - if not at the political level, then at least at the level of exchange of

information. On this theme, the Union's official publication, the Scientific Worker, stated that "the attention of members is directed to the letter from the British Committee for Aiding Men of Letters and Science in Russia" and suggested that members might wish to send gifts.⁸⁷ This gift exchange campaign did not go very well, but as a result of its pro-Soviet activities, the NUSCW formed the first 'Think Tank'. It was strongly supported by Bernal and Hardy, as well as by other pro-Soviet scientists including Joseph Needham, J.G. Crowther, J.B.S. Haldane, and P.M.S. Blackett - many of whom were to visit Russia in the inter-war years and all of whom were to become (between 1928 and 1935) close friends or acquaintances of Snow's. One of the first problems considered by the group was how to aid the Soviet Union in its problems of industrialization and mechanization.

However before the Union could make any real contribution on this front, internal imbalances began to take hold. Many more moderate members began to show signs of dissatisfaction with the Union's socialist leanings. At the same time, the scientific membership of the Union had effectively become out numbered by economists, sociologists and by other sympathetic onlookers. Dame Helen Gwynne Vaughan resigned from the office of President. Finances dwindled, and in 1924 Hardy took on the Presidency in an attempt to revitalize the union's membership and finances. However, in his two years in office he was effectively able only to mount a rearguard action to maintain its trade union status. A lack of funds finally settled the

issue and the NUScW was de-registered. Hardy resigned as President in 1926, and was soon replaced by Julian Huxley.⁸⁸

Within this brief period, one of the accomplishments of the NUScW was to clearly show scientists at Cambridge that they could no longer ignore either the social impact of their work or the close relationship which science now had with both society and government. Underscoring this point in powerful ways while appealing to the scientists' sense of internationalism which underpinned their definition of the Republic of Science was the growing persecution of Jewish scholars, and their systematic expulsion from universities.⁸⁹ J.B.S. Haldane put it most succinctly. By this time "we knew that science had a lot to do with politics."⁹⁰ But quite beyond these pressures on science were the public pressures.

The government's military use of scientific expertise served to link science in the public mind with destruction. At the same time the rising numbers of unemployed who had lost their jobs, at least in part, through technological change and economic depression, underscored this view and helped to align science in the popular mind with government interests and with the causes of the general social and cultural collapse.

Well into the early 1920s, scientists were often attacked in public as being defenders of an old and distorted social order. In what is perhaps the most incisive and unforgiving indictment of the scientist's apathy came in the sociologist Read Bain's 1933 article, "Scientist as Citizen". He wrote that:

Scientists, with few notable exceptions, are the worst citizens....; they more than any other single factor, threaten the persistence of Western culture. They are wholesale, if unconscious traitors to the civilization they have created....They do not vote, they sneer at politics and politicians....In short, the scientist....lacks moral courage....has tremendous....egotistical smugness, feels no social obligation....and [is] so highly specialized that he is almost psychopathic.⁹¹

Of course, very few adopted Bain's polemical flourishes but many of his complaints could nevertheless be heard in the writings of those less acerbic commentators. These critics generally attacked scientists for ignoring the effects that their science was having on society, and thereby for unquestioningly supporting the status quo. Clearly, the scientists' social and political aloofness could no longer remain unquestioned. As B.E. Schaar, Chairman of the Chicago Section of the American Chemical Society, wrote in 1932 following a visit to England:

The scientific man....apparently forgets his training, accepts without question prevailing opinions and becomes a tool in the hands of others for maintaining the status quo.⁹²

The New Republic echoed this view and identified scientists' conservatism with the "unfortunate progeny" of the ideological mix between science and industrial interests. The scientist has:

by force of his alliance with Philistine business men, he has become something of a Philistine himself, frequently unsympathetic to....[the] struggle against a reluctant and conservative society [by intellectuals, artists, and writers].⁹³

However, whereas scientists may have been conservative as a group, their conservatism was not rooted in a blind loyalty to a tradition nor was it rooted in a world view that paid homage to the values of business.⁹⁴ On the contrary, they viewed themselves as being the prime agents of both cognitive and social progress. They saw themselves as being proponents - due to their inherent internationalism - of social amelioration. Hence, the practical achievements of science, which at the time included increases in agrarian production, radio communication, flight, and improved health care and conditions made the objectives of political and cultural reform seem transitory and superficial.⁹⁵ The optimism that infused their scientific work and the social organization of the scientific culture carried over into a broader social optimism in which scientists thought of themselves as being the modern engines of change, political reform, and social improvement.⁹⁶

It was this sense of science as the embodiment of progress, as a source of unemployment and as an alleviator of such human distresses as malnutrition and ill-health at a time when social change was on everyone's mind that made science highly discussed. The output of books, articles and public lectures on science and its social applications grew steadily. Among the most widely received were the books by J.B.S. Haldane and Bertrand

Russell and those which appeared in a series of articles in the Daily Herald and on the B.B.C. The Daily Herald pieces on "How Science Can Help Us" were organized by Ritchie Calder⁹⁷ while the B.B.C. radio talks were given by Julian Huxley.

As Peter Collins has detailed, the 1920s and 1930s were the principal decades of the 'science and society movement' in England.⁹⁸ A number of prominent scientists, all of whom were to become either close friends or acquaintances of Snow's, espoused to varying degrees the Wellsian scientific utopia. For them, the experience of the war, economic collapse and mass unemployment, far from constituting some sort of case against science, actually confirmed the need science and scientists to take a more active role in the activities of society. The rulers and politicians, trained in obsolete disciplines and shaped by class experiences that would have made them more at home in the eighteenth century rather than the twentieth, were the carriers of an antiquated technique and philosophy that was bringing the modern world to the brink of catastrophe. Not less, but more science was the necessary antidote.

Among the leaders in the science and society movement in England was the biologist J.B.S. Haldane and the physicist J.D. Bernal. In 1924, Haldane published Daedalus, or Science and the Future in which he posed the question that was the fundamental underlying motif of the whole anti-science critique.

Has mankind released from the womb of matter a Demogorgon which is already beginning to turn against him, and may at any moment hurl him into the bottomless void? Or is Samuel Butler's even more horrible vision correct, in which man becomes a mere parasite of machinery, an appendage to the reproductive system of huge and complicated engines which will successively usurp his activities, and end by ousting him from the mastery of the planet? Is the machine minder engaged on repetition work with the goal and ideal to which humanity is tending? ⁹⁹

Haldane's answer was an exuberant vindication of science, its claims and possibilities. H.G. Wells, he thought, had been too modest in his scientific prophecies to demonstrate sufficiently the truly emancipatory promise of modern science. Haldane was correspondingly bolder in his speculations. He foresaw the energy problem posed by the exhaustion of coal and oil fields, and proposed to solve it by the exploitation of wind and solar energy. Developments in transport and communications "are only limited by the velocity of light", and "we are working towards a condition when any two persons on earth will be able to be completely present to one another in not more than one-fifteen-hundredth of a second". Novel drugs, such as acid sodium phosphate, which do not have the harmful effects of nicotine and alcohol, are proposed as beneficent stimulants to physical and mental activity. Chemistry would be applied to the production of food, so that within a century all necessary food could be artificially produced. This would eliminate agriculture and the agrarian way of life, a prospect which Haldane cheerfully

looked forward to. "Human progress in historical time has been the progress of cities dragging a reluctant countryside in their wake".

Haldane's little book caused quite a stir and was quickly answered in an admonitory tract by Bertrand Russell, entitled Icarus, or the Future of Science (1924). Science, Russell countered, was more likely to promote the power of dominant groups than to make men happy. Science had become the driving force of industrialism, and to that extent had been responsible for some improvement in the general welfare of the population. But industrialism had remained bound to the interests of the dominant social groups, and had served to largely increase the destructive power of the nationalist wars. Russell concluded:

Science has not given men more self-control, more kindness, or more power of discounting their passions in deciding upon a course of action....men's collective passions are mainly evil....therefore at present all that gives men power to indulge their collective passions is bad. That is why science threatens to cause the destruction of our civilization.¹⁰⁰

While Russell's argument stimulated considerable debate within the literary and scientific communities, they did not dissuade J.D. Bernal from forwarding an even more extravagant vision of science than Haldane's. In 1929, with the publication of The World, The Flesh and the Devil, Bernal confronted "the three enemies of the Rational Soul" and sought to rout them

once and for all with science. Physics would tame "the massive, unintelligent forces of nature"; biology would cure the problems of the human body; and psychology would control man's "desires and fears, his imagination and stupidities".

As far as the material world went, Bernal quickly went through a conventional recitation of expected developments (which could be predicted with "mathematical exactness"): the age of metals would give way to new synthetic materials, food would be synthetically and abundantly produced, and the world would banish want and achieve a high degree of luxury. The only limit that Bernal saw to material expansion was the second law of thermodynamics - the entropy law - and even here, he suggested, by "intelligent organization" we can defy it for a long time.

The flesh, in Bernal's view, was not so easy to subjugate, but his inventiveness was wonderfully fertile. Surgery and "physiological chemistry" would take over and speed up the process of natural bodily evolution. Undaunted by the shades of Dr. Moreau, or by the ridicule that was heaped upon Wells for a similar vision, Bernal proposed dispossessing the 'man of the future' of his inefficient limbs and organs, and substituting them with artificial parts which could be linked to the brain. Any new powers and functions required could be met by incorporating new artificial organs as part of the new cerebo-motor system. "We badly need a small sense organ for detecting wireless frequencies, eyes for infra-red, ultra-violet, and X-rays, ears for supersonics, detectors for high and low temperatures, or electrical potential

and current, and chemical organs of many kinds". Through such artificial additions and modifications, "a mechanical stage, utilizing some or all of these alterations to the bodily frame, might....become the regular culmination to ordinary life."

A much more moderate tone was heard in the B.B.C. talks which were the result of a decision to dispatch 'three modern pilgrims' to conduct nation wide surveys of agriculture, industry, and science: Julian Huxley was given science. As Peter Collins points out, the experience served to sharpen his thinking in two ways. Firstly the process of having to conduct a personal investigation into the relation of science to war, food, building, clothing, industry, communication and health, and of visiting most of the relevant institutions in the country, all opened his eyes to the great extent that science was involved in society. It made him acutely aware of the extent to which its development, through technology, was bound up with political and economic questions. What also impressed him was

the fact that both our existing structure of civilization, our hope of progress are based on science, and that the lack of appreciation and understanding of science among business men, financiers, educational authorities, politicians and administrators was a serious feature in our present situation.¹⁰¹

In his first talk, Huxley expressed his faith in the crudest scientific rationalism: "Why, certainly, any subject is capable of being examined

by the scientific method."¹⁰² As the series progressed he expanded upon this view and asserted: "in the long run human reason, employing the scientific method, will enable us to control our destiny".¹⁰³ And by the series' end he retained his confidence that "science, if it were allowed a free hand, could control the evolution of the human species."¹⁰⁴ To this bland optimism, however, Levy and Blackett were bitterly opposed. Blackett warned Huxley that "if society thinks the scientist is going to be its saviour, it will find him a broken reed."¹⁰⁵ Levy explained why.

Science is used, when it is used practically, to develop and further the ends of present-day society, and is restricted and circumscribed by the possibilities inherent in that social order. We have to study our desires in this matter - our prejudices, our bias if you will - and deliberately set about acquiring power in order to create with help of science such a biased society."¹⁰⁶

Science might serve as the tool of social reform, but it could never dictate its direction. Huxley, on the other hand, looked to the application of the scientific method to social problems for both the means and the ends of social progress. But, Levy argued,

We have to get rid of the myth of impartiality, for we have to recognize that whatever we set about doing is simply a method for fulfilling the desires of some person or group, and the only scientific question we can ask is whose bias has it been in the past, and whose is it to be in the future?¹⁰⁷

Furthermore:

we must give up the claptrap about science always
being the benefactor of humanity.¹⁰⁸

Huxley, wilting, finally conceded that "the form and direction [science] takes is largely determined by the social and economic needs of the place and the period"¹⁰⁹ but he nevertheless maintained that in the long run scientific advance could help prepare the way for a world-state.¹¹⁰

Although Julian Huxley's radio series served to identify the more prominent controversial issues in the debate over the social function of science, it was not able to resolve them.

Other important vehicles for the discussion of the social function of science did emerge however, which usefully served to augment Huxley's, and Bernal's contributions. Among these were the prestigious scientific journal, Nature.¹¹¹ One reason for the longevity of this debate in these pages was Sir Richard Gregory who was Editor of this journal for all but five years of the 1914 to 1939 period. Gregory was an enormously influential figure in science during the inter-war years through his active involvement with the British Association for the Advancement of Science, the British Science Guild, the National Union of Scientific Workers, as Editor of School World and the Journal of Education, and as a Director of Macmillan's Science Department

which was responsible for publishing Discovery, while Snow was Editor. Apart from these positions, Gregory forged a number of links between himself and key academic, industrial and government leaders, many of whom he met with (as he did with Snow) at the London Athenaeum Club.¹¹²

Gregory's opinions about the role of science in the economic recovery of Britain were well known. To him, the preeminence of the scientific elite rested on the commonplace belief in Britain that "there is one Science and the University [is] its teacher."¹¹³ This was a perspective that Gregory's Nature promoted and regularly elaborated on. To Gregory, science was essentially a pursuit of truth for its own sake, an enterprise whose object was to understand Nature better. Engineering and industrial research were clearly necessary and valuable but it was the realm of the inventor whose goal was the control of nature for a material end. Although these were at times dependent on scientific advance they were not suitable for the man of science.¹¹⁴ On the basis of this somewhat 'soft' distinction he concluded that,

as the font of all science, High Scientists had to serve as the state's leading makers of science policy. Only they sufficiently understood the 'inner logic' of their disciplines to know where the next scientific breakthrough might be made. Without their guidance science would cease to advance and so eventually, argued Gregory, would technology and industry. Therefore High Scientists had to exercise their hegemony over all forms of research....Gregory would not, however, offer industrial or governmental researchers anything like that measure of autonomy. As one of Nature's leading articles asserted, 'though they may regret the gradual encroachment of bureaucracy on

the freedom of scientific investigations [applied scientists] have to recognize that they are primarily public servants whose first duty is to perform their allocated tasks in the social machine'.¹¹⁵

But if scientists were to move from being politically removed to being policy leaders, then not only was there much ground to be covered in terms of gaining social and political legitimacy but they also had to address many contradictions which were internal to High Science itself.

The set of ideas that are subsumed beneath this title was far from homogeneous. There were essentially two distinct philosophies involved. These have been authoritatively analyzed by both Gary Werskey and Peter Collins who have correctly distinguished between the debate's 'radical' and 'reformist' elements.¹¹⁶ Briefly put, it can be said that the radicals believed that

only a society transformed along socialist lines would be prepared to make the fullest and most humane use of scientists and their discoveries. They presented their plea for an improvement in the cultural and political status of the scientist as an essential but subsidiary clause in their demand for a broad revolution.¹¹⁷

The principal architects of the radicals were mainly "the young charismatic figures of the 1920s" whose radicalism pre-dated the Depression.¹¹⁸ Its centre was undoubtedly Cambridge. Among its principal mem-

bers were J.D. Bernal, P.M.S. Blackett, J.B.S. Haldane, Joseph Needham, Lancelot Hogben, C.H. Waddington, Hyman Levy, and W.A. Wooster. As Snow noted, "they tended to be either physicists or biochemists whose sciences were being revolutionized at this time".¹¹⁹ Bernal, Haldane, and Levy were at various times paid-up members of the Communist Party of Great Britain,¹²⁰ and Blackett, Needham, Waddington, and Wooster all expressed sympathy with its ideology.¹²¹ Needham and Hogben, however, preferred to remain on the left wing of the Labour Party. While there were considerable differences in outlook they can all be called members of what Werskey has called a 'Visible College'.

In addition to their longstanding interest in the relationship between science and left-wing politics, those associated with the Radical elements of science were deeply stimulated from the visit of the Soviet delegation at the 2nd International Congress of the History of Science and Technology which was held in London from June 29th to July 4th 1931. The delegation, led by Nikolai Bukharin who was director of the Industrial Research Department of the Supreme Economic Department, included the leading physicist, A.F. Joffe, the biologist Nikolai Vavilov and the director of the Soviet Institute of Physics, Boris Hessen. Despite the delay of their formal presentation of papers until a special session could be arranged for July 4th, copies of the Soviet papers were made available in a bound edition entitled Science at the Crossroads. The thrust of these papers was that science was a dependent variable in society, grounded within - and largely determined by a historically specific configuration of social classes and productive forces.

The members of the Soviet delegation employed Marxist analysis to challenge the prevailing view of the history and practice of science which saw science as being socially removed. They contrasted the constraints which bore on science within a capitalist world which was in decline to the unlimited potential which, to their perspective, was just beginning to be realized under socialism. Somewhat unexpectedly, it was Boris Hessen, one of the lesser-lights of the delegation and who was a Stalin purge victim shortly thereafter,¹²² whose paper had the most impact. In his paper, "The Social and Economic Roots of Newton's Principia", Hessen entirely rejected the internalist approach to the history of science, demonstrating that Newton was not an isolated genius but was instead a product of a seventeenth century bourgeois society.

J.D. Bernal, one of those most intensely moved by the Soviet contributions, later noted that "Hessen's article on Newton....was for England the starting point of a new evaluation of the history of science." Bernal credited this major contribution with sparking an English interest in dialectic materialism and for showing what "a wealth of new ideas and points of view for understanding the history, the social function and the working of science could be and were being produced by the application to science of Marxist theory."¹²³ Bernal was not alone in his estimation. Hyman Levy noted, that the 1931 Congress was "epoch-making. What became clear", he noted "was not only the social conditioning of science and the vital need for....anticipating the social effects of discovery, but the impossibility of carrying this through with in the framework of a chaotic capitalism".¹²⁴

Unlike the radicals who tended to emphasize the interaction between science and society, the reformers tended to stress the impact of science on society. For the most part, reformers were prepared to accept the social order as given, provided that they and their kind could have a greater voice in public affairs. As Peter Collins has usefully argued, the reformers were also known for their emphasis on the supremacy of scientific rationality in questions of social or political concern. Since the First World War, reformers attempted to publically promote their ideas of the importance of science to society and to impress upon the government the potential of science in improving national prosperity. Much of their work was carried out through such ginger-groups as the British Science Guild¹²⁵ which was absorbed into the British Association for the Advancement of Science in 1936. Unlike the radicals, the reformers emphasized the international character of science and grew deeply concerned over the issue of freedom as the threat of war grew nearer in 1938. They tended to be more established scientists who wished to promote social change from within social institutions, and their political affiliations were either to the Labour Party or to the more progressive elements of the Conservative Party. Their spokesmen included Richard Gregory, Sir Fredrick Gowland Hopkins, and Julian Huxley.¹²⁶

The motivations underlying the various perspectives on the emerging 'social relations of science movement' can be briefly summarized as follows. The radicals felt that science was grossly undervalued in British society and in capitalist society generally. Socialism, on the other hand,

seemed to be geared to the fullest possible use and development of science. The fullest advancement of science was therefore seen to depend on the advent of socialism. Moreover, the Marxist interpretation of science taught that scientific activity was in fact determined by the social and economic needs of society. For each of these reasons the scientist was professionally bound to be closely concerned with social and political affairs. Within the radicals, there seemed to have been some confusion as to whether the involvement of the scientist in social affairs was the cause or effect of a socialist society. Both Blackett and Levy, for example, insisted that the salvation and progress of society depended on the advent of socialism and that the scientist could help only in so far as he worked towards socialism. Bernal, on the other hand, felt strongly that "Marxism and Communism are not ends in themselves. [They are rather] the best available means of achieving the transfer of power to the scientist."¹²⁷

The reformers, on the other hand, were also sensitive to the 'social frustration of science', but no matter how much this might have been bound up in the inefficiencies of parliamentary democracy, they were not prepared to work for socialism. In Nature, at least, the exaltation of rationalism was generally tempered by a reference to the 'spirit and service of science'¹²⁸ which was so conspicuously absent from Bernal's harsh rhetoric.

While socialism was unacceptable, the rationalists were prepared by the mid-1930s to concede the radical view that the "form and direction of science....are largely determined by the social and economic needs of the place

and period".¹²⁹ At the same time they insisted that science could (and indeed must), in turn, influence those needs. It was a duty of almost moral proportions. Nature was continually advocating an expansion of rational or scientific thinking "in place of prejudice, if mankind is to avert disintegration and regain control over events."¹³⁰ Social problems were a result of unthinking prejudice and needed the "ministrations of that professional practitioner of cool, unbiased thought - i.e. the scientist - for a cure".¹³¹ The reformers were inspired by the "vision of the new and greater social possibilities if knowledge is sincerely and courageously applied, and the faith that human reason - by using wisely the scientific method - can give us the control of our destiny".¹³² The reformer's involvement in social relations was therefore a matter of bringing scientists to this missionary view of their social responsibilities, and of educating the public in the virtues of scientific rationalism. "Once science had been placed at the centre of social consciousness, "statecraft would mainly become a question of making humanity fit for science or, at least, of modifying the political and economic systems of the world to enable its inhabitants to enjoy the fruits of scientific endeavour".¹³³ In such a happy world, of course, the scientist would be duly esteemed.

These tensions within the political, literary and scientific realms which Snow was to sense, first at the general level as a growing adolescent caught up in a modernist world of change, and later at a more focused ideological level as science and literature responded in radical and reformist tones to the new world, left a profound mark on Snow's intellectual

development. His most repeated and readily discernible response to modernity's dialectical culture was to come in the form of his 'two cultures' hypothesis.

CHAPTER THREE

BLINDNESS, INSIGHT AND THE TWO CULTURES

Every picture has its shadows -
as it has some source of light.
Blindness. Blindness and sight.

Joni Mitchell

Within the dialectical context of modernity, it is in many ways not surprising that C.P. Snow's The Two Cultures and the Scientific Revolution has become one of the significant signs of our age and the dominant image associated with Snow himself. A statement on the social, cognitive and communicative dichotomy between the arts and sciences, Snow's May 7th 1959 Rede Lecture at Cambridge University¹ spoke directly to an essential tension in the struggle of modernity between science, and literature which acts as a veil through which change and totality is viewed and which powerfully influences the modern mind.² As a result of this, Snow's seemingly simple thesis gained an authoritative appeal at many levels. The lecture gained resonance through Snow's own personal appeal as something of a 'Renaissance Man' or 'New Man' (being a scientist, civil servant, a literary critic and novelist). It gained a timely appeal as a result of the growing strategic importance throughout the West of science, technology and education as was reflected by the Atomic bombings of Japan, the launching of Sputnik, and the commencement of the 'space race' between the Super Powers. And finally, the lecture carried with

it a deep substantive appeal to a series of longstanding dichotomies in the Western philosophical memory, such as those cryptically referred to in terms of science vs religion, facts vs values, facts vs fiction, objectivity vs subjectivity, numeracy vs literacy, rich vs poor, ends vs means, quantitative vs qualitative and masculine vs feminine. However, in so far as this is true, Snow's lecture has also become deeply problematic as far as an interpretation that is meaningful to a larger and more precise understanding of Snow is concerned.

More specifically, in the 30 years since Snow's statement on science, literature and the modern condition, so many interpretations that were 'reader specific' have emerged that a distancing has taken place - or what the Yale critics might call 'a process of distanciation'³ - between Snow's original idea which was deeply grounded in his own personal experience and which stands as a core element throughout his work, and the multiple meanings which have since been attributed to Snow. These have varied widely and have included interpretations arguing for a 'return' (if this is indeed the correct term) to a liberal education at one extreme, and a surrender of the education systems to programs of computer literacy at the other extreme.⁴ Few of these at any time use Snow's lecture for anything more than a springboard for their own agendas. As a result, numerous dense, interpretive layers now lie between us and Snow.

Thus beyond his seven original statements,⁵ his numerous clarifications,⁶ the initial response, and the subsequent debate which emerged between 1959 and 1964,⁷ there also co-exists the multiple decontextualized

references to Snow's image which appear regularly today and which shape our dominant impressions of Snow.⁸ All draw on the Snow's original image of two cultures or cultural dichotomy, but few share more than a cursory grounding in his concerns. The net effect of this vast heap of confused and multilayered meaning is that a new sense has been constructed which is distant or foreign to Snow.⁹ His own discourse on the fragmentation of society has itself been fragmented. A decontextualized reading of Snow's thesis has, in typically modernist fashion, created meaning above the text. Consequently, and of serious concern to this essay, the original voice of the 1959 Rede Lecture, along with its considerable prejudices and its place within Snow's conceptual framework has effectively been buried beneath an ontological scaffolding of considerable proportions.

However, this is not to suggest that these distant readings are in any way invalid. While they make our task more difficult and interesting, they are not only clear expressions of the interpretive difficulties represented by modernity itself and to which the authors themselves are responding but they are also partly responsible for the creative re-readings of Snow that have demonstrated the continued vitality (and potential validity) of his notion. Indeed as Paul de Man has reminded us, engaging in the sort of energetic and critical discourse, the sort of which surrounds and engages Snow's thesis, can make possible both the full recovery of the statement's meaning as well as of the author's blindness and insights.¹⁰

With this engaging possibility in mind, it is the purpose of this chapter to recover Snow's original meaning in the 'two cultures' hypothesis by closely re-examining the relevant texts; to assess their strengths and limitations as well as its biases, and to prepare the ground through which its relationships to his larger corpus can be demonstrated, thus revealing its significance for modernist politics and culture.

Clearly Snow's 'two culture hypothesis' has been received as being a compelling image of our age. Regular citations in learned and popular journals reveal its contemporaneity.¹¹ Citations in books suggest the substantive appeal of the lecture.¹² The almost annual organization of international symposia to discuss the thesis suggests the deep *problématique* which Snow's formulation suggests.¹³ And the fact that the Rede Lecture remains in print in more than a dozen languages and is required reading at more than 500 universities attests to the continued allure of the hypothesis.¹⁴

Yet at the same time, decontextualized interpretations of the lecture and their judgements on its validity have led to anything but a unanimous view. For example, Robert Gorham Davis has offered the influential view that "if we, by act of will, forget temporarily about 'The Two Cultures' and read carefully through Snow's fiction to see what actually occurs there, we find it almost totally inconsistent with what we had led to expect."¹⁵ At the same time, Nora Graves was confident enough in her reading of the Rede Lecture to argue precisely the opposite view: i.e. that the hypothesis is the only idea in Snow's fiction.¹⁶ In less oppositional fashion, Aldous Huxley

has referred to Snow's thesis as "a bland scientism";¹⁷ Gertrude Himmelfarb, the noted New York scholar, has relegated Snow and his lecture to being little more than bald expressions of late-Victorian values and morality;¹⁸ George Levine and Lance Schacterle, who are both co-founders of the important Society for Science and Literature, have claimed that Snow's contribution to twentieth century thought has been little more than his phrase 'the two cultures', and that even this is "not a very helpful cliché";¹⁹ Lord Sherfield, Chairman of the House of Lords Select Committee on Science and Technology and who was recently before the Royal Society of London, dismissed the idea as being "largely bunk";²⁰ the late Raymond Williams saw Snow's lecture as one which was "generous and passionate"....but which was "hopelessly confused";²¹ physicist and noted philosopher of science, Gerald Holton, edited a collection of essays by prominent scholars, the sum purpose of which was to "dismiss the....'Two Cultures' thesis once and for all";²² and meanwhile, in what has been seen as one of the most vitriolic and rabid attacks in modern intellectual history, the literary critic of Downing College, Cambridge - F.R. Leavis argued, in his 1962 Richmond Lecture at Cambridge University, that Snow assumed an undue authority and knowledge, passing himself off as a genius.²³ Leavis went on to say that Snow was "blind, unconscious and automatic; He [was] a portent, a poseur, a vulgar stylist, a dispenser of clichés and an expounder of 'Sunday paper culture'".²⁴ And yet, as recently as 1986 the President of Rutgers University, Edward Bloustein, recalled the thesis to our attention as one of the most "critical issues that affects us all".²⁵

From these random but representative statements, it can be clearly seen that Snow's thesis has been received as being both important and contentious. But without a close inspection the basis for this impression can only be obscured.

To begin an understanding of Snow's concern, it is important to appreciate that the Rede Lecture was one of a series of public elaborations upon the theme. A forecast of these concerns can be seen as early as 1936 in Snow's Spectator article called "What We Need From Applied Science",²⁶ however the first true expression of these appeared in The New Stateman and Nation on October 6 1956. Many others were to follow in the form of university lectures,²⁷ articles in popular and scientific periodicals and radio shows with such dignitaries as Eleanor Roosevelt. These essentially came to an end by 1970 following the advice of such close friends as Sir J.H. Plumb and Maurice Goldsmith who agreed with Snow that the ongoing debates, though on an important theme, were no longer leading to fruitful discussions and were consequently interfering with his writing and his reputation as a writer.²⁸ Indeed Snow later felt that all the attention surrounding the Rede Lecture had in effect removed any possibility of him being considered for a Nobel Prize in Literature.²⁹

It is equally important to understand that the theme did not arise because of Snow's 'objective observations' of the post-war tone of Britain. Instead it is a theme that became definitive and personally meaningful for Snow between 1914³⁰ and his early years at Cambridge. Furthermore, it was

an experience whose formulation in terms of 'two cultures' was tacitly suggested to Snow at least as early as 1934 *via* a review of his own novel, The Search, which appeared in the prominent scientific journal Nature and which was written by noted historians of Chinese science, Joseph and Dorothy Needham.³¹ In part that early review read:

It is curious that in spite of the overwhelming influence exercised by science on our civilization, there has been so few attempts to express its ethos in literature....Many causes have probably contributed to this not least of which has been the fact that most writers are not in any sense within the boundaries of science, and must take those essential.... details on which the whole complex of human relations....depend at second or third hand.³²

This clearly demarked the social realm of science and literature which Snow experienced and attempted to bridge. The Needhams went on to remind Snow that in order to more adequately bridge this gap, he would need "a more definite socio-political outlook". If he could develop such a perspective for the "political education of mankind", they suggested, then "we are not willing to suggest a bounds for his possible achievement".³³

With this kind of encouragement from within the radical arms of the scientific community, coupled with his own personal motivations, Snow went on to focus persistently on the relationship between science and literature as well as on their role in world affairs. In so doing however he, at

times, showed a degree of intolerance with traditional culture. For example, as he said,

"the clashing of two disciplines....ought to produce creative chances. In the history of mental activity, that is where some of the breakthroughs came....[But although] the chances are there now....It is bizarre how very little of twentieth-century science has been assimilated into twentieth-century art. Now and then one finds poets conscientiously using scientific expressions, and getting them wrong."³⁴

And finally, it is important to bear in mind that Snow's prominent (but neglected) second half of his Rede Lecture's title dealt with "the Scientific Revolution".

Beyond these though, one important but often neglected element of Snow's focus on world affairs was cogently presented in his 1960 lectures at Harvard University in which he suggested that not only is it dangerous to have a scientist with bad judgement in a position of isolated power, but it is equally dangerous to have any scientist in such a position.³⁵ This theme - of emerging relationships between science and government, gave Snow's lecture immediate credibility in the pages of the Harvard Crimson Tide, at the meetings of the American Association for the Advancement of Science, and at the United Nations General Assembly which Snow visited in conjunction with his role at the Ministry of Technology. But these Godkin Lectures generated little reaction with either the less specialist public or with the professional

literary and social science communities.³⁶ This widespread and more vehement reaction was to come only with the two culture theory.

Although versions of Snow's 'two cultures thesis' appear in many places, its quintessential elements were presented in the October 6 1956 issue of The New Stateman and Nation. Even in this page and a half long piece, his casual yet aggressively realist tone solicited the reader's acquiescence. In this article which I will quote at length and comment upon briefly before moving to a more substantive discussion, Snow wrote that:

'It's rather odd,' said G.H. Hardy, one afternoon in the early Thirties, 'but when we hear about 'intellectuals' nowadays, it doesn't include people like me and J.J. Thompson and Rutherford.' Hardy was the first mathematician of his generation; J.J. Thompson was the first physicist of his; and Rutherford, he was one of the greatest scientists who have ever lived.³⁷

Thus from the outset, the personal importance that the 1930s held for Snow is clear. This importance was both social and cognitive - through his friendships with Hardy and others - and through his training in the 20th century's most revolutionary sciences within the shadows of men like Rutherford. Both reinforced Snow's sense of cultural divide. He continued:

Some bright young literary person (I forget the exact context) putting them outside the enclosure reserved for intellectuals seemed to Hardy the best joke for some time. It does not seem quite such a good joke now. The separation between the two cultures has

been getting deeper under our eyes; there is now precious little communication between them,....different kinds of incomprehension and dislike.

The traditional culture, which is, of course (emphasis added) mainly literary, is behaving like a state whose power is rapidly declining....

In these passages, Snow not only aligned the whole of traditional culture with the literary communities, but he also implicitly associated the political decline of the West with a presumed loss of character or leadership within the literary community and literature itself. In so doing, Snow suggested his sympathetic recognition and concern with the emergence of a post-literary society in a way that is not dissimilar with Marshall McLuhan, B.W. Powe, or Ithial de Solla Pool.³⁸ However unlike these writers, Snow saw the responsibility for these adverse developments as falling directly to the writers. He did not see the inner logics of technology and capitalist economies as being implicated or problematic. He went on:

....standing on its precarious dignity....occasionally letting fly in fits of aggressive pique quite beyond its means, too much on the defensive to show any generous imagination to the forces which must inevitably reshape [traditional culture]. (emphasis added)

At this point, Snow revealed one of his major prejudicial beliefs regarding the nature of scientific and social progress, as well as innate power of science as opposed to the influence of literature.

the scientific culture is expansive, not restrictive, confident at its roots,....certain that history is on its side, impatient, intolerant, creative rather than critical....and brash.

This was a feature which Snow referred to frequently. He described science, and the scientific culture, as being "diachronic"; that is, it is cumulative and progresses forward through time. Science, he said, builds on its past and incorporates it, but also moves steadily away from it. As an example, "any decent eighteenth year old student of physics in [the year 2070] will know more physics than Newton."³⁹ But, striking the balanced tone which was to win him favour with a wider readership, Snow added that:

Neither culture knows the virtues of the other; (emphasis added) often it seems they deliberately do not want to know. The resentment which the traditional culture feels for the scientific is shaded with fear; from the other side, the resentment is not so much as brimming with irritation. When scientists are faced with an expression of the traditional culture, it tends (to borrow Mr. William Cooper's eloquent phrase) to make their feet itch.

....scientists are losing a great deal. Some of that loss is inevitable; it must and would happen in any society at our technical level (emphasis added)....But....we make it unnecessarily worse by our educational patterns. On the other side, how much does the traditional culture lose.

I am inclined to think even more. Not only practically - we are familiar with those arguments by now - but also intellectually and morally (emphasis added).

The intellectual loss is a little difficult to appraise. Most scientists would claim that you cannot comprehend the world unless you know the structure of science, in particular of physical science. In a sense, and a perfectly genuine sense, this is true. (emphasis added). Not to have read War and Peace and La Cousine Bette and La Chartreuse de Parme is not to be educated; but so is not to have a glimmer of the Second Law of Thermodynamics. Yet this case is not to be pressed too far. It is much more justifiable to say that those without any scientific understanding miss a whole body of experience....

This kind of genuine temperance was further augmented:

It does not need saying that generalizations of this kind are bound to look silly at the edges. There are a good many scientists indistinguishable from literary persons, and vice versa....

....Nevertheless, as a first approximation, the scientific culture is real enough, and so is its difference from the traditional....

but Snow quickly returned to an uncritical stance with regards to science.

For anyone like myself, by education a scientist, by calling a writer, at one time moving between groups of scientists and writers in the same evening, the difference seemed dramatic.

The first thing, impossible to miss, is that scientists are on the up and up; they have the strength of a social force behind them. (emphasis added)

And then, strangely succumbing to a cognitive-cultural belief of the Cambridge scientific elite in a way that is contrary to what Snow himself excelled at illustrating in his fiction, Snow wrote:

In a sense oddly divorced from politics, they are the new men. (emphasis added)

There is a touch of the frontier qualities, in fact, about the whole scientific culture.

As we shall see, this view is one which is utterly out of character for Snow. If his writings reveal anything clearly it is the firm belief in the fundamentally political nature of human relations. Nevertheless, at this point in our discussion, the above noted passage illustrates implicitly the extent and power of the scientific culture's influence. And yet at the same time Snow was able to express the basic affinity he saw between scientific culture and the frontier world of the modern condition. He continued this strain loosely by saying:

The climate of personal relations [in science] is singularly bracing, not to say harsh: it strikes bleakly on those unused to it....

no body of people [the scientists] ever believed more in dialectic as the primary method of attaining sense....

before returning to his rather uncritical rhetorical overview of science.

The intellectual invasions of science are, however, penetrating deeper....[into the] problems of will and cause and motive. [Those] who do not understand the method will not understand the depths of their own culture. (emphasis added).

This categorial position, which Snow retained throughout his career, was refined into his concluding remarks on the two cultures in which he linked private and public experience:

[The] greatest enrichment of scientific culture could give us is....a moral one. Among scientists, deep-natured men know, as starkly as any men have known, that the individual human condition is tragic, therefore the social condition must be tragic, too. (emphasis added) Because a man must die, that is no excuse for his dying before his time and after a servile life. The impulse behind the scientists drives them to limit the area of tragedy, to take nothing as tragedy that can conceivably lie within man's will. (emphasis added) They have nothing but contempt for those representatives of the traditional culture who use a deep insight into man's fate to obscure the social truth....[for example] the political decadence of the *avant-garde* of 1914....[This is a symptom] of the deepest temptation of the clerks - which is to say: 'Because man's condition is tragic, everyone ought to stay in their place, with mine as it happens somewhere near the top.' From that particular temptation, made up of defeat, self-indulgence, and moral vanity, the scientific culture is almost totally immune. (emphasis added) It is that kind of moral health of the scientists which....the rest of us have needed most; and of which, because two cultures scarcely touched, we have been most deprived.^[40]

The impact of this article was not great, however it did attract some attention around Cambridge. This was not only due to the article's topic, but it was also due to the public attention which had recently been coming to Snow. As the winner of the James Tait Black Memorial Prize for Fiction in 1954 because of critical acclaim levied on The Masters and The New Men, as the recipient of a Knighthood in 1957 for his service as civil service commissioner during (and subsequent to) World War II, and as a Fellow of Christ's College all made certain circles at Cambridge take note. The result was an invitation in September 1958 from the Vice-Chancellor of Cambridge University, Lord Adrian (Master of Trinity College), to give the 1959 Rede Lecture. As had become the custom, it was agreed that the lecture would be published by Cambridge University Press.⁴¹ It appeared in September 1959.

In important respects, the Rede Lecture did not differ from the 1956 article.⁴² However Snow did take the opportunity to clarify and expand certain themes. Principal among these was his central notion of a fundamental split in Western society into two cultures.

I intend something serious. I believe the intellectual life of the whole of western society is increasingly being split into two polar groups. When I say intellectual life, I mean to include also a large part of our practical life, because I should be the last person to suggest the two can at the deepest level be distinguished.

This split existed in Snow's view between the two spheres of life which together exerted a powerful formative and reflective influence on the totality of our experience:

....at one pole we have the literary intellectuals....at the other scientists, and as the most representative, physical scientists. Between the two a gulf of mutual incomprehension....⁴³

This division operated at the level of attitude:

....they have a curious distorted image of each other. Their attitudes are so different that, even on the level of emotion, they can't find much common ground. Non-scientists tend to think of scientists as brash and boastful. They hear Mr. T.S. Eliot, who just for these illustrations we can take as an archetypal figure, saying....that we can hope for very little, but he would feel content if he and his co workers could prepare the ground for....a new Greene. That is the tone, restricted and constrained, with which literary intellectuals are at home: it is the subdued voice of their culture. Then they hear a much louder voice, that of another archetypal figure, Rutherford, trumpeting: 'This is the heroic age of science! This is the Elizabethan age!' Many of us heard that....and we weren't left with any doubt whom Rutherford was casting for the role of Shakespeare. What is hard for the literary intellectuals to understand, imaginatively or intellectually, is that he was absolutely right.... compare 'this is the way the world ends, not with a bang but a whimper'....⁴⁴

as well as at the level of social interaction:

[they have] so little in common that instead of going from Burlington House or South Chelsea, one might have crossed an ocean....In fact, one had travelled much further than across an ocean - because after a few thousand Atlantic miles, one found Greenwich Village talking precisely the same language as Chelsea, and both having about as much communication with M.I.T. as though the scientists spoke nothing but Tibetan.⁴⁵

The non-scientists have a rooted impression that the scientists are shallowly optimistic, unaware of man's condition. On the other hand, the scientists believe the literary intellectuals are totally lacking in foresight, peculiarly unconcerned with their brother men, in a deep sense anti-intellectual, anxious to restrict both art and thought to the existential moment.⁴⁶

And thus, moving beyond these elements of his assessment, Snow defined his conception of culture by saying that

not only in an intellectual [sense] but also in an anthropological sense [as well]. That is, its members need not, and of course do not, always completely understand each other....[In science, for example,] biologists more often than not will have a pretty hazy idea of contemporary physics; but there are common attitudes, common standards and patterns of behaviour, common approaches and assumptions.⁴⁷

In [the scientists'] working, and in much of their emotional life, their attitudes are closer to other scientists than to non-scientists....Without thinking about it, they respond alike. That is what culture means.⁴⁸

In this more extended definition the last two sentences are often extracted and condemned by antagonistic critics. F.R. Leavis in particular has emphasized the 'without thinking'.⁴⁹ But Snow again was careful to qualify his assertion. Between what Snow described as a scientific and literary culture,

as one moves through the intellectual society from the physicist to the literary intellectuals, there [are] all kinds of tones of feeling on the way.

This type of mediation has led many reviewers of the lecture to conclude that Snow's analysis is balanced, and that what he is advocating is (reasonably, it appears to many) the striking of an equilibrium in intellectual and

(consequently) social terms; what in essence is a praxis which is suitable to the fundamentally dialectic nature of the age. Such readings, however, flow out of the angst that developed in living at the end of liberal ideology or the *fin de millenium*. For Snow, writing in this context while denying the apparent fatality of the anxious moment, such balance was neither tenable nor attractive. He introduced his own preferred approach very subtly by noting that

I believe the pole of total incomprehension of science radiates its influence on all the rest.

This, he argued, was the most serious consequence of the cultural divide because

That total incomprehension gives, much more pervasively than we realize....an unscientific flavour to the whole 'traditional' culture, and that unscientific flavour is often, much more than we admit, on the point of turning anti-scientific.⁵⁰

The importance of this key observation, made early on in the lecture, is often overlooked. However its pivotal significance in terms of its connection to a major division in the text - absent from the 1956 article - is undeniable. Indeed so important is the section that Snow affixed it clearly to the lecture's title: 'The Two Cultures and the Scientific Revolution'.⁵¹ But

far more than simply demarking a section of text, Snow's interest in the scientific revolution stemmed from the belief that the events which demarcate it, more than any other, determines and expresses the character of modern society. This conviction permeates all of Snow's analysis and mediates - in successful and unsuccessful directions - all of his perspectives.

Snow distinguished between the scientific revolution and its industrial precursor.

The distinction is not clear-edged, but it is a useful one....By the industrial revolution, I mean the gradual use of machines, the employment of men and women in factories, the change....from a population.... of agricultural labourers to a population mainly engaged in making things in factories and distributing them....That change....crept on us unawares....One can date it roughly from the middle of the eighteenth century to the early twentieth....

Out of it grew another change, closely related to the first, but far more deeply scientific, far quicker and probably more prodigious in its results. This change comes from the application of real science to industry, no longer hit and miss, no longer the ideas of odd 'inventors'....Dating this second change is very much a matter of taste....For myself, I should put it....not earlier than thirty to forty years ago....⁵²

And in so, doing he defined what to him makes modern society unique.

I believe the industrial society of electronics, atomic energy, automation is in cardinal respects different in kind from any that has gone before, and will change the world much more.

It is this transformation that, in my view, is entitled to the name of 'scientific revolution'.

This is the material basis of our lives: or more exactly, the social plasma of which we are a part. And we know almost nothing of it.⁵³

In this connection, Snow did casually note that

it is only fair to say that most pure scientists have themselves been devastatingly ignorant of productive industry....

[they] have by and large been dimwitted about engineers and applied science....⁵⁴

but it was against the literati that Snow levelled the most ardent blame. This he said quite clearly.

If we forget the scientific culture, then the rest of western intellectuals have never tried, wanted, or been able to understand the industrial revolution, much less accept it. Intellectuals, in particular literary intellectuals, are natural Luddites.⁵⁵

If the scientists have the future in their bones, then the traditional culture responds by wishing the future did not exist.⁵⁶

To back up this claim, Snow asserted that

the agricultural and industrial-scientific [revolutions] are the only qualitative changes in social living that men have ever known. But the traditional culture didn't notice; and when it did notice, didn't like what it saw. Not that the traditional culture wasn't doing extremely well out of the revolution....[but] almost none of the imaginative energy went back into the revolution that was producing the wealth....Far-sighted men were beginning to see, before the middle of the nineteenth century, that in order to go on producing wealth, the country needed to train some of its bright minds in science, particularly in applied science. No one listened. The traditional culture didn't listen at all.⁵⁷

The academics had nothing to do with the industrial-revolution. [Indeed] intellectual persons didn't comprehend what was happening. Certainly the writers didn't. Plenty of them shuddered away....some, likeRuskin,....Thoreau and Emerson and Lawrence, tried various kinds of fancies which were not in effect more than screams of horror.⁵⁸

Moreover,

most writers take on social opinions which would have been thought distinctly uncivilized and demode at the time of the Plantagenets....Wasn't that true of most of the famous twentieth century writers? Yeats, Pound, Wyndham Lewis....[all] those who have dominated literary sensibilities in our time - weren't they not only politically silly, but politically wicked?⁵⁹

Snow did 'forgive' these supposed traits of the modern literati arguing that since literature, contrary to science, is slow in changing and lacking in automatic correctives and thus "it is ill-considered of scientists to judge writers on the evidence of the period 1914 to 1950".⁶⁰ However against these

persistently harsh and overstated themes, Snow went on to counterpoint - in a strident Bernalian voice - with the strengths of an expanding scientific revolution: medical care, enough to eat, "everyone able to read and write because an industrial society can't work without"....;

Health, food and education; nothing but the industrial revolution could have spread them right down to the very poor. Those are the primary gains - there are losses too....But the gains remain. They are the base of our social hope.⁶¹

And the basis for this hope emanates squarely for Snow from within the "scientist's optimism".⁶² This final thread is perhaps the most resilient throughout all of Snow's work. It can be found thinly disguised within the motto of his heraldic device ("I will either find a way or make one"), in the titles of his fiction (The Search, A Time of Hope, The Physicists: A Generation That Changed The World), in the core ideas and tensions between *Strangers and Brothers* and it is briefly described simply by Snow as he recalled Blaise Pascal's *dictum*, *on mourra seul*, which appeared in the 1956 article. This optimism, Snow claimed, is based

on a confusion between the individual experience and the social experience, between the individual condition of man and his social condition....The individual condition of each of us is tragic. Each of us is alone: sometimes we escape from solitariness, through love or affection or perhaps creative moments, but those triumphs of life are pools of light we make for

ourselves while the edge of the road is black; each of us dies alone....[Nearly all scientists] - and this is where the colour of hope genuinely comes in - would see no reason why, just because the individual condition is tragic, so must the social condition be. Each of us is solitary; each of us dies alone: alright, that's a fate against which we can't struggle - but there is plenty in our condition which is not fate, and against which we are less than human unless we do struggle.⁶³

The two truths which emerged from the totality of Snow's thesis were "straightforward": that "industrialization is the only hope for the poor,"⁶⁴ and that a re-thinking of our education is "the only way out".⁶⁵ The price of this polarization, and of inaction, was

sheer loss to us all. To us as people, and to our society. It is at the same time practical and intellectual and creative loss, and I repeat that it is false to imagine that those three considerations are clearly separable.⁶⁶

The response to Snow's statement was immediate. By commencement of term in October 1959, The Two Cultures and The Scientific Revolution was being read aloud throughout Sixth Form classrooms across Great Britain. Similarly, by 1961 it was being discussed within the nation's newspapers and periodicals in which form it quickly spread to North America. The wide variety of periodicals attested to the lecture's timely appeal and did no harm for Snow's growing fame. These ranged from Cambridge Review: A

Journal of University Life and Thought,⁶⁷ First Person,⁶⁸ and Bulletin of the Atomic Scientists,⁶⁹ to Spectator, Encounter and the New York Times;⁷⁰ however commentary did not come from any one 'cultural camp'.

Many of the criticisms of this initial exposure were of a superficial textual character. Many - including Norman Cousins, J.H. Plumb and Allan Bullock - objected to the term 'two', claiming that there were 'N-cultures'.⁷¹ And despite the pervasive political themes of Snow's fiction, these critics also questioned Snow for his "neglect of the political" in social circles.⁷²

Others attacked Snow for his use of the term 'culture', claiming that the social sciences clearly made up a culture which was neglected by the Rede Lecture.⁷³

Others rightfully complained of Snow's choice of examples to stereotype each side of the cultural divide. Most distracting of these was the suggestion that everyone should have more than a passing knowledge of the concept of acceleration, the Second Law of Thermodynamics (which, according to Snow, was roughly the equivalent of asking 'can you read?'), or the Non-Conservation of Parity.⁷⁴ However, on the other side, plenty of scientists (Snow pointed out) when asked about literature responded by saying that "well I've tried a bit of Dickens rather as though Dickens were an extraordinarily esoteric, tangled, and dubiously rewarding writer, something like Rainer Maria Rilke."⁷⁵ And finally, still other critics took Snow to task for the general lack of a philosophical framework.⁷⁶

However it was only with the 1962 Cambridge Richmond Lecture which was given by F.R. Leavis that what is widely referred to as the 'two cultures debate' gained truly widespread attention.⁷⁷ Leavis, who was a gifted and influential literary critic, clearly possessed the necessary talents to tidily deal with Snow's Rede Lecture and its growing popularity. However for some inexplicable reason, he chose instead to adopt the role of the obsessed crusader - of the 'fearless vampire killer'. The main points of Leavis' lecture dealt with Snow's loose use of the English language and with his view that though Snow is thought of as a "public relations man for science" he "is often far from being regarded with favour by all scientists".⁷⁸ However, the majority of Leavis' polemic amounted to no more than a direct and personal attack on Snow. It is not my purpose here to examine the motives of Leavis' actions, but it is instructive to present one or two examples of Leavis' tone on this occasion. In Leavis' opinion "Snow [was] in fact portentously ignorant";⁷⁹

The judgement I have come out with is that not only is [Snow] not a genius; he is intellectually as undistinguished as it is possible to be.⁸⁰

He continued that Snow's Rede Lecture exhibits a total "vulgarity of style"⁸¹ and that this should not be surprising since

as a novelist [Snow] doesn't begin to exist.⁸²

The reaction to Leavis was strong and immediate, however the net effect of the discussion was, not to shed light on the thesis under debate but instead, to defend either Leavis or Snow.⁸³ The author, William Gerhardt, who had been a complete recluse for a dozen or more years, broke his silence and wrote to say that the fact that Snow had written eleven novels while Leavis had written none was a fact not lost on detached observers. J.D. Bernal commented that

if I find Snow's novels interesting and worth reading, it is because he, almost alone among writers today, seems to know the kind of world of organization and machines in which we are now living.⁸⁴

while J.D. Scott sarcastically 'congratulated' Leavis on successfully replacing Boris Pasternak as the most controversial writer in the world. It is largely this intense exchange which has left a lasting impression on our contemporary image of Snow's lecture, but clearly it is one which is distorted. Nevertheless, the worldwide discussion of Snow's lecture was sufficient to bring Snow to write A Second Look in 1964.

Snow's reasons for doing so are made clear. On the one hand, the plethora of criticism, censure, and commendation demonstrated to him that his two-culture theory was unoriginal. As Snow had recognized, original ideas could not travel as fast as discussion of his lecture had. And yet, on the other hand, there was something in his idea that must be true.⁸⁵

These I will discuss shortly. But Snow also took this occasion to re-visit the Rede Lecture and clarify points which had been misinterpreted or misquoted in the debate. In regards to his use of the term 'culture', he cites a dictionary meaning - "intellectual development,....development of the mind" - and an anthropological meaning - "a group of persons living in the same environment [who are] linked by common habits, common assumptions, a common way of life".⁸⁶ Both of these meanings, he re-asserts, are necessary to his thesis. In addition, he still maintained that the use of the number 'two' is adequate for his discussion. However, reiterating the caution expressed in his original lecture, he noted that any "attempts to divide anything into two ought to be regarded with much suspicion. I have thought for a long time about going in for further refinement: but in the end I decided against."⁸⁷ In A Second Look he stated: "so the phrase 'the two cultures' still seems appropriate for the purpose I had in mind."⁸⁸

Snow's other rejoinders focused on what had become a popular misquotation by Leavis' - 'we die alone' -⁸⁹ in place of his "each of us dies alone" which Snow objects to because of the attempt to pluralize what he intended to be an essentially singular condition: the solitariness of man.

And finally, Snow emphasized that while his statements had been attacked for privileging science over literature, neither culture was "adequate for our potentialities for the work which is in front of us, for the world in which we ought to begin to live."⁹⁰

At the outset I argued that Snow's two cultures hypothesis speaks to important elements within his conceptual framework. However, not only have the popular interpretations of his thesis distorted this continuity but the severe limitations and biases of the Rede Lecture itself have contributed to its current disconnected status.⁹¹

One of the least important of these is the lack of originality of the thesis. As I have already pointed out, this was something which Snow himself recognized. Indeed, Snow pointed specifically to such similar statements as can be found in Jacob Bronowski's The Educated Man in 1984. Others, which Snow does not mention, include the bland contributions of J. Robert Oppenheimer entitled The Open Mind (1948) and Prospects in the Arts and Sciences (1954);⁹² and the more enlightened work of Alfred North Whitehead who tried to alert society to "the quiet growth of science" and to its effect upon the modern world, the production of "minds in a groove and the lack of intellectual balance".⁹³ Even before Snow arrived at Cambridge, the arts and science dichotomy was noted and discussed, as it was when the young poet, Julian Bell, (son of Vanessa Bell - painter and sister of Virginia Woolf) maintained in the 1928 debate at the Cambridge Union (on the motion that the 'Sciences Are Destroying The Arts') that

the scientist, the inquirer, the interrogator, was innately incapable either of creating, or appreciating art. The business man, the waste product of Science, was the immediate murderer.⁹⁴

Indeed many observers have pointed to the rough similarity of the argument put forward by Snow and by T.H. Huxley in response to Mathew Arnold's 1882 Rede Lecture.⁹⁵ Huxley, who was the champion and popularizer of Darwin's Evolutionary Theory (and who many have designated as being the person most responsible for driving a wedge between science and the rest of society by arguing on behalf of 'value-free' research),⁹⁶ suggested that the State should guarantee the happiness of Everyman through wealth, security, science, technology and knowledge. In Huxley's eyes, science was both intellectually and materially rewarding for civilization.⁹⁷ But as to any real claims of originality, Snow makes none. While others deride him for his apparent lack of awareness of the 1882 debate, Snow merely states that the two cultures is an important problem of modern societies.

A related flaw in the lecture stems from Snow's distorted historical portrayal of the conflict, by which I mean to suggest something more serious than simply an error in chronology. More specifically Snow saw the cultural split as being quite a recent phenomenon, being coincidental largely with the emergence of the industrial revolution during the late-eighteenth century. However as both the noted cultural historian, Leo Marx, and the historian of science, Lynn White Jr., have each convincingly argued,⁹⁸ - and, much before them, Edmund Husserl - the roots of the contemporary debate can easily be traced to much earlier periods in the history of Western culture. They both focus as an example on 12th century Europe when there developed

a distinct awareness of the gulf between the two cultures. They note that up to this point the seven traditional liberal arts were divided into the trivium (grammar, rhetoric, and logic) and the quadrivium (arithmetic, geometry, astronomy and music - with music conceived as the study of musical proportions). However this was a time at which mathematical sophistication accelerated rapidly. According to White, "as late as 1100 there were few scraps of Euclid's Elements known in Europe. But within one hundred years there were six complete versions of the Elements widely available, and "as confidence in the results increased quadrivially, conviction of the cogency of trivial arguments declined".⁹⁹ By the year 1200, in other words, the 'scientists of the day' were already beginning to narrow their research and methods to subjects which were tangible, physical and quantifiable. By the 14th century, White tells us, the two cultures divide could be illustrated by the strenuous efforts of Bishop Aurheme, who invented the graph and who futilely attempted for many years to graph beauty. White comments concisely: "it didn't work".

Natural reason had become too identified with its most precious expression, mathematics, to cope with a vivid but diffuse experience like that of beauty. The inherent limitations of reason were now recognized so clearly that whole realm of qualitative value - beauty, goodness, even truth - when the nature of that truth were not precisely calculable found refuge in theology with its epistemology of revelation.¹⁰⁰

Thus the essence of Snow's 'two cultures' can be found in Europe six hundred years ago. As Leo Marx puts it, "all that was holy, all that was intangible, [all that was] immeasurable had been purged from Nature".¹⁰¹

Snow's historical weaknesses are even more apparent in his likening of the literati to being 'natural' Luddites. Quite apart from the fact that Snow chose to erroneously represent all those associated with the new literary community as a homogenous group that responded alike to all modern situations, he nevertheless was able to successfully draw on a popular misconception which he himself appears to have held.¹⁰² The very name of 'Luddite' still evokes a powerful image of half-crazed men and women blindly striking out against the forces of progress - a handful of isolated, desperate people, irrationally smashing machines because they were 'afraid of new things'.¹⁰³ Indeed, this is the image which Snow wished to solicit. But as Albury and Schwartz, E.P. Thompson and others have demonstrated, this was far from being an accurate reflection of reality. As Thompson has noted,

the men who organised, sheltered or condoned Luddism were far from primitive. They were shrewd and humourous; [they] were amongst the most articulate of the 'industrious classes'. A few had read Adam Smith, more had made some study of trade union law. Croppers, stockingers, and weavers were capable of managing a complex organization; undertaking its finances and correspondence....All of them had dealings through their representatives with Parliament....¹⁰⁴

Indeed, the Luddites - far from being on the whole wild machine wreckers - were in fact responsible agents of technical change who were extremely concerned with managing the introduction of a new technology in a way which mitigated against de-skilling and unemployment. They were not ignorant of technology but were, instead, intensely aware of it. Thus Snow's suggestion of a rough equivalency between writers and Luddites simply does not work. Nor does his claim that 'traditional culture' was profoundly unaware of the changes which were taking place within society. The fact that mechanics and apprentices throughout Britain were flocking to newly established Mechanics Institutes for courses in science and engineering between 1800 and 1850, that the majority of people were beginning to work in automated factories or move from rural settings to industrial cities during the same period, or that Britain - at that time - was leading the world in reaping the productive and wealth-creating benefits of the world's First Industrial Revolution, all seem to have missed Snow's uncritical notice.¹⁰⁵

A somewhat more serious difficulty with Snow's Rede Lecture is its casual manner. Taking Snow's realist prose to an extreme, the lecture adopts a style that is far too anecdotal and autobiographical. The effective result is a caricature of a serious concern which only really works because, as with any effective caricature, it contains a grain of truth. Nevertheless, the style is distracting and has trapped critics into a consideration of terms ('two', 'culture', 'without thinking', 'reacting as if they wished the future didn't exist', etc.) instead of ideas.

A more serious flaw of the lecture arises from conflation of language and ideas. An example is illustrative. Throughout the text, Snow appears repeatedly to equate literary, traditional and managerial culture. He refers to novelists, critics, managers and politicians almost interchangeably. As he said in The Two Cultures,

literary intellectuals represent, vocalize, and to some extent shape and predict the mood of the non-scientific culture: they do not make the decisions, but their words seep into the minds of those who do.¹⁰⁶

But clearly to suggest that the literary community shapes the sensibilities of government and industry, that they reflect those sensibilities, or that they are so coherent as to represent a focused community is clearly mistaken. Surely Snow knew this, and yet it goes maddeningly unresolved.

Another distracting element of the Snow's lecture stems from the superficial treatment which he gives to his own central recommendation vis of rethinking our educational systems. At no point does he elaborate on this. Some have tried to take Snow's basic diagnosis having designed and implemented a 'two cultures' curriculum: two notable examples being the now discontinued core curricula of the University of Sussex and of C.P. Snow College at the State University of New York at Buffalo. But Snow himself never specified what a 'two cultures' curriculum would look like. He observed approvingly the Soviet and American ability to expand their science and

engineering education in response to perceived national needs, as well as the central role that public policy can play in this process, but beyond this Snow only mentioned education or students twice in his fiction - both times in a fashion which decries boring science teaching. Perhaps the answer to this problem lies in the observations of the distinguished historian of science, A.R. Hall, who recalled that Snow while he was a demonstrator of physical chemistry during the 1930s at Cambridge, Snow had a reputation for being something of a boring lecturer who was only interested in College politics - and not in education, teaching, or the subject. But elsewhere in his non-fiction, Snow argued in a polite but uncommitted way that "the history of science, if properly taught, might redress the gap".¹⁰⁷ And yet Snow went no further. For someone so apparently (arguably) interested in higher education as Snow was - and keeping in mind that only scheduling problems made it impossible for him to accept an invitation from Prime Minister Harold Macmillan to sit on the Robbins Committee on Higher Education in 1963,¹⁰⁸ - the two cultures and Snow's other work only leave the readers with something which is inconsistent with what they had been led to expect. The recommendations, though compelling in the policy and educational language of the day, remain unanimated and strangely superficial. Furthermore, Snow's major implicit assumption that science and literature should have parity - both educationally and in the terms of society at large - seems remarkably naive. Science has become an exceptionally powerful, mathematically specialized discourse, and as such it establishes what Husserl called the

'instrumental horizon' behind which the intent of the epistemological project is suppressed.¹⁰⁹ To a large degree, its use (except on purely ideological grounds) is inadequate for anything except the understanding - and control - of the natural world. At the same time, literature - which is written in the 'language' of Dickens, Kundera and Shakespeare - is exactly that discourse which is used in every aspect of our lives to describe and communicate the political, social, emotional, and cultural realms. As such, the attempt to achieve equal status between each form of discourse is to deny the practical roles, flexibility and constraints of each.

But perhaps the most serious flaw of the Rede Lecture is its philosophical shallowness. As we have already seen, Part Two of Snow's lecture is called "Intellectuals as Natural Luddites", and here he seems to miss entirely the scope and cogency of the critical reaction to the industrial and scientific revolutions. He argues that intellectuals other than those who are within the scientific culture "have never tried, wanted, or been able to understand the industrial revolution much less accept it. Intellectuals - literary intellectuals in particular - are natural luddites". Snow's point here seems to be that intellectuals other than scientists and engineers were allied with wealth and power - the governing elites - and that they simply disdained the practical, equalizing power of science-based technology. Much of what Snow said argues that science is, morally and practically, on the side of Everyman while traditional culture has been corrupted by its longstanding affiliation with aristocratic power.

Clearly there is some truth in this view. But in his eagerness to align the advance science and technology with the interests of the poor, Snow overlooked not only the fact that modern science has (since the first World War) increasingly become allied, co-opted, and directed by government and industry, but he has also dismissed the critiques of the modern writers and their role in leading the emergence of a new and widespread paradigm in thinking about the nature of progress which many of these writers embodied. As Leo Marx has said, all Snow hears in the critics of modern material progress - and in this connection he names Ruskin, Thoreau, D.H. Lawrence, Yeats, Pound, Emerson and those writers who shaped literary culture - is what he calls "screams of horror". Clearly it is ridiculous to paint all of these writers with such a broad brush. Indeed, as elements of their writing clearly shows, some were tuned-in to a fundamental change in modern mass culture to which Snow appears to have remained partially blind. Indeed many influential writers were not at all oblivious to the power of the new technology. Many embraced the new technology for their own productive and creative purposes. Many others grasped the subtle changes which were taking place in thinking about progress long before the general public had made sense of the changes. Indeed like Snow himself, many began to see science and technology as a possible tool for social good through a epistemological, moral, political, and economic liberation from the dominant aristocratic, class-bound forms of social life. Through the 1950s, writers such as J.B. Priestley and Malcolm Muggeridge ascribed to this view. However for many of the writers

who Snow specifically identified and criticized, they saw a transformation of the belief in 'scientific progress which was in the service of Man' into an increasingly complacent belief in the sufficiency of the advancement of science, technology, and industrial innovation as an end in itself. If it can be said that modernist writers have been typically critical of science, it has not been because they didn't understand science (it is surely an overstatement to suggest that everyone should understand the principles underlying the workings of the internal combustion engine or the microwave oven) but rather it has been because they saw a danger emerging at a time of deep seeded political and cultural turmoil of a new blind faith or ideology.

Thus when Snow sarcastically mocked Thoreau by saying that it is alright

to do a modern 'Walden if one doesn't give a damn
about the welfare of the poor

it is clear he has missed the point of Thoreau's critique of industrial society. Indeed, if one carefully reads Walden it can be seen that it is in fact a sustained criticism of the disintegration of progress into a materialistically-oriented, science and technology bound, technocratic culture.¹¹⁰ As Thoreau noted, technological innovation was becoming merely an 'improved means to an unimproved end'. While Snow is correct in noting that by the year 2070 undergraduates will know far more physics than Newton did, the point he

seems to miss is that it is unlikely that they will *de facto* be better individuals.¹¹¹ However this is precisely the point that he ignores in his Rede Lecture and to which he pays attention in his fiction. How can we learn to manage the power of science, technology and knowledge from a private and public perspective? In Snow's identification of the literary community with luddism - as opponents to the new power - and even taken as caricature, he is quite wrong: he has revealed the same tone deafness to sensibility in himself that he has accused modernist writers of having. Many of the writers he singled out not only recognized the new potential of science, but they also understood that these potentials could only ever be fully realized if their proponents could also bring their power to bear under morally and politically defensible purposes. Hence Snow's analysis of the two cultures is weakened by his failure to recognize the cogency and authenticity of the Modernist reactions to the mechanistic and technocratic revolutions.

And yet having said all this, it is still clear that despite the considerable flaws, weakness, and biases that exist in Snow's lectures, there is something in Snow's notion regarding the incomprehension between the two cultures that goes to the heart of modernity's ruptured condition. Forget that his use of the word culture is vague and misleading, that his analytical division into two cultures is arbitrary, given that he identifies these almost solely with literary intellectuals on the one hand, and with physicists on the other. Although Snow's lecture at many points echoed the Heroic Age of the morally upright, 'gentleman's', amateur tradition of Science, this is a

caricature which is now *passé*. Science, even by the 1950s, had become a highly complex social and political activity which was fundamentally aligned with corporate and government structures. Thus the problem is not just an isolated one of knowledge in a modern democratic society. Nor is it simply a problem of intellectual or educational dimensions. And yet, as a close examination of Snow's other materials shows, he was well aware of the depths and meaning of this.

Thus, if we restrict our reading of Snow solely to those writings which deal with the 'two cultures' hypothesis, we are met by a variety of hermeneutic difficulties which give us few points of access into his larger conceptual framework. And yet it is only within this framework that we can gain a clear view of how Snow saw the enigmatic modern self and its potential for meaningful reintegration. It is only at this level that we can see how he treated literature, science and politics as co-extensive elements of his own quest of totalizing self-definition. Only once we appreciate the parameters of Snow's response to his own modernity can we assess his strategy *vis-à-vis* both the struggle of modernity and our own personal quests.

SECTION 3

SNOW'S TRIPTYCH OF LITERATURE, SCIENCE AND POLITICS

CHAPTER FOUR
LITERATURE AND THE STATE OF SEIGE

Making use....of what
he has beneath his eyes

Claudine Chonez¹

The system that works - this, and
nothing but this is reality for the
realist.

J.P. Stern²

All novels of every age have concerned themselves with the enigma of the self,³ and neither Snow's novels nor the novels of modernity are exceptions. Indeed as soon as a literary character such as Snow's 'Lewis Elliot' is created, then questions regarding the author's definition of 'the self' inevitably arise. Within the struggle of modernity, what can 'the self' mean? How can it be grasped in its aesthetic, cognitive and political totality, and how can it be communicated to readers? These are among those fundamental questions on which the novel form is based and which it must address. However, the answers which authors choose to give to these questions not only reveal a variety of literary responses to the demands of the novel form, but they also expose differing conceptual and political responses - both to the individual self and to the individual self's place in the historical context of the period. In Snow's case, he was aesthetically something of an outsider striving for the

centre. Cognitively, he deeply understood some of the scientific forces which continue to define the Metropolis. And politically, he was undeniably a part of the broad reconstitution of liberalism.⁴ As a result, Snow's responses to these questions place him squarely within the embrace of the struggle for modernity.

Given the modern public spheres' will to dominate and sub-merge individual life in what Martin Heidegger called an active 'forgetting of being', it should not be surprising that much talk today has come to be concerned with the abandonment of the self, the novel's *raison d'être*, and hence of the 'death' of the novel. Indeed this is a theme which is considerably developed by Georg Lukacs in his treatment of the tension between realism and modernism.⁵ Through Heidegger's perceptive phrase, we are reminded of the crisis situation of our time on at least two fronts. First, through this forgetfulness, we have participated in an active undermining of the social function of the novel form itself. This has led us to talk of 'the post-literate' society in which the novel is seen as providing little more than a vehicle of escape, entertainment or commodity fetishism. No longer is it seen as a potential instrument for the prodding of meaningful themes. Secondly, we can sense in Heidegger that - following his teacher Edmund Husserl - our roots of 'forgetfulness' are to be found in the method and authority of our sciences.⁶

In so far as this is true, we include the historical view that as the world came to be comprehended as a whole, so too did it become apprehended as a question to be answered.

Stimulated by the conviction that there is nothing without its reason, science energetically explored - as it continues to today - the why of everything, to the point that whatever exists is seen as being explainable, calculable, and (to a large degree) predictable.⁷ Thus, in effect, science reduced the natural and life worlds to the status of objects for their investigation. The more man and women advanced their themes of knowledge through specialized disciplines, the less could be seen either of the world or of the self in clear and comprehensive terms.

As I suggested at the outset, science and technology have been effectively used and emulated by literature in the modern era. Thus to suggest that the novel form has lost its potential for totality - that the novel's social and aesthetic function have been surpassed,⁸ is to miss the unique strength of the novel form. Throughout the history of the novel, its sole *raison d'être* has been to identify those sites of contemporary existence which had become problematically hidden. A most successful preoccupation of the novel, in fact, has dealt with gaining knowledge of the self no matter how distant or imperiled the self may have seemed. Even within our own period in which both the self and the novel appear forgotten and in a state of seige, it can be asserted that the novel has not forgotten the self.

This claim is not without basis. To move beyond the resigned acceptance of our tendency to forget our own being, we must recognize that we are also beings of the world (or, what Heidegger characterized as *in-der-Welt-sein*). As such, we can redress our passive tendencies and recognize that Man does not relate to the world as an object to subject - or as an eye to a painting. Instead the state of Man and the world are inexorably bound together. The world is a part of Man. It is his and her dimension - his and her *milieu* - and as the world changes, so changes the self and its recognition of existence. Formulating modernity's central problematic in this way can be reassuring for it says, in effect, that our task is not to find a bridge between our private and public selves, but it is only to see the bridge(s) that already exist. But how is this to be done? The answer, as Snow asserted, is to be found in the self, in the characteristics which the self has come to embody in its period, and in literature's ability to communicate elements of our condition. Snow believed that the study of the individual condition could only be effected through the study of the individual in society. Because he found that most, if not all, modern individuals could only be meaningfully understood if both the private and public sides of their lives could be examined. He found that the fundamental interactions between the individual and society are most alive in their rationality and politics, and aesthetically in their literature.

Seen in these terms it should not be surprising that within our own context of a public sphere dominated by both science and administration, it is the thinking self - i.e. one who is aware of his modern environment,

asks questions of it, and acts - that has come to be the measure of all things. Thus, it can be said that not only is 'the thinking self' capable of clearing the air that obscures the bridge(s) between our public and private selves, but it is also capable of bringing us directly into contact with that vital literary device of 'the hero', and of helping to define a central element of modern liberal individualism.⁹

Of course, conceptions of 'the hero' and 'the heroic' vary. But whether one adopts a benign definition of 'hero' such as

the chief personage in a poem, play or story around whom the interest in story or plot is centered¹⁰

or a more Hegelian conception of the modern hero - as one who faces the world alone - it is clear that the thinking self must be one who 'acts'. It is through action that Man steps out from the repetitive everyday and distinguishes himself from others to fully become an individual. Indeed this, in effect, is the modern quest. Dante said as much:

In any act, the primary intention of he who acts is to reveal his own image.¹¹

But this quest can clearly take on many forms. Action can be seen as being a self-portrait of the actor, regardless of whether our own 'heroic' self-image is that of Robert Musil's 'man without qualities' or of Snow's 'new man'.

But clearly, action - in and of itself - is not a sufficient precondition for the definition of a meaningful literature - be it modern or otherwise. In Kafka, Joyce and Proust, for example, the actor can not recognize himself in action. Although he hopes to reveal himself through his acts the image bears no resemblance to him. In one sense at least it can be argued that this is one of the great discoveries of modern literature. But in another sense it suggests that, in order for it to realize its historical mission in the quest of the self, modern literature needs - in addition to action - to turn away from the visible world in order to examine the more invisible and thinking interior life. Only by doing so will the author, or the novel form itself, be able to examine those motives and ambitions which are an integral part of the modern self - which are meaningful within our own historical setting.

However it must be remembered that, at their best, novelists are neither prophets nor historians. Novelists are explorers of existence; a novel is a prose form through which the author explores, by means of 'experimental selves' or characters, some great themes of contemporary existence. The great novelist can make no issue of his ideas. As Milan Kundera has said, the novelist

is fascinated not by his voice but by a form he is seeking, and only those forms that meet the demands of his dream become part of his work.¹²

It is against these considerations that we will begin to find the significance of C.P. Snow. This is only fitting for, on a beach in Marseilles in 1935, Snow articulated the full scale of his Strangers and Brothers series of novels. He was to spend the next thirty-five years seeking to fill the form which would satisfy the demands of his dream.¹³

It is in some ways ironic that the principal point of entry into Snow's aesthetics should come through his flawed critique of modernist literature which is found in his Rede Lecture, but this is indeed the case. Snow's sweeping depiction of the 'writer as luddite' does embody the untenable argument that modern literary genres and criticisms have been developing in a way which in some sense is 'anti-scientific'. It also suggests a view which - when given sufficient room to breath outside the service of a narrow thesis - can lead to a more accurate perception of Snow's aesthetics which sees the so-called 'modernist' literature's responses to the modern condition as being stylistically inflexible and substantively distant from any understanding of the modern self. These differences between the dogmatic Snow of the Rede Lecture and his more subtle literary sensibilities are meaningful, for in remaining open to his subtleties, Snow can be more usefully seen as forwarding a lively critique of literature and the struggle of modernity. This element of Snow's work is too often missed when readings of Snow are closely

based on the 'two cultures'. As we will see, Snow's 'literary luddite' thesis is a poorly articulated aspect of his own realist's aesthetic which underpins his cognitive and political realism and upon which he bases his reconciliation between modernity's public and private self.

However, this is not to suggest that what Snow offers is a fully articulated critique of literature. Rather, anything Snow presents by way of direct criticism is decidedly partial - ranging from a prolegomenon to an intuitive reaction. Rarely, if ever, does his literary assessment achieve the status of a full-blown analysis. Rather, he critiques literature by using a broad brush - employing the sweeping voice of experience and common sense, instead of precise and comprehensive analysis, to suggest his aesthetic preferences. It is these partially exposed, and partially developed, views that he amplifies through fiction.

Gaining access to Snow's critical ideas on literature is difficult, not only the level of ideas but, on the level of sheer evidence as well. Snow was impressive in his output as a writer, but any search of his non-fiction will only reveal sketchy allusions to his problems with modern fiction. While it is possible to gain some insight into Snow's aesthetics either by reference to early and lucid assessments made by Snow's friend, the author William Cooper¹⁴ or by supposition, noting for example, that Snow's wife was herself an influential Proustian scholar, would result in little more than patch-work conjecture.

A more meaningful assessment of Snow's literary criticism can only come directly through his writings on writing. The principal sources of this are to be found in Snow's book reviews for the London Sunday Times [1949-52] and the Financial Times [1970-80],¹⁵ in such rare articles as his 1961 essay, "Science, Politics and the Novelist",¹⁶ and through brief introductions to his own Trollope (1975) and The Realists (1978). What these writings reveal, even in their own, unique and fragmentary fashion, is quite interesting.

Snow's attack on modernist writings are almost as well known as Leavis' assault on Snow.¹⁷ James Joyce and Virginia Woolf were the novelists most often criticized by Snow. Indeed, Snow admitted that his own literature was

quite [a] deliberate reaction....against the kind of purely aesthetic novel represented by, say, Joyce and Virginia Woolf.¹⁸

But they were by no means his only targets. At times, his list of grievances expanded to include several imagist poets, many experimental novelists, as well as their descendents such as Dorothy Richardson, Yeats, Eliot, and Pound. However Snow's list was not all inclusive. Wyndham Lewis, for example, escaped Snow's commentary (due, perhaps, to Lewis' own rejection of Futurists and hyperaesthetics, which would have pleased Snow),¹⁹ as did Richard Aldington. Despite Aldington's unique modernist credentials as writer,

Hilda Doolittle's (H.D.) husband and as a friend of D.H. Lawrence, he became one of Snow's favorite authors following the publication of Death of a Hero in 1929 which starkly described the rough war experiences of World War I. Indeed, following Aldington's 1934 visits to Cambridge, Snow recorded his view that "anyone in touch with 20th century literature knows....you can scarcely read [Aldington's] work and remain indifferent."²⁰ Soon after Snow's publication of Richard Aldington: An Appreciation in September 1938, Aldington reciprocated with a letter to Discovery of which Snow was then Editor. The letter, which undoubtedly appealed to Snow's developing interest in both the social aspects of modern science and the desirability of encouraging a dialogue between the two cultures, discussed the responsibility of persons with scientific training and was published on the eve of World War II as "Science and Conscience".²¹

Nevertheless, despite a few apparent inconsistencies in whom he included amongst modernists, Snow had no trouble in temporally situating what was for him the problematic modernist novel. This he identified firmly with the period between 1914 and 1945,²² a period which was arduous for literature itself, Snow, and for society. Yet underscoring the shock of the war, Snow claimed that these restrictions on the novel's range "happened almost overnight".²³

Furthermore, Snow had no difficulty in categorizing those modern novel forms which he found to be especially problematic. These he referred to variously as 'the stream of consciousness novel', the 'moment to moment'

novel, fiction which was concerned principally with 'the continuum of sensation', novels of sensibility, and the 'novel of total recall'. However, Snow refused to accept the popular phrase 'experimental novel' as the word 'experiment' has real meaning in inductive thought. Snow found the misappropriation of this term (which, he tried to suggest, was fostered by the literary community) to be even more bizarre than that expressed in his favorite story of a cantankerous physicist howling of modern writers "why do these idiots think that polarized light is a specially superior form of light?"²⁴ In Snow's view, the application of the term 'experimental' to a fictional style of writing which has not budged for four decades is ludicrous. Snow included Dorothy Richardson's Pointed Roofs, Virginia Woolf's To the Lighthouse, Harry Green's Party Going, Carson McCuller's The Heart is a Lonely Hunter, and Joyce's Finnegan's Wake in his list of unprogressive - even retrograde - novels.

To Snow, these various writers and forms (whatever they are called) were producing work which was "arid and mindless".²⁵ The new 'modern' novel was "meaningless in semantic terms and certainly in human terms".²⁶ In so saying, Snow repeated his harsh literary criticism which was revealed in the Rede Lecture. But he also suggested that the forms of writing which were becoming dominant in the inter-war period were in part themselves a reaction against the success of science. Science in effect was driving serious literature "underground".

[The] science which has made novel writing diminish and hide is the science which is the dominant expression of our entire industrial society, the science which is both the cause and effect of the technological revolution in which we stand. And the devitalizing effect which science has had on novel writing....is not because it is evil or antihuman, but simply because it has been so overwhelmingly successful.

In the same year that T.S. Eliot wrote about the world ending not with a bang but a whimper. Ernest Rutherford, the British physicist, was saying, loudly and with his usual unselfconscious abundant delight in his own genius, that this was the Golden Age of Science....[It was] hard for art to live in his shadow or the shadow of all he symbolized.

For science had lived up to all its boasts. It has seemed to know all the answers [even though the real point about science is not that it knows the right answers but the right questions]. Anyways, it works. Against the supreme achievements of 20th century science....what is there for a writer to do? No one ever said so consciously to himself, of course, but it is that feeling which has made the frontiers of novel-writing....shrink....

The reflective mind has been sacrificed. All that is left is an attempt to reproduce the moments of sensation, to convey just what it is like to experience this instant of the here-and-now.²⁷

This was a view that Snow held throughout his life but it was not one which was static, despite popular perceptions to the contrary. This hypothesis led Snow to overtly recognize that in order for a work of fiction to be truly meaningful, or even 'viable' in the modern world, it must lead a difficult double life.²⁸ Snow understood that, through its own internal integrity, all works of fiction must maintain contact with both other literary works and with the world. Overemphasize the lived-world, and a novel risks falling into propaganda or the merely documentary (even though this can have its use). Overemphasize language, and a novel will collapse into meaninglessness and endless self-reflection. Following these simple rules brought Snow to hold that in the truly great novels

there must clearly be a presiding, unconcealed, interpreting intelligence. They are all of them concerned with the actual social setting in which their personages exist. The concrete world of physical fact, the shapes of society, are essential to the [realist's] art....²⁹

As such, the many routine misrepresentations and doubts of the self in life have a chance to be tested, to be uncovered and replaced by a more comprehensive and functional sense of self.³⁰ This literary view had important implications for Snow's view of social change and politics. But for literature in itself to fully embrace its possibility of social change, it must reflect on its own duality through its language and structure.

It is not surprising then that Snow felt the new novel forms to be incapable of either progress or duality. Snow noted that these new novel forms had revealed "a remarkable suicidal tendency to narrow [its] range".³¹ The principal literary techniques which effected this narrowing were the 'stream of consciousness' and the 'interior monologue'. At a time when the images, definitions and functions of the self were under seige, 'the new literature' and 'the new criticism' had begun to retreat from its traditional activity of engagement, becoming responsive only to the demands and fetishes of the text. As a result, Snow not only accused it of shedding the duality which is vital to its success, but he also accused it of being party to the abandonment of the self in a world now seemingly devoid of meaning. Technically this development in literature can be documented in many ways: through the 'disappearance' of the author; through the development of the anti-hero, or through the privileging of language and text over representation of the social-life world. The significance of these developments for the self in a late-capitalistic, bureaucratic Metropolis has been well documented.³² But in Snow's view, these developments resulted in an aesthetic *cul de sac* for which there could be no corrective and no progress.³³ The new fiction had

stayed remarkably constant for 30 years....Between [Richardson's] Pointed Roofs in 1915 and its successors there was no significant development. In fact, there could not be; because [the interior monologue

and stream of consciousness], effectively [cuts] out precisely those aspects of the novel [from which] a living tradition can be handed on.³⁴

Indeed, Snow and many of his literary colleagues such as John Wain and William Cooper were suspicious of the fact that "the Modern movement [or] 'the Men of 1914' were still known as 'Modern' forty-six years later [thus showing] that we are not dealing with any historical situation in a serious sense".³⁵ In Snow's mind these writers were dishonestly and uncritically presenting themselves as a future wave when, in fact, they themselves were trapped - frozen - within an *avant-garde* which had become *passé*.

What the novel was losing as a result of the modernists' textual preoccupations and social withdrawal was far more than a stylistic convention. In the new forms,

reflection had to be sacrificed, [as was] moral awareness [and] investigatory intelligence....³⁶

As far as the reflective, investigatory intelligence was concerned, Snow distinguished between the modernist's insight

which tells us what it is like to be in a certain mood and his preferred insight which asks, why should I be driven by these motives [or] capable of this action?³⁷

This distinction is important, for Snow found that the new novel's preference for interior monologue plus its almost compulsive emphasis on images and patterns served only to distance the subject of fiction from the fiction itself. A piece of evidence that Snow liked to cite was that these new and popular literary techniques were no longer seen as a way of writing but "as the only way of writing". They served to work only as they could - as proxies for the direct complexities inherent in the struggle that is modernity. Snow 'stream-lined' the cognitive sensualities of reality by referring simply to 'flux'. Any written attempt to express the flux of

our sensations and mental experience must, of course, rest upon a convention. [In reality], the flux is very largely non-verbal,...[The technique of the] stream of consciousness, at its highest point, as in Joyce is an attempt to find a verbal equivalent for [this] non-verbal flux. [Its] strategy is straightforward: adopt what looks like a naturalistic approach, write the verbal equivalent as though it were the flux itself; discard the reflective intelligence, and try to make the words suggest what scientists call a one-to-one correlation with the elements of the verbal flux.³⁸

Snow saw such literary techniques as being not only limiting in terms of the range of experience which the novel could address, but also in terms of their access to a necessary insight through which the persona of the self is located and explored.

The essence of introspective insight...., is that one and the same time one sees oneself with total intimacy and at the same moment as though one were someone else.

Immersed in the stream of consciousness, one can never achieve the second part of this illumination.³⁹

Having recognized these elements of Snow's literary critique however, it must be pointed out that stream of consciousness and interior monologue techniques, as well as psychological insight or introspection, have been the sources for serious misreadings of Snow's aesthetics.

This is a delicate point for while Snow argued against the fiction of Joyce and Woolf he praised as great novelists such masters of the interior monologue such as Tolstoy, Dostoevsky, Balzac, and Proust.⁴⁰ Snow knew well that Proust was a master of analyzing that truly modern condition of 'lost time', but Joyce analyzed this familiar Proustian ground of the 'present moment' with considerable immediacy - and yet Snow found the result almost incomprehensible. Snow defended this position in the following way:

Anyone who has read novels between 1920 and 1950 can recognize this moment-by-moment technique. In reality, it is not so much a technique as an attitude of mind, which suggests that a writer can only learn anything of life through the immediate present, i.e. he should confine his art to what he can see and hear or....to the solitary moments of free association. No attitude could be more sterile. It is not in the least how one learns about life in actual fact.⁴¹

Here, Snow's seems quite content to restrict his commentary to a level of technique alone. But even beyond this, his inconsistencies are notable. As Frederick Karl has pointed out, when one tries to apply the realist ideas of these authors whom Snow admired, one finds that they do not at all fit with Snow's perspective at all. As ideas, the Russian realists' views were almost the opposite of Snow's. For example, Tolstoy advocated an almost total rejection of administration, bureaucracy, industrialization, and ambition -that is almost all of the values which Snow accepted, assessed and promoted. Similarly, Dostoevsky had apocalyptic visions in which Man found salvation through Jesus Christ, but Snow and his characters were aggressively atheistic.⁴² But Snow ignored these inconsistencies between his evaluations of literature and his own output. To a degree, Snow's distaste of Joyce is more understandable. Whereas Snow found meaning in the world at large, Joyce confronted the intensely immediate moment. In a sense there would seem to be nothing more obvious or tangible than the present moment. And yet as Joyce's work articulately revealed, it eludes us completely. All of the sadness of modern life lies in that one observation. In the course of a single second, all of our senses register a swarm of events, sensations and ideas. And yet to the degree that Joyce's literary technique was able to seize that moment for inspection, it brought us directly in contact with the possibility that our quest for the self may ultimately end, not in resolution but, in paradox. More particularly the more powerful the 'stream of consciousness lens' of Joyce's literary microscope,⁴³ the more elusive the self and its

uniqueness appears to be. "Beneath the great Joycean lens that breaks the soul down into atoms, [the more we realize that] we are all alike", that our uniqueness cannot be fully grasped by the interior life.⁴⁴ This view - which is really an essential element of the existential phenomenology articulated by Merleau-Ponty and Schutz - is really what Snow will not agree with - for two reasons.⁴⁵ Firstly, the belief that individuals cannot be unique removes all hope for the betterment of Man. The belief that cognition, thinking or rationality cannot provide the vehicle for this betterment only traps Man in despair. Secondly, reductionist philosophies believe that - in science, for example - ultimate understanding rests in determining and analyzing ever smaller particles of matter. 'Anti-reductionists', however, recognize that even within an individual organism, a contradiction to the absolute nature of reductionist theory exists. Admittedly, in the area of scientific experience, a particular scientist's adherence to one theory or the other as a total philosophy is irrelevant. To be sure, reduction is a successful and vital feature of the scientific method. But as numerous philosophers of science such as Karl Popper have argued, reductionism can only be a method for research; it cannot succeed as a total philosophy. Snow argued strenuously that literary works of art and problems in literary criticism are reducible and must be examined in this light if they are to be understood. But Snow, like

the anti-reductionists in science, saw reduction as totally inadequate from a philosophical perspective.⁴⁶

As Snow suggested time and time again, the ultimate success of a literary work is connected to its moral fiber. Having said this however opens the door to numerous interpretative difficulties. Many of the growing number of post-1945 realist literati spoke of the need to reconstitute British life and politics in terms of morality. Thus it is not surprising to find that Snow - as a member of this community, and despite his own dislike of moral appeals - did make occasional references to the need for 'moral fiber' in life and literature. However, rather than take such rare citations as they were intended, critics who were eager to suggest possible grounds for an intellectual reconciliation between Snow and Leavis (by symbolically closing, in their minds at least, the gap between 'two cultures') have eagerly accepted the moralistic language used occasionally by Snow at face value and have leapt to the conclusion that the real differences between Snow and Leavis were in fact quite small.⁴⁷ Using an article which was written by Snow on America's deplorable "sex-obsessed novels" of the 1950s and 1960s as the sole support for this thinking, these critics have cited but one passage:

no culture is healthy if clever writers fluctuate
uneasily between the unreadable and the obscene.

This statement, it is argued, is one with which a Leavisite could have made or agreed with easily. But this view, taken in the context of Snow's conceptual outlook, is superficial on many grounds. First, to Snow, claims made on behalf of morality or a moral tone are "vaguely absurd". Secondly, in Snowian terms, moral fiber is more of a reference to a typically English 'stiff upper lip' - used in support for post-war reconstitution of the every day than an appeal to divine intervention. And third, any serious differences between the literary outlooks of Snow and Leavis are to be found, not on the moral plane but, in the nature of their literary imaginations and their relationships to social change. At this level of abstraction, Snow can correctly be seen as something of a technological utopian⁴⁸ who is strongly opposed to Leavis's Blakean Romanticism. But Snow's occasional references to moral quality are solely reflections of his realist's framework. They are not grounded in any elaborate philosophical tradition. Indeed it can be argued that his 'moral' reaction is part of the larger, post-war English wave in which amoral aestheticism was roundly discredited.

Indeed when World War II was over and a new literary atmosphere began slowly to emerge in Britain, a group of writers which included C.P. Snow, William Cooper and Pamela Hansford Johnson set out to fairly systematically (and, in the end, very influentially) establish a tone for the

post-war novel. As with most movements, the tone was experimental - except this experiment was a revolt against experimentalism. As William Cooper put it

During the last years of the war....[C.P. Snow] and I, not prepared to wait for Time's ever rolling stream to bear Experimental Writing away, made our own private plans to run it out of town as soon as we picked up our pens again - if you look at the work of the next generation of English novelists to come up after us, you'll observe we didn't entirely lack success for our efforts. We had our reasons for being impatient. We meant to write a different kind of novel from that of the Thirties and we saw the Thirties Novel, the Experimental Novel, had got to be brushed out of the way before we could get a proper hearing. Putting it simply, to start with: the Experimental Novel was about Man-Alone; we meant to write novels about Man-in-Society as well. Please note the 'as well'; it's important. We have no qualms about incorporating any useful discoveries that had been made in the course of Experimental Writing; we simply refused to restrict ourselves to them.⁴⁹

Thus what emerged in this 'reaction against experiment' was 'a preferred tone of neutrality'⁵⁰ which in fact amounted to both a disagreement about literary forms and about the class origins of writing in Britain. The experimental novel and the literary *avant-garde* had been largely identified with Bloomsbury. The 'new writers', including Snow, sought to assert different social and cultural origins for their work. Their new fiction was as much a class revolt as a formal revolution. It signalled a retreat from a good many well-established literary assumptions and allegiances. It found a usable past in

the main line of English writing by looking back to George Eliot and Charles Dickens. It reactivated the spirit of social attention, and it spoke the language of consensus. Its impact was considerable.

But while Snow was aware of the ground swell of sympathetic criticism which supported him and his colleagues from the late 1950s onwards, this did not cause him to lighten his attack on modernist fiction, nor did it encourage him to move on to new lines of criticism. As he said,

There are a dozen or more promising novelists in England - Doris Lessing, William Cooper, Emyr Humphreys, Francis King, Kingsley Amis, J.D. Scott, Brigid Brophy, John Wyllie are some of the best....Not one of these....shows any interest in the sensibility novel....several of them have explicitly and roughly savaged it....⁵¹

However, the fairly widespread emergence of this reaction against modern literature, plus Snow's new opportunities to travel to the United States and Canada in the decade following the Rede Lecture as a celebrity *cum* scholar-in-residence,⁵² did encourage him to turn his attention away from modern novelists to an extent and to comment more on modern critics.

As he explained, from about 1925 to 1945 the new novels were taken for granted. But as these literary forms began to lose the interest of the reading public, literary critics ('coroners', to use Snow's language) began to declare the death of the novel. The gap between an increasingly specialized 'art-novel' and the reading public was growing. There were plenty of

books being written, published, and read, but they were not the same novels that the literati were talking about. "Many plain people were just plain baffled. They did not have the patience to follow the course of the aesthetic war but when asked to read wedges of moment-to-moment sensation, they passively went on strike."⁵³ In Snow's view, this was a situation which extended well into the 1960s and which was fostered by academic critics of literature.

During Snow's many visits to North American universities, he grew increasingly disapproving of the new criticism. He came to view the new academic critics - with the notable exceptions of Alfred Kazin, Harry Levin, Leon Edel and Lionel Trilling, who Snow deeply respected and all of whom shared at least a modicum of admiration for Snow's writing - as groups of unwitting accomplices in the decline of the novel. Snow saw the lesser critics as mimicking the faults of the modernist writers by studying literature as if it was no more than verbal structure. He saw them as waiting for meaning to be automated and split so that they might reveal the literary secrets with the same 'authority over nature' as scientists.⁵⁴ Snow never argued that the activity of these academic critics was useless. He only argued that their types of literary criticism were far better suited to the consideration of novels whose ranges are deliberately narrow. According to Snow, this kind of criticism is unable to adequately evaluate such 'real heavyweights' (as he liked to refer to them) as Balzac, Tolstoy, Dickens, Dostoevsky, or Proust. In the case of these writers their work is too elusive and too big in their art to be handled by

such techniques. Modern academic critics do not have the required equipment to handle War and Peace, one novel which many - including Snow - consider to be among the greatest works of fiction ever written. To be assessed properly, such a novel requires an array of techniques.

Clearly, Snow's critique of criticism and the experimental fiction is only partial and is ultimately dissatisfying. But in so far as it unrelentlessly stems from a concern with the self and the modern condition, it does encourage us to explore his critical alternative - his realists' response.

As a close reading of Snow's fiction reveals, the importance of the 'novel as art' emerges out of its capacity to communicate. Thus, it is necessary for all of the literary components to work in the same direction. It is the main task of a writer, the hero in fiction, the fiction's structure, themes, and techniques to, together, transmit the visions of life as completely as possible. It is on general terms that Snow viewed the experimental novelist as investing too heavily in a notion of the novel as being simply an arrangement of words. Meaningful literature cannot be valued only on the grounds of whether particular arrangements of words can be an exact correlative for a highly personal version of experience. In this type of literature - literature which is obsessed with an aspect of private life - it matters little if this vision can say anything much about the outside world, or whether it can say anything about objective truth. To Snow, this aesthetic view is both silly in the trivial sense,⁵⁵ and absurd:

it is rationalized into thinking which shows the characteristic of bad thinking, of a complicated rococo, and often subtle in its decorations, but naive at the core. The basis for the rationalization is, of course, a naive comparison with non-representational graphic art: and its result would be to make the novel not less significant, but also not more....⁵⁶

To argue that characters, scenes, structure and themes cannot be separated from an author's intention, and that there can have no meaning apart from the words is, in Snow's framework, a nonsense - a solipsism.⁵⁷ As science has revealed, the self can never again be conceived of in egocentric terms. Nor can it ever claim to be the sole source or object of knowledge. But in Snow's mind, the Moderns' refusal to recognize or acknowledge this connection between life and art was effectively dishonest. It represented a "syndrome of attitudes" which was, at its roots, a pure social reaction.

The romantic conception of the artist, the alienation of the intellectual, the aesthetic of the anti-novel, the abdication of the generalizing intellect, the hatred of the scientific-industrial revolution, the desire to contract out of society. This syndrome is....visible in a considerable sector of advanced literature all through the first half of the century....[There is a] connection which seems to be close, though not in individual practitioners inevitable, between this sector of advanced literature and extreme social reaction - not conservatism, but extreme social reaction.⁵⁸

Perhaps the most extreme example of this is, for Snow, to be found in social and aesthetic exile. Of course one of the central themes of

modern literature is exile. Certainly when one thinks of this, all sorts of names spring to mind. Ezra Pound was an exile all of his life. Vladimir Nabokov was an exile, albeit he was forced into exile. Joseph Conrad was a cultural exile in England. And James Joyce - who wasn't really in exile (in the sense that he picked a quarrel with Ireland, and nobody actually forced him out) - nevertheless gave "silence, exile and cunning" as Stephen Dedalus' motto. Other examples abound. Nevertheless, one always gets the sense with exiles that they are trying to deal with material or experience which cannot be expressed. They are always at the limit of the articulate - at the limit of the intelligible. They become marginal beings. And in so doing become quintessentially modern. However in so far as 'the exiled voices' became the dominant figures of this century's literature, many of the literary historians of this period have romanticized exile for its so-called liberating qualities. Snow didn't agree with this view for a moment - even though he, in a sense, exiled himself from mainstream society and subsequently spent a life 'caught' between classes. He was ever self-conscious of his 'place' in society. He wished to escape his past, yet he never wanted anyone to forget the difficulties and significance of his progress. As Snow simply put it, the

disadvantages of exile is that particular kind of unselfconsciousness [which allows you to be your own man] leaves you. That the things that in your natural habitat are as easy and as unthought about as breathing, suddenly have to be thought about. And so, one of the many disadvantages of exile is that you lose a degree of freedom, you lose a chance to be

unselfconscious in places where you would normally
be so.⁵⁹

Certainly, social and aesthetic exile did seem to give modernist writers a sense of exuberance - a freedom of a certain kind. But in the end it was always circumscribed by something that enabled them to look at others who did feel at home with a kind of resentment. This single, and ultimately depressing, element of exile is one with which Snow was concerned as the 'separateness' that such a sensibility implied can, in the end, only inhibit the communication of shared experiences. As Raymond Williams noted, a weakness of the literary exile stemmed from his or her tendency to separate 'feeling' from 'thought'. This conterminously leads to the separation of the public and private spheres as well as of consciousness and unconscious. But while this is an inevitable outcome in Williams' conception⁶⁰ it is highly undesirable and avoidable in Snow's conception.

However given all of the above, perhaps what is most problematic for Snow regarding experimental literature is, not that it is experimental *per se* but rather that - given its hegemony over the creative or social sensibilities of the period - it represents and promotes a view of progress which is fatalistic and passive. This perception is ultimately corrosive. Nowhere is this better seen than in Snow's response to the popular modernist claim that

a work of art is irreducible. A novel which is a work
of art exists only as a structure of words, independ-

ent of the writer's intention. From the structure of words, the 'characters', 'scenes', must not be separated, for they have no meaning apart from the words
⁶¹

With one word, "silly", Snow dismisses this view and in so doing begins to build his own alternative literary framework. This alternative was to be an aggressive, but contemporary, realism in which the connections between past, present and future were always evident - even in the face of modernity. His focus was on literature (as a form), and science and politics as major forces of modernity. His voice always recognized the weight of modern times, but he nevertheless championed the individual as the ultimate shapes of change.

All of Snow's fiction is made up of stories that thread processes of connection between the past and the future. In his novels, not only do we find families, generations and the recurrence of experience, but we also encounter time and memory as crucial elements as well. In so doing, he does not simply construct 'the architecture and edifice' of our time, but he makes these themselves matters of speculation, as indeed has been done in a great deal of the major fiction of our temporally disoriented century.

But there is no doubt that Snow's Strangers and Brothers sequence is significant. It has made a bid to be regarded as one of the great documentary and recapitulative works of a century that is not so easily susceptible to documentation. Snow's realism has succeeded at a time when realism itself has hardly seemed possible. As such, Snow's edifice represents

one of the more ambitious ventures of contemporary British fiction. From Strangers and Brothers (later re-named George Passant) (1940) to Last Things (1970), Snow told us a tale that reached across some sixty years of British social, political, strategic, scientific, intellectual and emotional history. It was also a story of modern time and memory. It is in these terms that Snow's fiction is, as he insisted of other major fiction, reducible.

A work of art and especially a literary work of art, "is, in almost every kind of way, reducible....In fact, if one did not [reduce them] it would not be possible to discuss [such work] at all."⁶² As the cases of Tolstoy, Balzac and Trollope (to use Snow's preferred examples) illustrate, writing deliberately and unavoidably includes a discursive theory of history and as such it cannot be treated as a self-sufficient verbal structure in any sense which has real semantic or social meaning. Snow's own Strangers and Brothers sequence of novels exemplifies this perfectly. Throughout this sequence of eleven novels, Snow is concerned with time and history, but not as treadmill or *un roman fleuve* as in Anthony Powell's A Dance to the Music of Time. Snow's sequence traces the course of our modern era in a straightforward fashion. Strangers and Brothers deals with the period 1925-1933; The Consciousness of the Rich covers 1927-1936; Time of Hope encompasses 1914-1933; The Light and the Dark advances through the years 1935-1943; The Masters focuses on 1937; Homecomings deals with the decade 1938-1948; The New Men examines the war years of 1939-1946; The Affair focuses on 1953-1954 while the Corridors of Power stays with 1955; The Sleep

of Reason is concerned with the 1960s; while Last Things concludes the series in the late 1960s. Although Snow may sometimes take the reader back in time, we always move forward - we are always moving towards the discovery of some larger insights into the nature of our era and ourselves.

Snow may have quarrelled with modernism, but he greatly admired Proust. However his admiration was less with the Proust of formal and aesthetic sensitivity than the Proust who could construct, through the operations of memory, the great social edifice of French life. He also admired the Proust who could pursue and develop his theme throughout a lifetime. But where Proust's is a fiction of consciousness, Snow's is a fiction of history - both public and private. His is the history of one man who constitutes the history of a culture, and memory is a mode of response and retrospect which links origins and background to future events and possibilities and the great changes of the modern world.

The sequence,⁶³ which closely parallels the life of Snow, takes the form of a biography of Lewis Eliot - later Sir Lewis Eliot, though unlike his creator, he never achieves a barony. He is the son of decent working-class people in the Midlands; his birth place is recognizably Snow's Leicester, and his date of birth is around 1905. He enters a divided world - the nature of which is suggested by the book and series title, Strangers and Brothers. Eliot has a deep and intuitive understanding of his brother (Martin), and of two friends who stand in a kind of fraternal relationship to him. Others are strangers, external phenomena to be recorded and coolly observed. As the

series develops, and as Snow himself gains more insight into the workings of the world, this basic relationship expands and comes to stand allegorically for the relationship between society - its institutions, motives and customs - and the individual who, although a stranger in any technical sense, still shares the same ambitions, drives and hopes and experiences the same private experiences as any other person. The recording and commenting side of Eliot is not all we are allowed to see of him. He is an emotional man, although he tries to keep his emotions under control. He suffers in his first marriage to a neurotic, upper-class wife who is likely to damage his career. He is dedicated to a brilliant scholar, Roy Calvert, who is manic-depressive. Death, tragically, ends both relationships: his wife commits suicide while Calvert is killed in an R.A.F. bombing raid over Germany. About the loss of Calvert Snow wrote with a particular bitterness - it was a bitterness that was echoed by many who lived through the war and who saw the loss of friends and promising individuals.

Eliot's career flourishes and, as an external lecturer in a Cambridge college, he comes into contact with the world of academic politics. With the outbreak of war, he temporarily becomes a civil servant to assist in the war effort. He meets the woman who is to become his second wife. Her father is a successful artist - a painter who is contemptuous of, or indifferent to, the attitudes of society. At this point in Snow's epic tale, one of the imponderable events against which the world of reason cannot legislate descends upon Eliot and his new wife. The illness of their first child suggests

a spiteful revenge on them for having lived as lovers (defying social convention). But as the mysterious power of illness lifts, their relationship is left more firmly cemented than before.

Professionally involved in the relationship between science and government and particularly in developing a nuclear deterrent for Britain Eliot shares the growing sense of horror of many of his scientific friends. He sees his brother give up a promising career in scientific research because of his opposition to atomic warfare. Eliot then enters into the 'corridors of power' (to use a phrase coined by Snow) and examines the closed politics of decision making committees. The passage of Sir Lewis through this high-level wonderland reveals to him a dark and inexplicable division in society.

On one of his returns to his boyhood town as a Student's Representative in a legal case before the University Court, Eliot and his own teenage son visits his father in the house in which he grew up. But the old man's life seems untouched by the successes or existence of his two successful sons. Eliot seems only to be able to observe his father's life as one might see a boat from a shore. But there is comforting nostalgia for Eliot as he is involved with a group of militant students, one of whom leads Eliot into a labyrinth of horror and murder through which he must pass, incapable of either influencing events or of resigning from them. Eliot is thus brought to face with the limits of reason and control.

Ultimately, Snow's series comes to a conclusion - with Eliot leaving politics, facing his relationships with his family, facing his own

existence as well as his past as his heart stops for a number of minutes during an operation. Eliot examines his life's potential, his relationship with others, and life's meaning. He tries to do so without mercy and, in so trying, he achieves a sort of freedom which resonates throughout the series. Thus Snow's sequence is clearly a history of our time as told by an individual who holds all of the ear-marks of our popular idea of a modern hero. Snow's chief character, Lewis Eliot, and those around him, are scholars, professionals, and successes in those circles which affect us the most on a day-to-day basis. But more than this, the series is also a thoughtful examination of some of modernity's deepest themes. Rather than simply being a passive recitation of insignificant events, Snow injects an articulate and analytical mind into the scene which actively interprets events both for himself and for his readers.

Often, Snow's central character of 'Lewis Eliot' is centre stage. Occasionally, he is what Malcom Bradbury has called, a 'wise ghost' lurking on the edge of others' lives, always ready with a thought, an observation, solution or compromise.⁶⁴ He begins his journey through the pages of Strangers and Brothers in the streets of a lower-class provincial town (recognizable as Leicester), looking in on the lit and warm windows of real life. He ends it with Last Things, only just surviving the novel and telling his tale with the raging impotence of old age. But in between, there can be no doubt that he is one of the most ubiquitous and prolific narrators, bringing us through twentieth century British social history, maintaining his own intimacy with many of the larger events and daily choices of the struggle of

modernity. For example, in The New Men he is at the birth of the British atomic bomb; in Corridors of Power he is involved in the aftermath of the Suez Crisis; and in The Sleep of Reason he is involved in a court case closely resembling the Moors Murder trial. Each of the eleven volumes in the series has its own distinct subject of concern, but the sequence is linked, not just by a common narrator but by a belief that this narrator is intimate with the very nature of our time, with our history - a history which is constructed not only out of Eliot's ascent through his social order but through the movement of a certain kind of decent, optimistic, rationalist mind toward pre-eminence in public and private affairs.

As Malcolm Bradbury has said, Strangers and Brothers is told like "a Victorian novel and written in much the spirit of a Wellsian one. Snow conducts the sequence in an efficient, almost timeless, prose which is highly discursive." "The entire narrative clearly depends on a strong autobiographical content and a repertorial social attentiveness which acts as an invitation to look at the record." In many ways, Eliot seems to function "as a diarist for Snow himself while at the same time engaging in the fictional function of effective dramatic presence at the significant junctures of history. Indeed in some sense history must be that which is near to him as he must arrange to be near to history. As such, he is one of our larger men of history. The curves of both modern history and his life seem connected. The world is made for us to feel young and optimistic when he is; important and wise when he is; old and distant when he is."⁶⁵

As the observant narrator, Lewis Eliot's manner is emotionally flat, often indifferent (his is not the world of fantasy or imagination), increasingly pompous and finally irascible. He is a public man who has some sense of his own weaknesses, and the tale gives him some insight into both himself and his limitations. For the most part, he is without irony. He portrays a critical intelligence and yet he seems to have a sense of decency in human affairs although this is somewhat ambiguous, for this is not simply a perspective but is a social commodity which enables his success. His famous gift for compromise does tend to make him dull, but it also opens all doors to him. This is both socially and narratively convenient. He is in every sense a modern realist who has found his way to the places where reality does its daily work, in that realm which he calls 'the world', meaning the public world of social life, power, political influence, and responsibility.

As many of his critics have pointed out, there is much to the real world which is left out of Snow's world. But his world is presented in a way that is so familiar that we think we know it already. It is presented to us with a low-key discursiveness which may leave much unsaid and a lot more unfelt, but how well we know it. This gives the impression, as much as realism does, that it is all virtually unconstructed, that it partakes of the pure contingency of life. But the truth is that it is highly constructed according to a clear rationality and historiography.

Snow's tale is the story of the 'new men', who have new ways of thinking, who bear the radical wisdom and ethical anxieties of science as well

as the liberal program whose task is not just research and discovery, but reform and social amelioration. It is the story of rational social development, the kind that a lot of scientific thinkers during the 1920s and '30s saw as being a real possibility: Man would make a decent and humane society out of His capacity to mediate His own survival, and His own sanity. To Snow such hope means freedom from limitation and possessiveness.

Snow's technical alternative to the radical modernist novel is modern realism. Realism has always had the advantage of being at home amongst the social institutions of its day, and of operating necessarily both in the aesthetic realm as well as in the cognitive and political realms. Indeed, realism is often touted for its capacity to represent totality. In its pure form, realism is a strategy which seeks to situate the individual within the entire historical dynamic of their society. Viewed from the perspective of participants, yet structured by the omniscient historical understanding of the author, the best realism presents history as a process which is revealed in the specific (but generalizable) logic and experience of groups and institutions.

Thus, as critics as diverse as Lukacs and Stern have outlined, modern literary realism can be a liberation and an emblem of the richness of the world just as much as it can be a restriction or a prison-house.⁶⁶ As such, realism leads a double existence - working simultaneously inside literature and in the 'real world' of the everyday. Literary realism has no special vocabulary or syntax of ideas. No style and technique is exclusively its own (although transparency of language, style, and technique is something

of a pre-requisite). What unites the two parallel realms of meaning is realism's representational quality. Literary realism designates more of a condition than a content. It refers to both a way of thinking about the world as well as a way of expressing it. Thus, it should not be surprising that modern realism works most effectively when it maintains the middle ground between life and art. Indeed it should not be surprising that there is an area in which realism is most fully at home: where human relationships are formalized or protected against the caprice of solipsism - in the social institutions of the age. The failure of the critics to recognize this has been problematic for the popular reception of Snow's literature. For the transparency of his prose has too often been mistaken for a simple representation of life rather than being a crafty interpretive art.

To the extent that realism has no contribution to make to a model of reality, Snow must be considered a neo-realist having no consistent political line to advocate - now being subversive, now conservative. As we shall see in Chapters 5 and 6 Snow's politics float along a continuum of post-war liberal thought which is tied to no political party or platform but which is relentlessly loyal to the radical science commitment to a re-definition of the self.⁶⁷ The object of Snow's aesthetic interest is unabashedly the real world. Its subtle intention is to instruct while its objective is unashamed to delight. It is thus no coincidence that when asked 'what do we read novels for?', Snow answered unequivocally that we read them "for various kinds of pleasure."⁶⁸ (Ironically,

Snow never allowed himself to see that writers such as Joyce could also be read for entertainment.)

But in so far as Snow qualifies as a realist or neo-realist, he does not represent the charming realism of the eighteenth and nineteenth centuries, as some have suggested.⁶⁹ His is more a realism which aggressively attempts to reflect the totality of modern technological society. However the selection of realism as an interpretive strategy is not unproblematic. Indeed as Frederic Jameson has detailed, literary realism and literary modernism have long shared an opposition to each other. "The division of these two starkly antithetical tendencies (form-oriented versus content-oriented....) is dictated by the attempt to deal adequately with modernism" rather than the other way around. The disturbing element about transparent literary realism as a technique to approach something of a totality seems to be that "whenever you search for 'realism', it vanishes".⁷⁰

This is not surprising as this is what realism does best. But what is more helpful is the observation that the strategy itself is highly ideological in that it is inseparable from the development of capitalism and the quantification of the market system, and that it is linked to the bourgeoisie as its product.⁷¹ As a result, realism may be too closely tied to the interests of a decaying bureaucracy to be able to objectively critique those elements of modernity's social anomie and fragmentation. But what Jameson and others offer in realism's place is a narrative which avoids modern social content as a way of managing or containing it, of secluding it out of sight in

the very form itself. Nevertheless, it is clear that the debate between literary realism and modernism loses its interest if one side is programmed to win in advance. To understand the struggle of modernity, we need both sides. We are, after all, inexorably children of tradition and modernity.

Numerous critics have heard Snow claim that his is a realism for the post-atomic age⁷² and have taken for granted that he had not moved beyond the bases upon which he attacked radical modernist literature. In other words, critics have assumed that his was a political utopia which featured an 'Heroic Age' of science at its core. However a more perceptive and helpful view would recognize the impact which the second scientific revolution of quantum mechanics and the Atomic bomb had on Snow's thinking. As he stated on numerous occasions, the year 1945 represented a quantum leap for Man to a new level of technology. The obvious question which Snow asks is "is the atomic age going to make things worse for Mankind and for novel-writing?". To this he answered

I do not believe the worse is likely....The bomb has staggered scientists with a moral shock from which the best and most sensitive will not easily recover. Up to 1945 the climate of science was optimistic. Now that unquestioning optimism has drained away from most of the scientists I know. Technology is successful, they feel. As for science, they do not go in for facile despair, but there is a weight on their brows. And that mood brings scientists and novelists closer together....and the new humility of the scientists has in turn given the novelist new confidence.⁷³

In terms of the implications of this technological awareness on the novel, Snow showed himself to be both more aware and better equipped than others. Paralleling the concerns raised by such critics as Adorno, Horkheimer, and Walter Benjamin,⁷⁴ Snow acknowledged that in an advanced technological society we will

edge closer to the position where....private novels [are produced], with a readership of one, which alone are treated as Art [while] popular novelists give up the struggle for any glint of truth and get read in millions at the price of surrender to the mass media,....film and television. It is arguable that such a polarization is the fate of all art in an advanced technological society. [And if] it happens, and it may happen, we shall have committed cultural suicide.⁷⁵

But such a scenario is avoidable, in Snow's view, if we foster a novel form "has its roots in society".⁷⁶ "The novels of the atomic age must mount "a new attack on the relations of men to their environment" which is the "highly articulated complex of our technological society."⁷⁷ Only then will we, and the novel, "breathe freely". Only then will a reconciliation between modernity's public and private selves be possible. But - as Joe Needham reminded Snow in 1934 - to achieve this requires a clear-minded social-political outlook as well as a series of complementary critical and literary techniques. Together, these could promote an "active insight into the atomic age".⁷⁸

Clearly, Snow had the necessary assembly of talents for this task.

Snow....augmented the traditional realism of the English novel - realism in the line of Trollope, Thackeray, George Eliot, Galsworthy, and Bennett - with the technical enrichments this century has brought to the novel....⁷⁹

Among these talents was an emphasis on direct experience, first-person narrative, psychological depth and social extension. Together, these permitted Snow to link the private (cognitive and emotional) and the public (political) elements of the contemporary human condition. Thus beyond the purely historical portray it of time which is presented in Snow's sequence, Snow's prose draws considerable energy from the modern social setting of his fiction. Snow never forgets that novels, especially 'serious' novels, have a primary purpose of gaining knowledge of other people as well as of ourselves.⁸⁰ As Pamela Hansford Johnson put it, the greatest realists (and here she includes Snow without reservation)

elucidates for man not only his neighbour but himself; by increasing the self-knowledge of the reader he changes him on the surface perhaps imperceptibly, but inwardly with a completeness.⁸¹

In order to achieve this in his novels, Snow uses a device called 'introspective insight' through which he seeks to link the worlds of life and literature.

The essence of introspective insight....is that at one and the same time one sees oneself with a total intimacy and at the same moment as though one were someone else.⁸²

This technique is essential to Snow's literature for it allows him to probe beneath the continuum of feeling and enquire about motivations, ambitions, moods, and actions. Although it is different than the introspection used by realists such as Tolstoy or Dostoevsky, Snow's technique for introspection achieves much of the same effect: that is, it makes for a complex and enriching interaction between the individual personages and their complex social ranges.

Snow's plots are explicit and his language is conversational. Narration and dialogues are purposeful and external. Since, for Snow, human loneliness and death are two immutable realities, he rejects the interior monologues of much radical modernist writing. To Snow, a 'psychic odyssey' (such as that found in Joyce's Finnegan's Wake) is at best irrelevant, and at worst almost obscenely personal. In contrast to this, Snow's world is always

observable, and when the situation dictates that evidence or time cannot be present, he uses Proustian recall. But far from being a convenient trick of an unaccomplished author, it serves as a learning device for Lewis Eliot while providing an effective bond for the novels in the series. Snow's language is that of analysis and commentary. But to many, this feature represents a weakness of Snow's fiction. As an early critic of Snow's work has written,

Snow....wants to show man functioning in the larger world, not man praying or playing but man working and making, *homo faber*, and yet, he also wants to see why that particular man acts that way - what his motivation is, what his causal psychology is, what he really is. These ambitions should bring Snow back to the inner man in a much more profound way than he is willing to go....⁸³

The themes in Snow's literature are science and politics. This in itself has necessitated the adoption of a decidedly 'non-stream-of-consciousness' approach for, as Snow describes it, trying to express motivations or experiences in science through interior monologue "would result in the equivalent of a series of equations which were meaningful only to scientists. The problem would be a serious one of communication". Similarly, Snow claims that stylistically, politics is both "easier and harder". While the communication problem is not the same (i.e. verbal symbolism) the complexity of power relationships between men in organized society is itself a technical problem. "One cannot write about politics without constant call on causal

and introspective insight....so one cannot use a technique like stream-of-consciousness which [*de facto*] rules them out."⁸⁴ In verbalizing the relationship between power networks and social settings, Snow argues that

one needs every aid within the writer's power to dissolve or disguise the complications....There is no single aid so useful as the reflective intelligence.⁸⁵

However, the themes of science and politics of which Snow writes are only his 'thematic epidermis' - the more obvious skin of his literature. They provide the vehicles, in effect, for his realist's interests. As he says, from the beginning he knew approximately the deeper themes he was going to write novels about.

[The] position seemed to me something like this: I was interested in the individual human condition and the social condition. I was interested in the power relations of men, and the progress of individual lives in time. and I wanted to show that such human beings, no better, no worse than they are, are all we have to make society of.⁸⁶

In order for Snow to try to achieve the artful balance between the self and society; between the competing claims of individuals and groups; and between the action and backgrounds that have in fact defined the modern condition, he wrote directly of those areas in which literary realism has always felt at home - i.e., in the social institutions of our time. But so common is

our experience of the de-formation of institutions - of their dehumanization and bureaucratization - that we have largely lost our understanding of their *raison d'être* and what realists have sometimes called 'their charm'. Throughout 19th century realist fiction, for example, the stock exchange, government offices, municipal administration, Church, and the army most often served as the background to individual action. In so doing, it embraced the claim of early sociologists' that the individual self, in any living sense, was inextricably involved in a social whole. They were establishing a unity and a truth which realism - including Snow's realism - has never ceased to take for granted. Thus, by focusing on the 20th century university, government office, law office and research lab - all against the backdrop of recognizably contemporary events, Snow's fiction is classical in literary terms and modern in its social selection of its sites. His settings are all identifiable, familiar and symbolically charged.

But of all the elements of Snow's literature, it is his use and development of character which truly defines him. Indeed as Pamela Hansford Johnson wrote in the year of their marriage:

character in Mr. Snow's novels is by far the most important element, and he allows nothing to obscure this.⁸⁷

Like his settings, Snow's characters are all familiar and almost all are cast in professional roles: lawyers, professors, clerics, scientists, politicians, industrialists and physicians. As such, Snow was able to unobtrusively examine - by necessity - tensions felt within modernity by juxtaposing professional norms or values with issues relating to responsibility, power, ethics, as well as tensions arising from conflicts in self-definition. The actions of Snow's characters are most cogently defined as members of both formal and informal groups filling a variety of roles ranging from leaders and group members to individuals. But if taken in its narrow view, Snow's characters could be criticized for representing only the technocrats and the intelligentsia. However the problems of both society and the individual are so powerfully conceived of and animated in these professions and sites that making them partially transparent can be, and is, in the case of Snow, highly rewarding.

The unifying techniques and themes of Snow's Strangers and Brothers series are at least partially realized through repetition and parallel action. This can be seen with the major theme of politics. Strangers and Brothers, like Sleep of Reason, begins with legal hearings and ends with trials. The Affair is an academic hearing in the same setting throughout as The Masters, which also is concerned with a heated election. Elections also occur in The Light and The Dark, Homecomings (Gilbey's demise and the rejection

of George Passant's permanent civil service status) and Corridors of power. Although these elections all take different forms, they all require some form of voting, decision making or similar political activity. There is, as in all the novels, a great deal of formal and informal dining, walking in parks or by rivers, *tête-à-tête*, and caucusing. The same characters weave in and out of the series. George Passant, for example, who is seen as an ebullient idealist in the opening book is seen as spent and debauched in Sleep of Reason at the end of the series.

Although one of the major themes - that of science - occurs throughout the Strangers and Brothers sequence in (for example) The New Men and The Masters, nowhere is it presented more effectively than in The Search - a volume which precedes, but which is not included in, the sequence of novels. The book is about the struggles, disappointments and successes of a young scientist. It is largely autobiographical and presents a foreshadowing of the style and technique which sustain Strangers and Brothers. The novel concerns Arthur Miles, a scientist who searches for an understanding of himself, of his relationship with others, and of the conflicts that arise when the ideals of science - those by which he has organized his life - seemed to be betrayed. It is in some ways curious that the successful character of Arthur Miles - a scientist - was abandoned by Snow in favour of the lawyer, Lewis Eliot. Snow had no background in law, but clearly understood scientific research. Upon careful consideration, however, it can be seen that Miles was in effect too close to Snow's own persona. So close, in fact, that Snow's

artistic range would have been severely restricted had the Miles character been continued as the basis for a series. Snow himself understood this and noted that, despite the high praise for The Search, it was "a false start".⁸⁸ However, by adapting a persona and profession in which Snow didn't know the details of, he was able to get at his concerns in a much less encumbered way.

Much has been made of the autobiographical character of the Snow novels. But rather than detract, Snow's close observation of individuals who are intimate actors in the corridors of power has only lent greater credibility to Snow's exercise. Never does the character portrait become so photographic that art gives way to journalism. But the list of 'models' that Snow used is most interesting. Many of Snow's friends at Cambridge served for the principal, partial or composite sketches of his fictional characters as did some writers, industrialists and politicians. Amongst the scientists were G.H. Hardy, J.D. Bernal and Frank Bowden; amongst the academics were Sir J.H. Plumb and Herbert Howard; the writer, William Gerhardt; and the First Lord Beaverbrook are all among Snow's models.

In addition to the characters themselves, Snow cast quite a number of predictable types. For example, Horace Timberlake is a 1930s industrial philanthropist whom Chrystal successfully courts on behalf of the college. Lufkin, the wartime industrialist, is Snow's mid-century millionaire, capitalizing largely on the wartime situation to gain from military-related contracts. The gregarious Schiff represents financial success during the

1960s, largely through international portfolio management. There are academic 'types' as well: the paternalistic Brown; the aloof and assured Crawford; the scholarly elitist, Gay; the unpopular G.S. Clark; the out-of-touch Shaw; and the opportunistic Lester Ince. Although an atheist, Snow also included a number of clergymen: Lawrence Knight was the country parson; Ralph Udal who is a scholar-Minister looking for a good living; Despard-Smith who is the resident theologian in Cambridge - a bitter, old man; and finally, there is the socially involved Godfrey Ailwyn. While the clergymen are not reprehensible, they are certainly lacking in convincing religious faith. Contrary to the dominant criticism, Snow's characters do mature and their attitudes (whether or not they are in tune with the times) clearly signal an evolving history as they come to grips continually with the various challenges of our organized, technological society. Given that Snow's novels fully realize more than 40 characters, this in itself is a considerable achievement.

These 'types' are animated directly by Snow's use of a first person narrator. Throughout the Strangers and Brothers series of novels, this narrator is Lewis Eliot. Eliot appears in eight of the novels as the camera eye and in three as the autobiographical first person. Through this narrator device, Snow has effectively chosen to subject his characters to direct observation and analysis. Thus, it is the job of the narrator not only to act himself but to interpret the psyche as it manifests itself in external action. This technique has been identified as a "more social, objective and public approach

to character"⁸⁹ and thus is Snow's attempt to address what Lukacs highlighted as the central aesthetic problem of realism: to provide an adequate presentation of the complete human personality in a work of art. However, there have been criticisms of Snow's first person narrator. Bernard Bergonzi sees Snow as failing in both of his observer and autobiographical roles.

With the camera eye method the narrator has to see and record everything important that happens: if he is describing a small and enclosed world this need not present any difficulties, but the larger and more varied the society, the greater the danger of manifest contrivance on the author's part in order to have his narrator in the right place at the right time. With the autobiographical method, where the narrator is much more at one with what he writes about, this difficulty may not arise: unable to describe naturally and convincingly his own deepest emotional experiences....⁹⁰

In the observer - or, camera eye - novels, Bergonzi finds it remarkable that in The New Men Eliot is privy to so much information in so many locations. He also finds it extraordinary, for example, that the senior Mr. March would make Eliot such a confidante. To Bergonzi, this is simply not convincing. Perhaps, as Ruth Walsh has argued, Bergonzi has paid Snow a great compliment without realizing it for he has confused the reflection of the thing with the thing itself: he writes as if Eliot were controlling himself and does not consider manipulation or recreation by the author.⁹¹

Other critics have also noted Snow's use of the first-person narrator, but one - Helen Gardner - inadvertently highlighted the core element of Snow's literary realism. In making the case that Eliot's world was "grey and drab", she also highlighted the point that one of the reasons Snow's novels can be so readable and have so much to say about the contemporary scene is that he presents a "hero of our time....one of the indisputable men of the twentieth century....a born administrator....successful and important, but not, of course, famous."⁹² For Snow, true heroism exists, not in the salient moments of history but, in the minute and mundane decisions made by everyone on a daily basis.

It is through an expression of what some would call 'intelligence' or what Snow would call 'reason' that many of modernity's anxieties can begin to be dealt with on a personal level. The point for Snow is not that the narrator should announce the truth as though he knew it all along. It is far more important that the narrator (in the case of the novels) and individuals (in direct social contexts) should become sensitized to the experience of thinking about a problem. Thus, a narrator can become directly involved in the process of discovering. Snow does this in a back-and-forth movement of reporting and reflection, an ongoing dialogue between the self and society, the text and the world. As we shall see this element is a particularly important one for establishing Snow within a modern context. Indeed his typical characterization conforms more to a definition of character as that which "defines itself by what it thinks and what it thinks about".⁹³

In Snow's series of novels, planned to cover more than half a century of English life, he created one of the most remarkable series of portraits of our time. Character and understanding for Snow are both to be discovered directly through a process of living. What he does through his fiction is try to express all of these qualities in a coherent whole reflecting his views and interests in science, politics and the modern age. The artistic design Strangers and Brothers is such that it suggests a resonance between its constituent parts and the whole. The techniques, plot, language, themes, sites, and characters all strive to convey this unity - this paramount interest in the self - through the intermediary of a narrator who is always involved in the action. "The inner design consists of a resonance between what Lewis Eliot sees and what he feels."⁹⁴ Snow's art is a direct, daylight art. The transparency of his fiction encourages the reader to glimpse into the major institutions which make our society work. The active intelligence of the narrator encourages us to think for ourselves, to actively seek our individual totalities, and to become our own New Men. His work appeals directly through the mind and less through the senses. But understanding the role and form that reason takes in Snow's response to the juggle of modernity is crucial to grasping the breadth of his realism. This is the subject of the next chapter.

CHAPTER FIVE

THE UN-NEUTRALITY OF SCIENCE

El sueño de la razón produce monstruos.
(The sleep of reason brings forth monsters.)

Francesco Jose de Goya¹

That there is a direct relationship between Snow's conception of reason, his philosophy of science and the radical High Science which he was to find at Cambridge is clear. Indeed the case can be made at several levels that it was science, as one of modernity's most powerful driving forces, which ultimately provided Snow with many of his basic values and insights which were to inform his own search for totality and balance in modern life. That science, scientists, and rationally, thinking individuals were all important features of his literary attempt to write a reconciliation between the public and private spheres strongly attests to this. Examples abound.

As we will discuss at some length in this chapter, it was science which gave Snow his earliest sense of intellectual power and excitement. At the same time, it was science which gave Snow his first model or stereotype of 'social greatness' and of the trappings that science and society could confer on an individual. Later, it was science which provided the vehicle through which Snow could defy traditional class barriers of English society and leave provincial Leicester by taking a higher education, going to

Cambridge University as a student, Fellow and Tutor, and becoming a member of the bureaucracy in metropolitan London. It was the rigour and social cohesion of scientific research at a time of social turmoil and political collapse which was to imbue Snow with an acute sense of what a more stable democratic structure that was based on science could look like. It was through his involvement with the left-wing political factions of the 1930s scientific community that Snow gained a liberal, if somewhat utopian, view of the social function of science. Thus it can hardly be said to be an overstatement to assert that science is a pivotal element to any understanding of Snow. However in so saying, we also raise important questions about scientific knowledge and Snow's position as a scientific realist. Did Snow believe in the immutability of 'scientific facts', in their status as value-free and absolute truths, or in the evitability of scientific progress?² Such might be asserted if one were to read his Rede Lecture as being a simple expression of scientism,³ or if one were to read Snow's The Physicists: The Generation That Changed the World as an uncritical tribute to that profession. However such readings would badly underestimate Snow's complex perspective.

While there is no clear correlation between literary and scientific realism, it can be said that both perspectives share (a) an aversion to absolute or dogmatic positions and (b) a preference for 'transparent' or apparently non-intrusive methods. And yet 'realist' perspectives are highly

constructed. Strictly speaking, typical representations of scientific realism can be thought of as follows:⁴ the descriptive terms of a scientific theory typically refer to objects, quantities and so on in the external world; and theoretical statements are true if what they state about these objects and quantities is in fact the case. "When the scientific realist claims that theoretical terms 'refer', he or she means that the terms in question refer in a straightforward, literal sense. For example, terms like 'electron', 'positron', and 'quark' refer, according to the realist, to existent sub-atomic particles with certain mass, charge and spin. This is in contrast to the position taken by the more extreme forms of empiricism, such as positivism."⁵ In a sense, scientific realists never know if a scientific theory is true. However, their philosophy is the only philosophy which does not make the sheer success of modern science seem to be a miracle. As John Forge has outlined, "one function that is fulfilled by theories, and which was largely overlooked by traditional positivists, is the prediction of previously unknown phenomenon, such as the prediction of the positron by Dirac's theory of the electron. That novel predictions should fall out from theories interpreted as merely economic bases for generating statements describing previously known phenomenon is indeed, seemingly, miraculous. However, if theories are taken to describe actual regularities in the world it is quite conceivable for these to become manifest in hitherto unknown and unforeseen ways. Also, reference to these regularities can explain more mundane and everyday

predictive successes. So argues the scientific realist.⁶ Thus realists are only rarely sceptics when it comes to science. They believe that science does describe the natural world rather accurately. They agree that it might be otherwise - that their theories may be false. But this openness serves primarily to underline the significance of the successes they attribute to science rather than dismantling it.⁷

However, as Roy Bhaskar points out in his Scientific Realism and Human Emancipation,⁸ there are many grades of scientific realism and the attributes just outlined tend to define tenets of a 'strong' realism.⁹ The realist program which best describes Snow can best be thought of as being a modification of this. As we will argue, while Snow clearly did believe in the independent existence of the natural world, he also came to fundamentally understand that scientific theories were mental constructions. As such, they might be (and probably were in any deeply meaningful sense) false. Thus for Snow, 'truth' was a metaphysical concept which bore no meaning in absolute terms. Indeed, to try to impose truth claims on science or on the social world seemed to Snow to be vaguely absurd. By relieving the burden of pursuing such a notion, Snow was freed to respect science as an activity that was uniquely successful in its ability to advance and bring with it 'progress', through a combination of mental work, social organization, and collaboration. This modified version of scientific realism then defines what

Snow would have viewed as being the kernel of the 'scientific method'. Science, in these terms, outlined what Snow would have called 'reason'.

In many ways, Snow's conception of 'reason' actually previewed what was to become a dominant view of scientific change in the modern philosophy of science. This view, which is most cogently forwarded by Thomas Kuhn in his 1963 classic, The Structure of Scientific Revolutions, outlined the close linkage that exists between cognitive and social factors in the development of scientific theories. In Snow's language (which is evident as early as 1938 in Discovery as well as in The Two Cultures, Science and Government, and Public Affairs) the excitement of a second scientific revolution -- in this instance, the major scientific revision of electronic structure or proposed by Schrodinger, Dirac, Pauling and Heisenberg - was to be found in the resolution of anomalies and puzzles which were developing in the early years of the century's normal science. In Kuhn's terms, a field of science is cognitively dominated by 'paradigms' which are accepted, almost without question, by the scientists working in that area. These paradigms are jealously guarded, socially protected and passed on to the next generation of students through teaching and research supervision. The core element of this paradigm is a well-established and seemingly comprehensive theory or set of theories. Closely associated with this set of theories are research methods and problem-solving techniques. Most research is directed towards investigating 'puzzles' which can be identified

but not fully explained within the dominant theoretical framework. As the research advances, however, various 'anomalies' become evident. Snow's excitement regarding the revolution in physics and chemistry around atomic structure was one not only that he was aware of and which he explained in 'Kuhnian' terms but, was one which was cognitively and socially important to him. In the course of these puzzle-solving activities, some anomalies are resolved but others undergo a cancerous growth that threatens the integrity of the paradigm itself. Eventually a rethinking, or Gestalt shift, shows that the data can be reinterpreted in terms of a rival theory, the acceptance of which creates a new dominant paradigm which embraces the facts in a more comprehensive manner. A new 'normal' science is born. Kuhn has acknowledged that the language he used in the second scientific revolution was openly discussed in the 1930s.¹⁰ Snow's use and meaning of the language (such as revolution, paradigm, puzzle, and anomaly) is found regularly in his writings.

In very general terms, Snow clearly recognized his debt to science and to the radical scientists at Cambridge. Indeed much of his literary output directly attests to this fact. Recall, for example, the central place which Snow gave to the 'scientific revolution' in his Rede Lecture and the relationship between science and government in his Godkin Lecture; or note the pivotal role that scientists play in 10 of his 17 novels;¹¹ or simply

take heed of the sentiment he expressed throughout his last book which was a tribute to physicists.

However, to move beyond this superficial recognition of the importance of science in Snow's life and to arrive at a clearer understanding of the exact nature of this influence is not, in itself, unproblematic. The principle reason for this is that there exists an obfuscating mythology concerning Snow which uncritically accepts that, as a scientist, Snow was at the very centre of what he fondly called the 'Elizabethan Age of Science'; that Snow was a physicist who worked at the Cavendish Labs under Rutherford; and that Snow was a member of Cambridge's scientific inner circle, the Kapitza Club.¹² To be sure, these are images that were fostered by Snow himself. But the net result has been that Snow's own scientific career has itself been made 'golden' by uncritical readers, with a subsequent authority being deferred to Snow and all he wrote. Remarkably little attention has been paid either to the accuracy of these images, their importance for Snow's thinking, or the quality of Snow's own scientific research.¹³

More accurate, but still only partially understood, images have Snow as a member of the 'Visible College' made up of Hardy, Bernal, Blackett, and Julian Huxley and which concerned itself with politics and the modern social function of science:¹⁴ as a co-founder, with Bernal, of the Science of Science Society which operates today as the International Science Policy Foundation¹⁵ and as an occasional member of the London-based 'Tots and

Quots' dining club which was convened by Sir Solly Zuckerman to discuss government science policy.¹⁶

Clearly, Snow was deeply influenced by individuals within both the radical and reformist factions of the 'Visible College', notably Bernal, Hardy and Huxley. Equally clearly, Snow shared many of the same concerns and intellectual outlooks. For example his expression during his Rede Lecture of the benefits of the second scientific revolution which included food, health and automation exactly echoed the arguments of Bernal's 1939 The Social Function of Science. At the same time, his insistence on creating change from within social institutions is a view that is very much at the heart of the Reformist's credo. And furthermore, his disagreement and debates with the 'Republic of Science School' - particularly with distinguished X-ray crystallographer/philosopher, Michael Polanyi¹⁷ who fervently argued on behalf of the objectivity and social neutrality of science, and the government of science by scientists only - clearly aligned Snow with both elements of the 1920s and 1930s Social Relations of Science Movement.

But beyond this, what were Snow's views on science, scientific knowledge and the scientific community? In Snow's view, what should the role of science in social change and government be? And how did he link scientific knowledge and social responsibility? Clarifying these questions is the purpose of the present chapter.

It was in 1914, at the age of nine, that Snow experienced the intellectual spark that was to drive his life: science. In his words, it was "the first excitement that knowledge gives".¹⁸ Indeed, the young Snow was indirectly coming into contact with the first phase of the second scientific revolution which is often associated with Thompson's atomic model (1900), Einstein's papers on relativity (1902-05), Rutherford's discovery of the atomic nucleus (1900-11) and Bohr's model of the atom (1912). This was a profoundly private experience for the young Snow, as it injected him with both a clear sense of individuality and of contact with an unfolding, exciting world. This was a potent combination which Snow would never forget or separate.

The world into which Snow stumbled as a boy was a world of profound revolution. He recorded his re-collection as follows:

I had got hold of a bound volume of Arthur Mee's Children's Encyclopedia. It was a dark afternoon and I was sitting by the fire. Suddenly, for the first time, I ran across an account of how atoms were supposed to be built up. The article had been written before Rutherford had discovered the nucleus, although by the time I read it the nuclear atom must have been well known. However I was innocent of all that, I had never seen the word "atom" before; this article explained that its descriptions were only a guess, that no man knew the truth, and yet it seemed to open up a new sight of the world.¹⁹

For Snow this article, which was in a section called The Child's Book of Wonder, crystallized what would lastingly become his core understanding of 'rationality' or 'reason' by saying that:

though so much of [the descriptions in] that article could not endure, it gave me the first sharp mental excitement I ever had. Somehow it gave me the heightened sense of [both] thinking and imagining at the same time.²⁰

Snow's childhood was filled with a wide range of books and periodicals. These were regularly available in the Snow household,²¹ and it was the early reference to science that were to most stimulate Snow. But Snow's boyhood interest in science was not solely the result of private 'book learning'. It was also strongly encouraged by his father. Though not in any trained in science, William Edward Snow took his son's interest in science seriously. Acting partially out of a late-Victorian belief in 'self help' and partly out of a deeply hierarchical understanding of Britain's classed society, 'W.E. Snow, Fellow of the Royal College of Organists' was able to keep Charles' spark alive by helping him build small cardboard telescopes and by talking of the 'great men' who had studied and advanced science - the names of Newton and Priestley were often whispered into Snow's young ear. Snow alluded to this in his highly autobiographical novel, The Search (1934), which opens with the young hero, Arthur Miles, stating that:

It must have been a Sunday night, for my father and I were walking...This particular Sunday night was warm and twilight...the sun had just gone down behind the river, and - in the yellow sunset sky there was a sickle of new moon, and high over our heads a sprinkling of stars just coming dimly out. We stopped and looked. My father said: "I wonder if they're what we think they are? Stars! Stars like this!" He waved vaguely. "People think we know about them. I wonder if we do." I gazed up at him. "I wonder if we can," he added. I didn't know what he thinking. All of a sudden I felt that all the things around me were toys to handle and control, that I had the power in a tiny, easy world....The night had taken hold of me. I wanted to do something with those stars. I did not know what, but I was elated. Their beauty stirred me, but it was not only that... "I'm going to find out all about them."...."Perhaps you will" [my father] reflected. We began to walk home. "A lot of people have tried, you know," he said doubtfully. "Sir Isaac Newton - and Sir Robert Ball - and Sir William Herschel - and Sir Oliver Lodge -.... "Very great men."²²

As Snow continued to read all that he could on science, that first sense of creativity, imagination, and power continued to be fanned as images of what it meant to be a scientist - of what it meant to be a 'great man' and of what 'progress' meant - began to take shape. He began to look forward to his introduction to formal school science.

This was to come at the Alderman Newton School for Boys, the buildings of which are still standing in Peacock Lanes, Leicester, and which Snow attended - first as a student until 1921 and later as a lab assistant until 1924.²³ However, Snow's first exposures to 'school science' proved to

be, as they are even today for far too many school students, a dulling and unexhilarating affair.

I had looked forward to my first day of science lessons; and when they came I was puzzled and disappointed....When I saw [the chief science master], I was not sure whether it could be he. Even to a boy, eager to be impressed, he was not an impressive man....He taught us in an indifferent, uninteresting way; during that lesson, and the rest of the term, we did nothing but stand in the laboratory and heat little pieces of wood and similar things, and tiny portions of powders from bottles on the benches, in tubes....He told us to notice what happened....I studied the tubes very carefully. For the first few months I still thought I must be missing something. This business couldn't be as pointless as it seemed. But no one explained what I was doing. It just became a drill, like any other drill, one of those inexplicable pieces of school routine, a good deal less interesting than the French verbs I was beginning to learn in the lesson before we went to the laboratory. School "science", I decided, was something quite different from my own exciting private science, my world of space and stars.²⁴

Indeed the apparent teaching strategy for science which continues to hold considerable sway gave Snow a severe distaste that was to stay with him throughout his life and that was, in part, to lead to his criticisms which he levelled against education in the Rede Lecture. As he wrote, the dominant educational philosophy stated that

[if] you want to interest your pupils, you can put them in the position of the original discoverer. Put

them in the position of the discoverer! The pedagogic nonsense of it all! When you think of the chances and stumbling, the flashes of insight and the sheer mistakes, that have gone into every discovery since science began!²⁵

Nevertheless, despite the contradictions which Snow met between his private science and school science, he was able to keep his interests, hope and ambition alive.

Snow was a bright, all-around, student. He achieved an average grade of 508 out of a possible 560: the lost marks being in Woodwork and Gymnastics. His basic intelligence and temperament were sufficient to put him on to the first class honours list when he took the school's 1921 Oxford Senior Local Examinations²⁶ in English, History, Geography, French, Math, Religious Knowledge and Chemistry. He achieved a distinction in Physics.²⁷

In order to do so, Snow's experiences in taught science were clearly not always disappointing. At one point during his middle years at Alderman Newton, his usual routine in science class was disrupted in a way that finally matched with the private science he had been cultivating on his own:

"We're not going into the laboratory this morning [the science master] said. I'm going to talk to you, my friends....Forget everything you know, will you? That is, if you know anything at all." He sat on his desk swinging his legs. "Now, what do you think all the stuff in the world is made of? Every bit of us, you and me, the chairs in this room, the air, every-

thing. No one knows? Well perhaps that's not surprising, even for nincompoops like you. Because no one did a year or two ago. But we're beginning to think we do.²⁸

....if you took a piece of lead and halved it, and halved the half, and went on like that, where do you think you'd come to in the end? Do you think it would be lead for ever? Do you think you could go down right to the infinitely small and still have tiny pieces of lead? It doesn't matter what you think. My friends, you couldn't. If you went on long enough, you'd come to an atom of lead, an atom, do you hear, an atom, and if you split that up you wouldn't have lead any more. What do you think you'd have? The answer to that one is the one of the oddest things you'll ever hear in your life. If you split up an atom of lead, you'd get pieces of positive and negative electricity. That is all matter is. That's all you are. Just positive and negative electricity....²⁹

And whether you started with lead or anything else it wouldn't matter. That's all you'd come to in the end. Positive and negative electricity. How do things differ then? Well, the atoms are positive and negative electricity and they're all made on the same pattern, but they vary amongst themselves, do you see? Every atom has a bit of positive electricity in the middle of it - the nucleus, they call it - and every atom has bits of negative electricity going round the nucleus - like planets round the sun. But the nucleus is bigger in lead than it is in carbon, and there are more bits of negative electricity in some atoms than others. It's as though you had different solar systems, made from the same sort of materials, some with bigger suns than others some with more planets. That's all the difference. That's where a diamond's different from a bit of lead. That's the bottom of the whole of this world of ours.³⁰

That morning's lecture provided all the added impetus that Snow needed. From that moment on, he was able to direct his energies through more clearly distinguished institutional paths.³¹

With his formal education completed at the age of 16, Snow remained at the school for a further three years (1922-1924) as the school's laboratory assistant. This was taken up subsequent to a suggestion made by H.E. (Bert) Howard who had joined the Alderman Newton staff in 1922.³² As Howard made clear to Snow, by staying on at school in this capacity, he would be able to prepare himself for the Intermediate British School Certificate (IBSC) which was then a prerequisite for admission into the external science degree program of London University. This seemed, to Snow, a most appropriate thing to do for, although he knew from a very young age - certainly before age 16 - that he wanted to be a writer, he was pragmatic enough to realize that science would give him "a nice way to earn a living".³³ "It was [both] the easiest way to a more congenial life, for a time" and the way to escape "the discontented life" of Leicester.³⁴ Thus the timing of Howard's suggestion was fortuitous as, prior to 1921, there was no opportunity for a university education in Leicester.

These extra years at the school clearly were not easy for Snow as he was growing impatient to leave Leicester and get on with a career. Howard was influential, however, and Snow stayed. The time was made more tolerable by late night chess games, cafés, long discussions of litera-

ture (Snow read and re-read Dostoevsky, Tolstoy, Proust, Balzac and Wells) and long considerations of the future for a provincial lad with a science education. This time was well spent and passed quickly for Snow.

In 1921, however, as a memorial to those from Leicestershire who had died in the war, a university college was opened in Leicester in the disused Leicestershire and Rutland County Lunatic Asylum.³⁵ The syllabus and examinations of the college were set by London University.³⁶ In 1925, Snow was awarded a scholarship on the basis of good IBSC examination results and was thus able to complete a general B.Sc.. However, given that the college only appointed its first physical science lecturers in March 1925 Snow, in effect, had to complete the majority of his degree work alone. He was examined on the subjects of Mathematics, Chemistry, and Physics but received little tutoring from the faculty.

The two new lecturers in Leicester were Louis Hunter who was a hydrogen bond specialist and who was appointed to teach chemistry, and Alexander ('Sandy') Menzies, a spectroscopist, who was appointed to teach physics.³⁷ After his years of studying and working as a lab assistant, Snow now was keen to pursue research and so neither Hunter nor Menzies had much difficulty in convincing him to stay on for the additional two years in order to take his Honours B.Sc. in Chemistry. In making this commitment, both Hunter and Menzies were well aware of Snow's reputation as a lab assistant. As the science master at Alderman Newton's had warned, Snow's

idea of dismantling equipment after a lesson was to open a top drawer just below the equipment and, stretching his arms all around the apparatus, sweep it into the awaiting drawer. Thus Snow had, at an early age, become renowned for his lack of ability in practical experimental matters.³⁸ As a consequence, Hunter was able to reminisce that Snow had been one of the worst students of experimental chemistry he had ever met. Further evidence of this deficiency is provided by Snow's brother, Philip, who wrote that:

....[Snow's] slender fingers and flipper-like hands could not assemble equipment. An external examiner for London University told me that he had marked an experiment by students who had to prepare a dye stuff, malachite green, from supplied chemicals. It was normal, at the end of the experiment, for hands and fingers of all the students to be covered with the dye: Charles managed to emerge distinctively with the addition of a green face and green hair.³⁹

But despite this weakness in experimental chemistry, Snow succeeded in taking a first class Chemistry degree as an external student from London University in 1927.⁴⁰

Following this, Menzies, who was one of the first physicists in Britain to take up Raman Spectroscopy in 1928,⁴¹ convinced Snow to specialize in Spectroscopy, which was then one of twelve M.Sc. subjects that London University allowed external students to study for. As Menzies' very first research student, Snow studied the Raman Effect and investigated the

absorption of light by molecular films of cinnamic acid, as well as their absorption spectra and chemical constitution.⁴²

Although Snow received no honours for his work - due, according to both Menzies and the historian W.H. Brock, to the fact that he was the only external M.Sc. candidate in all of England in that year - he did receive his M.Sc. in 1928. Out of this work came the first of Snow's more than 20 published scientific papers: "Band Spectra of Molecules Without Unused Valency Electrons" (1928) and "The Relation Between Raman Lines and Infra-Red Bands" (1929),⁴³ this latter article serving as an important bridge for Snow between Leicester (and his work with Menzies) and his new research at Cambridge.⁴⁴ Nonetheless, London University examiners did award Snow a Keddey Fletcher-Warr Studentship worth the substantial sum of £200 per year for each of three years (1928-1930) so that he might pursue further research. Snow's chance to leave Leicester had come. However the studentship was normally tenable only at London University. Menzies (who had been a Fellow of Christ's College, Cambridge) argued to the examining board that Snow should be allowed to continue his research in spectroscopy and that the best place for this was, not London but, the Department of Physical Chemistry at Cambridge. Once the London committee had acquiesced to this idea, Menzies then had to convince the Fellows of Christ's College of this idea. This was not an easy matter due to the lateness of Snow's application and the nature of the request. Both caused a

small row amongst the Fellows. Nevertheless, in the final analysis Snow's application was accepted and he went up to Cambridge as a research student in October 1928.⁴⁵

From this it is clear that Snow's exposure to Cambridge's legendary 'corridors of scientific power' owes just as much, if not more, to Sandy Menzies as it did to Snow's own intellectual abilities and hard work. Although Snow was finally on the verge of realizing the dreams that he and Bert Howard had put in place and worked towards, he was also leaving behind his childhood era of 'private science'.

It was with a sense of warmth, awe and impending power that Snow entered prestigious Cambridge University in pursuit of a what was then the rare Ph.D. in Physical Chemistry. The awe with which Snow did so was genuine as he had, literally overnight, gone from a world in which there was little in the way of research or tutoring into an institution which had, by all accounts, one of the highest concentrations of research in physics and chemistry. In addition, here was the research and the researchers of which Snow had been reading as a boy. Indeed it was here, in Snow's own areas of atomic and molecular structure, that research would alter the very nature of our understanding of ourselves and the world around us. As Snow later came to realize, the discovery of the atom finally put an end to the scientists' "affectation" of separating human concerns from scientific truth.⁴⁶ Evidence of the juxtaposition to the private science of his early years was

now all around Snow as the names and voices of Sir J.J. Thompson, Lord Ernest Rutherford, Professor Peter Kapitza, J.D. Bernal, P.M.S. Blackett, John Cockcroft, James Chadwick, and Paul Dirac all could be heard in the courtyards! Great names and exciting ideas! "It was, perhaps, the most brilliant period in Cambridge intellectual history. When you think of the people who are about..."⁴⁷ Indeed, when Snow later associated the second scientific revolution with the year 1925, he was not making an outlandish claim. While we often think of the Einstein papers of 1903-1905, the Bohr model of the atom (1910) and the Rutherford model of 1912 as signifying the dawn of modern science, Snow's perception very accurately aligns with a number of powerful breakthroughs. In 1923, for example, the Compton effect was discovered, as was the 'de Broglie wavelength'. But more importantly, the theory of quantum mechanics was introduced in 1925 with its foundations being developed with great rapidity during the next few years. These were largely introduced by Heisenberg, Born, Schrödinger, Bohr and Dirac. Cambridge physicists were deeply involved in these discussions.⁴⁸ In this kind of environment, who could blame Snow for dreaming of greatness and wishing that he too would become a Fellow of the Royal Society?⁴⁹ But in the interim, there was much work to be done. Snow was determined to be part of it all, even though his ambitions were temporarily tempered by a provincial child's awe.⁵⁰

Snow felt certain that, as Bert and Sandy had repeatedly told him often, "one can not have a scientific career without going to Cambridge"⁶¹ This "Mecca, Westminster and Rome; this was the greatest scientific meeting place in the world".⁶² He recalled the feeling of preparing to meet these men and ideas:

[It] was an exciting time...., for the first time in my life I was meeting very clever people.⁶³

I remember reading the University Calendar, learning the names of the professors. looking them up in the Who's Who and in the indexes of the modern textbooks.⁶⁴

He was not disappointed. He was introduced - not to the world he had dreamt of, but - to the real world of science. As a result, Snow's childhood view of the immutability of scientific knowledge and the inevitability of scientific progress began to be significantly revised. Moreover, the private world of science which he had associated strictly with books, ideas, and only rarely with scientific discussions was suddenly replaced by large, busy and fully staffed labs, a host of possible mentors to choose from, their conflicting ideas, and an array of research students with whom to share one's excitement and thinking. Nowhere else in Snow's writing, and perhaps in all literature, is this realization portrayed more vividly than in those two sections of The Search entitled "The First Friends" and "Effect of a Revolution".⁶⁵

Referring to his earliest Cambridge classes, Snow fictionally evoked the revisions that he faced as a student in his growing realization of the apparent contradictions that he was coming to realize were a necessary part of scientific thinking. These revisions were to initiate the transition Snow made from being essentially a private 'positivist's' science to the more public world of a realist. The first of several transitional blows came from a professor:

[the Professor of Physics] was a plump man with something of a presence; most of his lecture was read from notes, but at times he looked up and spoke to us with a slightly pompous affableness. "We're beginning to think - "he said once, and told us about the modern development of an idea, and I had the thrill of being intimately in touch with the hub of the world. He mentioned the nucleus and said, "Rutherford has suggested a constitution for it, but I'm not sure that he's right." Before that, I had never imagined that these new concepts were anything but unanimous; I had heard of controversies in the past, but the science I was studying seemed without people or contradictions."⁸⁸

Thus Snow came quickly to understand that science is both cognitively and socially constructed.

A second blow came from fellow students against the potential ethical and political blindness of science:

When Sheriff or I assumed, as we so often did, that science was inevitably going to change the future,

and that we were optimistic because of it, Hunt protested:

"I can't understand the way you two believe."

"Don't you see", Sheriff would break out, "that science has got the future in its hands? It will make people live longer, give them leisure, give them power - why, we shall soon have Nature at our mercy. Isn't that enough for you?"

There was a pause. Hunt was always a little slow at finding his reply. And then:

"It's not. We shall have a fine healthy population, maybe - and give it some wholesome exercise now and then by making it run away from poison gas.

But I'll grant you everything will get more hygienic every year. We shall pull off a gigantic piece of plumbing. Do you think that's enough for me? Do you want me to have a mystical belief in a super-plumbing organization?"

Sheriff got nettled.

"One can make anything ridiculous by reducing it to its lowest terms."

"And anything romantic by raising it to its highest."

"Romantic be damned!" Sheriff cried.⁵⁷

This position certainly reflected the extreme view of many of Snow's colleagues but was not one to which he subscribed. He was far too sceptical and pragmatic to lend himself to such beliefs - although this kind of exuberance made up, by his own calculation, something like 2 per cent of his temperament. Indeed, Snow would have eventually agreed much more easily

with the argument made by Jacob Bronowski⁵⁹ that those "who think that science is ethically [and politically] neutral confuse the findings of science, which are, with the activities of science, which is not."⁶⁰

A third blow, again from students, came against the epistemological certainty of 'scientific facts':

"The people who have the power in their hands. Look at them. They're not like you, Arthur. They're not wider than the average. They're infinitely narrower. Like this Austin of yours. Like clever children with an aptitude for mechanical toys."

"That's not fair", I said.

"It's fairer than your picture of bright clear minds - and everyone else in the darkness."...."all those words....you haven't got a monopoly on the truth."

"In a way, I think we have."

Hunt smiled, a little annoyed. "God, you're as arrogant as the rest. How?"

I spoke quickly; I had thought this out:

"We make experiments and we get results and we infer that there are such things as atoms. Then we work out that if our atoms are right we ought to do more experiments and get certain definite results. We try it: and our atoms fit the facts."

Hunt paused. "Your atoms are just a guess that works. They're not the truth."⁶¹

The epistemological frailty of science was repeatedly driven home, even if only tacitly. The normal science of lab routines plus the late nights of studying, arguing about theory and formulae, bore the lessons of realism in science.⁶¹ Snow referred to this himself in the guise of Arthur Miles (the hero in The Search), using an allusion to Heisenberg's Uncertainty Principle.⁶² In drafting a compromise position between Hunt and Sheriff, however, Snow reiterated the impact of the scientific revolution that he was participating in as a student, as well as its nature.

It is rather difficult to put the importance of this revolution into words. In fact, it is important because it cannot be put into words. However, it is something like this. The relation between the choice, the chooser, the external world and the fact produced is a complicated one, and brings us before questions of relativity and epistemology: but one gets through in the end, unless one is spinning a metaphysical veil for the sake of craftsmanship, to an agreement upon 'scientific facts'. You can call them 'pointer readings' as Eddington does, if you like. They are lines on a photographic plate, marks on a screen, all the 'pointer readings' which are the end of a skill, precautions, inventions, of the laboratory. They are the end of the manual process, the beginning of the scientific. For from these 'pointer readings', these scientific facts, the process of scientific reasoning begins: and it comes back to them to prove itself right or wrong. For the scientific process is nothing more or less than a hiatus between 'pointer readings': one takes some pointer readings, makes a mental construction from them in order to predict some more.

The pointer readings which have been predicted are then measured: and if the predictions turn out to be right, the mental construction is a good one. If it is

wrong, another mental construction has to be tried. That is all. You take your choice where you put the word 'reality': you can find your total reality either in the pointer readings or in the mental construction or, if you have a taste for compromise, in a mixture of both.

The scientific revolution that began in 1925 was altogether a matter of mental construction.⁶³

Thus the 'real' science that Snow was coming to know was one that was a mental construct which was full of people, politics, and contradiction. Indeed Snow's language shows clearly that he was aware of the thinking of the day. For example, as A.S. Eddington wrote in 1930,

The philosophic trend of modern scientific thought differs markedly from the views of thirty years ago. Can we guarantee that the next thirty years will not see another revolution....[By] dogged endeavour, he is slowly and tortuously advancing to purer and purer truth; but his ideas seem to zigzag in a manner most disconcerting to the onlooker.⁶⁴

Here, in what Snow came to see as the liberal-democratic model of rationality lay the source of science's power. Among its facets were curiosity and concern about the world around us, reasoned and open (public) enquiry, and responsibility. This realization clearly gave a new dimension to Snow's scientific thinking, and at times it left him with an exhilarating and intoxicating sense. His description of scientific progress clearly illustrates both

this and its aesthetic pleasures - again echoing that first excitement that knowledge gave to him.

Before, a great many pointer readings had been necessary for us to use the mental construction of atoms like solar systems - the Atom which [had first] fired my imagination when I was a boy. These atoms, of course, were never objects in the sense that a pin is an object: they were - mental objects, transcendental objects, bridges between one pointer reading and another. And if we went from our pointer readings and constructed our atoms and made them obey certain rules, then we could prophesy a lot of other pointer readings. As mental constructions, our atom worked fairly well. But not well enough. Too many pointer readings were left unexplained, and even such explanations as there were had about them a queer arbitrariness, a lack of neatness, which left most of us dissatisfied. For nearly all scientists feel, rather than think, that our mental constructions should have a sort of economy which produces an aesthetic response.

During the time between the end of the war and the beginning of the scientific revolution, there was none of this economy. The mental constructions were affairs of patches, expediency, makeshifts and hope.

Then almost simultaneously a few men began to think along different lines to the same end. The model atom was not good enough. So let us, they said, get rid of models altogether. Let us stop thinking of these transcendental objects as though they were ordinary objects we can see and feel. Instead of the transcendental objects, we will have mathematical expressions that will take their place. They we be 'atoms'; but now we will describe them in a definite mathematical way, instead of trying to make pictures with our sense in regions where the senses cannot enter. These new mental constructions are the most economical that can be made between pointer readings; the idea had an austerity that went

home to a certain type of mind at once. And it worked. It worked like no other in the history of science. As soon as the model atom was thrown away and the new mathematical constructions made, atomic science fell into order straight away. At the beginning, to perform operations, one or two rather obscure mathematical techniques had to be unearthed. And then paper after paper came out in the German and English journals; anomalies ceased to be anomalies...facts which had puzzled us before now fitter in completely....⁶⁵

It was because of recollections like these that Snow was able to freely and honestly exclaim throughout his literary career from the Rede Lecture to The Physicists that "we are living through the greatest of scientific revolutions".⁶⁶ "We're lucky to be alive just now....Coming into things like this. Coming into science at this time of all times. It's the renaissance of science, it is the Elizabethan age - and we're born right in the middle of it. Lord, we shall have lots of fun!"⁶⁷

And yet, at other times it could also be a time of deflation and anger as it was when:

suddenly, I heard one of the greatest mathematical physicists say, with complete simplicity: "Of course, the fundamental laws of physics and chemistry are laid down forever. The details have got to be filled up: we don't know anything of the nucleus; but the fundamental laws are there. In a sense, physics and chemistry are finished sciences." It is two hundred years since Newton talked of our being like children who pick up pebbles on the beach. This man who spoke of 'finished sciences' was Newton's successor. As I heard his clipped, impersonal, voice saying what

to him was an evident fact, I realized for the first time, how far science had gone. We were not picking up pebbles from the beach any more; instead, we knew how many we should be able to pick up. They had found the boundary to our knowledge; some things would remain unknown forever; one of the results of this new presentation of matter was to tell what we could not know as well as what we could. We were in sight of the end. It seemed incredible to me, brought up in the tradition of limitless searching, mystery beyond mystery, the agrophobia of the infinite. I resented leaving it. I gazed at the speaker's opaque brown eyes, angry with him for the insight and the vision that made my own belief in a hazy, unending progress seem, even to myself, both tawdry and second-rate. I wanted him to be wrong. Yet I could see what he meant.⁶⁸

Thus, between the charged, all-embracing, climate of Cambridge, and the powerful juxtapositions of insight and emotion which were to cascade from his first fireside exposures to the real world of scientific research's most exotic frontiers, the character of Snow's outlook was revised in a way that served to deepen his commitment to his realism. This fused with his own natural enthusiasm and hopefulness, and buoyed him through difficult moments. The sobering contradictions and struggles of science which he encountered as a student served - not as a depressing counter balance which fostered an ideological belief in science's special epistemological status (Snow was far too sceptical for such a belief) but rather, - as a powerful amplifier to Snow's tough-minded pragmatism which already underpinned his character.

With these combined revisionist forces, Snow was folded into Cambridge's scientific culture. He turned his attentions (for the time being) to his own research. As he said, while keeping the frailty of facts and the excitement of intellectual rigour in mind:

Details of the future kept running through my mind - [when] I could begin [my] research....⁶⁹

While Snow worked near the Cavendish and Dunn labs, he never actually conducted research there.⁷⁰ Indeed, his home for two years was a bench in the Physical Chemistry Laboratories in Free School Lane which is now part of Pembroke College.⁷¹ These facilities were quite new when Snow entered them in 1928 and were becoming renown in their own right for the high quality and wide ranging research carried out there.

Despite the fact that the Professor of Physical Chemistry at these labs was Professor Martin Lowry - whom Snow described as "a very clever man who had never been accepted in Cambridge....and who had, with a certain kind of obstinacy, got stuck with researches on optical rotation that didn't attract many pupils" -⁷² and that the titular, administrative head of the lab was the rather dower Sir William Pope, these laboratories nevertheless took on an exciting tone that was commensurate with what Snow expected of Cambridge. Of particular interest to Snow was Eric Rideal, an

eclectic researcher who had been appointed in 1920 to the then newly endowed Humphrey Owen Jones Lectureship in Physical Chemistry.⁷³

By 1922, Rideal and his entire research team had joined the Lowry labs. According to one of Rideal's closest and longstanding research associates, R.W.G. Norish, "the atmosphere [during this period] was a lighthearted one, and Rideal was bubbling with ideas, good and bad, but [he was] not strong on experimental detail, leaving the working out of his ideas to the (hopeful) ingenuity of his students....Rideal would come round the lab most days to talk in a very airy and stimulating way, and if one could separate the good from the bad, one got on quite well."⁷⁴ (emphasis added) A research student with Snow, Philip Bowden, agreed and wrote of Rideal that

all those who have worked with Sir Eric Rideal agree about his gay and infectious enthusiasm for scientific work and about his conviction not only that all problems are soluble but that it will be great fun solving them."⁷⁵

During these years leading up to Snow's arrival, Rideal developed an outstanding research school which included electrochemistry, photochemistry, and spectroscopy.⁷⁶ As a result, the chemistry research students at Cambridge - including Snow and Philip Bowden (whom Snow would soon collaborate with) - had a natural attraction to Rideal. Rideal appears in

Snow's novels as Professor Desmond. Rideal's broad-based tutelage was just the place to go. Snow soon became aware of this and noted that

Rideal was willing to accommodate research on any topic from pure physics to biology, and his sub-department accordingly became a kind of hold-all for anyone who thought he had a decent problem.⁷⁷

In practice, however, Rideal's research programme was never as ad hoc as this might suggest. Snow came to appreciate, as did others already did at Cambridge, that Rideal's reason for encouraging such diverse research was not his "consuming desire to understand the nature of chemical reactivity" as Brock has suggested, but rather was his impetuous interest in the non-invasive analysis of chemical structure. He was always willing to try any new analytic tools. Indeed Rideal's strength seems to have been his enthusiasm on the broad front. It was said that he could answer any questions on any area of physical chemistry. This may also have been his weakness for many have alluded to his superficial tendencies in that research students who were looking for guidance had to carefully fumble through a hundred of Rideal's research suggestions in order to find ten useful ideas.⁷⁸ Nevertheless, he was responsible for producing some fifty professors and fourteen FRSEs. If 'Desmond' of The Search was truly Rideal, then Rideal could (and often did) disclaim ownership of any ideas which did not pen out. Snow was, as a result, left 'red-faced' as he was with his N_2O

analysis and his photochemical studies of biological molecules. However, with this kind of enthusiasm and eclecticism of research, Snow was to find in Rideal an excellent match, not only for his own research which floated within that poorly defined world of 1920s and '30s physics and chemistry but also for his intellectual temperament and style which was never to really accept intellectual barriers. This refusal to accept intellectual bounds was a characteristic which was ultimately to bring Snow to leave science. In a particularly revealing passage from The Search, Snow wrote of Arthur Miles (i.e. himself) that "Arthur plunges....they're almost the complete successful life plunges....But the scientific plunge couldn't last, because, you see, Arthur never lets himself quite go. There's always a piece of him detached and wandering 'Now why am I doing this?' He plunges and asks. Most people only plunge or only ask. But if you plunge and ask and can't answer the question - well, the plunge ends....[that has] prevented him from believing anything; but the ability to plunge has made him know what it's like to believe something. He's been able to go into things - up to a point. The detached part of him has got in his way...."⁷⁹ More will be made of this later.

In a rather obscure essay on the nature of chemical research being done at Cambridge which was published in 1933, Snow analyzed with considerable acumen the directions in which chemistry was moving, including the increasingly close relationship which chemistry and physics

would need to develop.⁸⁰ "Chemistry", he began, "is essentially the science of molecules." A primary tool for unravelling these molecular structures was spectroscopy, which Snow likened to "solving an immense and rather tedious crossword puzzle", the process being "laborious in the extreme to perform (*albeit*) exciting and invaluable in results". Arguing strongly that the future of chemistry rested with physics, he was optimistic that "a physical invasion" of the electronic states of complex organic molecules would soon be possible, and he gave examples in support of his view from the work of Rideal and his pupils. Interestingly, Snow did not refer to any of his own work which - by the time of the article - consisted of 17 scientific papers written either in solo or in collaboration with Rideal and Lowry, as well as with other research students.⁸¹ It is intriguing as well that Snow's argument concerning the future closeness of physics and chemistry was to foreshadow a talent that he was to display rather prominently later in his career: notably, this was his ability to write of scientific detail in clear prose that was accessible to the lay-person and his ability to identify areas of scientific importance at an early stage, as he was to later do with genetics and bio-chemical research, operations research, and cybernetics.⁸²

Largely as a result of the highly autobiographical nature of The Search, it is often assumed by readers of Snow that he, like his character Arthur Miles, was a crystallographer and that he had built an X-ray spectroscope.⁸³ But for no particularly reason Snow changed this small detail.

He had, in fact, built an infrared spectroscope with A.M. Taylor.⁸⁴ Clearly Snow knew a good deal about crystallography and knew some of the top practitioners of the time such as W.L. Bragg (later Sir Lawrence) who convinced Snow, one night on a cold and damp train platform, to leave Cambridge in 1940 in order to become the Technical Director of the Ministry of Labour during the war,⁸⁵ and Bernal who also had an important impact on Snow. However, if our examination of Snow's scientific career were to be restricted to his fiction and his more publically accessible writings, all we would find would be a few very superficial and cursory statements on the content of crystallography. For example Snow superficially defined it in his interview with John Halperin:

Crystallography is the study of crystals.⁸⁶

Somewhat more usefully, Snow wrote in The Physicists that

Crystallography had always been off the mainstream of modern physics. It deals, not with the structure of nuclei and atoms, but with the geography of atoms - the position of atoms in solid matter, and recently, and far more difficult, in liquid matter also. Crystallography is not only an elegant study, but one with multifarious uses. However the nuclear physicists didn't consider it touching the core of physics. [With the exception of Bernal] Rutherford didn't permit it to enter the Cavendish. It might be slightly more acceptable than spectroscopy, Kapitza remark-

ed, but both were like putting things into boxes, or perhaps a form of stamp-collecting.⁶⁷

and once again:

W.L. Bragg..., whom everyone agreed was a scientist of the highest class, had devoted his life to [crystallography]. So did another man of great gifts, J.D. Bernal. Although chemists and geologists had been looking at the exterior form of crystals for centuries, Bragg and Bernal could bring a twentieth century technique to bear on the fundamental atomic structure of crystals. The key was X-rays. X-rays are radiation, light light, but with a much shorter wavelength. X-ray wavelengths - at around a ten-thousand-millionth of a metre - are very similar to the spacing between atoms in a crystal. When X-rays shine on a crystal they penetrate it. But some are reflected back from the different layers and rows of atoms, and the reflected patterns are not easy to read. It requires an experienced judgement, or complex computer programmes that have only been available in the past few years. But in principle, all the information is there, cryptically, in the pattern of reflected X-rays.⁶⁸

But beyond these, the few general references to his own research which do exist are vague and share only a repeated allusion to the "tedious", "difficult" or "laborious" nature of the work. A hastily added yet obligatory mention of the ultimate value of going through such a process was also typically included.⁶⁹ If we note Snow's repeated description of the work in these rather dismal terms, and at the same time recall his own reputation for being a

poor experimentalist plus his desire - recognized since 1921-22 - to become a novelist, then important questions regarding Snow's impression of his own research and future prospects as a scientist invariably arise.

By turning our attention to Snow's scientific papers, some of these questions can be addressed. Before this, however, a number of preliminary observations can be made. Firstly, it can be noted that Snow's total scientific output spanned the period 1928 to 1935. Secondly, it can be said that these consisted of 26 papers.⁹⁰ Seventeen of these (65%) were collaborations while nine (34%) were written solely by Snow. Of the collaborations, a quarter were written with research supervisors (notably Rideal and Lowry) while the remainder were written either with colleagues or with Snow himself acting as the senior researcher and writing with students. Some of these collaborators would go on to become highly successful researchers in their own right: most notably in this regard, Sir Eric Eastwood (FRS, and who was to become, in 1962, the Director of Research at English Electric while Snow was their Director of Scientific Personnel); and Philip Bowden (CBE, FRS, Fellow of Caius College, Professor of Surface Chemistry at Cambridge, Director of English Electric from 1953-1968, Snow's life-long friend, and the man who appeared as Sir Francis Gettiffe in Snow's novels).⁹¹ A third introductory point is that all of Snow's articles appeared in recognized and well-regarded journals such as the Proceedings of the Royal Society, the Transactions of the Faraday Society, Nature and the Proceedings

of the Cambridge Philosophical Society. Snow also wrote two chapters for the 1933 edition of F.W. Aston's classic text Mass Spectra and Isotopes,⁸² and a 1933 chapter on "Chemistry" in Harold Wright's University Studies Cambridge. In addition, although it was not standard procedure during the 1930s for journals to have articles carefully peer reviewed, Snow's papers were all 'communicated' by credible researchers including both Rideal and Lowry.⁸³ Indeed one paper acknowledged the assistance of Patrick Blackett. A fourth and most significant preliminary observation concerns Snow's field of science. Clearly his interests were in the area where physics and chemistry overlap, but his insistent identification with physics was obviously more a matter of choice than of strict fact. More specifically, even cursory examination of Snow's scientific publications reveals that his research was not in crystallography, but was rather in the related field of molecular spectroscopy.

Snow's scientific research all dealt with aspects of the interaction of molecules and electronic radiation.⁸⁴ As J.C.D. Brand has noted, they fall into three main groups which are distinct chronologically. These might be described as Snow's periods of research into (1) infrared vibration-rotation spectra of di- and tri-atomic molecules (1928-1930), (2) the photochemistry of large molecules (1930-1933), and (3) the electronic spectra of solids and gases (1932-1935).

Snow's first contributions to published science were in 1928 and were based on his M.Sc. work. However his first contribution to a high-level science meeting came in September 1929 at a meeting of the Michael Faraday Society held in Bristol. The topic of the conference was "Molecular Structure and Molecular Spectra". This meeting was, in fact, very well timed as applications of the new quantum theory to physical chemistry were just appearing.⁶⁶ Indeed as C.V. Raman himself pointed out at the meeting, the 1928 discovery of Raman scattering⁶⁸ had opened up a completely new means of studying molecular structure.

By 1929, the only infrared spectra for which extensive rotational analyses that had been completed were those of the hydrogen halides in which intervals between successive lines in the rotation structure is large and readily resolved. However, the spectra for polyatomic molecules were far from understood. Snow's papers on the fine structure of carbon monoxide (CO) and nitric oxide (NO) were landmark contributions and put him ahead of all competitive researchers in this area. Snow's collaborators were E.K. Rideal, F.I.G. Rawlins, and A.M. Taylor.⁶⁷ Rideal's interest in the infrared was new and was, in part, stimulated by Taylor who was a visitor to Cambridge from the Applied Optics Institute at the University of Rochester, New York. It is worth noting that after his collaboration with Snow, Rideal dropped this line of investigations into the infrared entirely.

Snow's paper described work which had, for the first time, achieved a resolution of rotational structure in the fundamental bands of CO and NO - molecules whose reduced mass is substantially greater than that of diatomic hydrides. To achieve this resolution Snow and Taylor constructed a simple prism-grating spectrometer⁹⁸ which was of proven design and which was comparable in performance to other high-resolution instruments which were operating at that time.⁹⁹ The Snow-Taylor instrument involved a single infrared beam with the sample material and reference cells exposed alternately. The sensitivity of the instrument was adequate to resolve the detailed features of the fundamental bands but not sufficient enough to determine more than the general outlines of the overtones bands.

Although acceptable for CO, the resolving power of the Snow-Taylor spectrometer could not handle the more complex NO spectra. CO was shown, by Snow, to consist of the P and R branch energy levels only; however NO proved to be the first and for many years the only example of diatomic molecules of an infrared spectrum in which a Q branch energy level is present between the P and R branches. The importance of this observation was that it confirmed Mulliken's prediction in his molecular orbital theory. This was, in fact, the first time that infrared rotational analysis was used to determine orbital symmetry.

The difficulty in dealing with NO, as was anticipated by the theory of Hill and Van Vleck,¹⁰⁰ is that it is made up of two almost superimposed

components which each have slightly different rotational constants. No instrument in 1929 could have resolved this structure; but Snow, Rawlins, and Rideal must have been unaware of the Hill-Van Vleck work for they would surely have noted the absence of this Hill-Van Vleck splitting. Ten years later, when the double band of NO was finally deciphered, the authors of the analysis commented that the

existing measurements of the fundamental [by Snow, Rawlins and Rideal] were made with insufficient dispersion and sensitivity for precision measurements".¹⁰¹

Brand has remarked that this comment "is less than generous". However, it is hardly a pejorative statement but is rather a neutral explanation. In spite of some difficulties among the CO and NC analyses which formed the core of Snow's Ph.D. dissertation, these have become landmark papers in the field - bringing Snow closest to the crest of a breaking wave of scientific discovery. They had the desired effect of helping Snow achieve a Cambridge College Fellowship and of launching Snow into his professional scientific career. However his future work was not to be quite as successful. Indeed, his tendency to rely on negative evidence plus his impetuosity (what Brand has called 'the dark side of ambition') landed at least four serious scientific blunders on Snow's doorstep.

In 1929, Snow wrote a paper entitled "The Relation Between Raman Lines and Infrared Bands". This was communicated to the Philosophical Magazine by Rideal. In this article, Snow discussed the compatibility of Raman and infrared spectroscopy. However, in what is a rather general and inconclusive analysis, Snow made the startling claim to have observed infrared absorption by N_2 and O_2 which "while not definitely proved is more than a possibility". By today's standards, this claim sounds preposterous as neither molecule exhibits an electric dipole. In fact, it seems certain - as Brand has pointed out - that Snow's 'observations' were caused by uncompensated residues of CO_2 and H_2O in the spectrometer. However, Brand's criticism is a shade too heavy for, at that time, no possibility could have been ruled out. Nevertheless, Snow's speculations were mistaken and he should have been suspicious of any absorption in the same region as CO_2 or H_2O . But Snow never checked - revealing what was to become a problematic flaw in his experimental method - and (perhaps more surprisingly) neither did Rideal. As Snow's supervisor, it is remarkable that he ever sponsored such an extravagant claim by a student who was only in his first year of doctoral research. Thus the adequacy of Rideal's

'Desmond-like' supervision must be seen - at least in part - as contributing to Snow's negative experiences in science.

This incomplete understanding of theory was to manifest in another paper from this phase which set out to establish the structure of nitrous oxide using infrared and Raman spectroscopy. The basic question Snow asked was 'is the molecule symmetrical (NON) or unsymmetrical (NNO)?' During this research, Snow was in touch with E.F. Barker of the University of Michigan and was well aware that the vibration-rotation spectrum of carbon dioxide had proven that its structure was symmetrical, O-C-O. In this analysis, Snow reported the fine structure in the N_2O IR spectrum. He was the first to do so. But in his analysis Snow unequivocally claimed the structure to be linear symmetrical NON, thus specifically ruling out the linear NNO or 'bent' NON possibilities. Within a year, however, Barker (at Michigan) showed the structure to be linear NNO.¹⁰²

The significance of this event in Snow's career requires a more technical analysis into the problem of negative evidence.

The assignment of observed bands to particular vibration modes is never easy. Variables to be manipulated include the wavelengths of the centre of each band, their intensity of absorbance, their overall envelope shape and the comparison of the presence or absence of each band in ordinary IR and in Raman IR. Brand has shown Snow's minor errors in

assigning each mode whether symmetric, asymmetric stretching or bending, fundamental or overtone, combination or 'hot'. In themselves these errors are forgivable; even today, comparable mis-assignments are made at an equivalent frontier of research. However these errors pale in significance compared to Snow's gigantic gaffe when comparing the IR and Raman data. For it is this primarily reasoning that decides whether the molecule is NNO or NON.

The Rule of Mutual Exclusion, as it is now called, allows a simple test of symmetry. Although Snow and his contemporaries would not have used these words *per se*, their knowledge of theory is correct by today's standards and this rule can be seen as a easier way of expressing this knowledge.

Thus the rule states that if a molecule has a centre of symmetry, (e.g., OCO) all Raman active vibrations are IR inactive and vice-versa.¹⁰³

If there is no centre of symmetry then some (but not necessarily all) vibrations may be both Raman and IR active. If ever one fundamental band is found to exist in both IR and Raman at the same frequency, the molecule cannot have a centre of symmetry.

Snow was led astray by two errors, one of his own and one from the paper written by Dickenson, Dillon and Rasetti. Rasetti's paper reported that

Only one Raman line was found; this was rather weak but sharp. The frequency shift was 1281.8. An infra-red absorption of this frequency would lie at 7.8 μ ; we are not aware of data showing any band at this wavelength. However, the least approximate agreement of the frequency measured by us with the difference between the frequencies corresponding to the prominent absorptions given by E.V. Bahr as occurring at 2.86 and 4.49 may be significant.¹⁰⁴

Actually there is another Raman line at 2224 which, if known, would have given the game away. The point here is that Snow bought the Rasetti work, 'hook, line and sinker'. Rasetti said that there is no IR band at 1282. Snow's instrument could not reach down below 1400 because the grating became ineffective in that region. He did a quick scan "...a search with a prism [NaCl] instrument up to 15 μ [i.e. down to 700 cm^{-1}] has not discovered any more strong bands." Was this the error due to a technical assumption made by an assistant in The Search? It would have been easy for Snow to check that his small spectrometer was working, by running CO_2 , which absorbs in that region. But he didn't and the false, negative result stood. Snow continued to follow Rasetti's speculation that the Raman line is somehow derived from the difference between the 2223 and the 3487 bands (note 3487-2223 is 1264, not exactly 1282).

It has taken the unlucky combination of both these experimental errors for Snow's analysis to be wrong. If either one had not occurred Snow would have been the right picture. Snow had reported a very strong band at

2223. If Rasetti had reported the same band in the Raman, the rule of mutual exclusion would have ruled out the symmetric NON structure. Alternatively if Snow had picked up the 1285 IR band with his own prism spectrometer he would have matched it to Rasetti's 1281 Raman band and again the NON structure would have been ruled out.¹⁰⁵

Barker's paper of a year later gives us several clues as to what went wrong. First Barker showed very clear spectra (he was renowned for his superior gratings). In this case the resolution was more than adequate to pick out lines separated by only 0.8 cm^{-1} . Snow's published spectra of the strongest band was incomprehensible and, with the benefit of hindsight, the numbers he quoted in the published table were totally wrong. He reported peaks with an average separation of 2 cm^{-1} . One can only surmise that he was looking at either noise or, more probably, optical interference bands from non-parallel surfaces of the NaCl discs in the spectrometer.

However Barker was kind in the paper that demolished Snow's work, giving Snow partial credit for being involved in the reasoning that lead to the correct NNO structure. As he wrote,

During the course of the investigation our observations were submitted to Professor Dennison, and he first suggested this interpretation, which is apparently the only consistent one. We understand that the idea originated in a discussion between Dennison and Snow on the subject of the N_2O spectrum.

and later in the paper

Snow has kindly informed us that his computations using our three fundamental frequencies reproduce the specific heat curve very accurately.

Barker's work not only had better resolution but it also extended to the higher wavelength and he picked up the 2224 IR band which ruled out the NON structure. The case was closed.

Snow was clearly moving in the right circles. One can imagine Dennison, who was mentioned above and who was five years older than Snow, debating the issue with Snow in Cambridge. Dennison, the American prodigy who had worked with Bohr, Heisenberg and Schrodinger, was well known in the Cavendish. Earlier in 1927 he had been asked to give three lectures. Finding himself short of material for the third, he resolved the ortho-para Hydrogen specific heat problem that had eluded the theoreticians; one of the highlights in his illustrious career.¹⁰⁸

The immediate criticism of Snow's paper on N_2O ¹⁰⁷ was to be his first exposure to public criticism of his logic and judgement and, on the evidence of novels such as The Search, he was not to forget the unpleasant feeling that this represented.

Snow's research into photochemistry, which was to amount to the biggest embarrassment in Snow's young scientific career, were undertaken with Philip Bowden - Frances Getliffe in Strangers and Brothers - in 1932-1934. Snow had just published the mystery novel Death Under ??????, and it was during this next period that Snow wrote and published New Lives For Old and The Search. The purpose of their research was to study the structural rearrangements brought about in large biologically important molecules by the absorption of light quanta. (We mustn't forget that it was the stated objective of Arthur Miles in The Search to apply crystallography to biological systems.) Neither Snow nor Bowden had any previous experience in this area. The research program was based on the

dual premise that (i) the ultraviolet and visible absorption bands of large molecules could each be attributed to local sub-groups, or chromophores, and (ii) physiological activity, when present, similarly resided in a particular sub-group of the molecule as a whole.¹⁰⁸

As a consequence, or so Snow and Bowden thought, it should be possible to link physiological activity to a particular absorption band. More particularly they believed that they could destroy the biological activity of a vitamin by irradiation in an appropriate band or induce physiological activity of an

inactive precursor by a photochemical rearrangement using light of a correctly-chosen wavelength. "At the time, vitamin molecules were at the threshold of structure determination by standard methods of chemical degradation, but no vitamin had yet been prepared in the laboratory from physiologically inactive material."¹⁰⁹ Snow and Bowden hoped in effect to leap-frog this process through photochemically-induced partial synthesis. It is likely that the idea for this line of experiment came from J.D. Bernal whose own work, on the photo-rearrangement of crystalline vitamin D, was published at almost the same time.¹¹⁰ In part, Snow's enthusiasm in this work was connected to his enthusiasm for the new quantum theory.

The idea had an austerity that went home to a certain sort of mind at once. And it worked like no other idea in the history of science. As soon as the model atom was thrown away and the new mathematical constructions made, atomic science fell into order straight away....it was convincing beyond the quiver of a doubt....it was fairly easy to see how the new ideas would include a theory of crystals. I could imagine the sort of explanations which would soon clear up most of the problems of quantum mechanics, the first suggestions on crystals and molecules were beginning to come out. I could see, in the near future, these new methods restating my own work....And my ambitions, I thought, my plans [would lead to] attack on the structure of biological molecules....¹¹¹

Rideal who had achieved an outstanding success by applying surface chemistry to biological systems, was now trying to replicate this success by applying spectroscopy to biological systems.

Snow and Bowden published their preliminary work in a letter to Nature.¹¹² In so doing, they acknowledged the "generous co-operation" of such individuals as Sir Frederick Gowland Hopkins and J.B.S. Haldane. Unusually, Hopkins, who was then President of the Royal Society and a pioneer of vitamin research also sponsored a press release in The Times under the title 'Birth of a Vitamin'. As Brock had pointed out, "the event was a 30 day wonder", attracting considerable positive attention from industry and the press. The journal, Industrial and Engineering Chemistry, wrote that "production of Vitamin A on a large scale and its manufacture in foods, such as bread and cereals, may be expected if recent British experiments are confirmed." The Chemical News wrote that "by arranging for the exclusion of the radiations which destroy the vitamin and free passage for those which create it, further yields should be obtained." The Lancet and the British Medical Journal both reported that "they believe they have produced vitamin A artificially". However, within weeks their work was publically criticized by two senior authorities on the organic chemistry of vitamins. The work of Snow and Bowden, according to this assessment, was completely wrong on all points that were essential to the argument.¹¹³ In a devastating letter published in Nature, (later Sir Ian) M. Heilbron and R.A.

Morton of the University of Liverpool dismissed the claims of Snow and Bowden. Hellbron and Morton dominated this field. Their demolition was done on many levels. To begin with, the method used by Snow and Bowden was not new. Indeed, "the technique (the study of spectral absorption curves, and irradiation with light of selected wavelengths) is familiar and has already been applied in vitamin studies". Morton had used spectral analysis of vitamins as early as 1928. Additionally, "the idea of experimental method as a key to several vitamins seems to underestimate the differences between organic compounds of widely varying constitution". This is the scientific equivalent of acknowledged experts saying that Snow and Bowden 'didn't know their organic chemistry.'

More serious criticism of the Snow and Bowden work was addressed regarding each of vitamins A, B, C, and D. Of the vitamin A experiments, for example, Hellbron and Morton wrote that "from the published spectrograms their product is obviously coloured and in all probability contains unchanged carotene, so that the relevance of the promised biological assay does not emerge, since it has been fully established that carotene is converted *in vivo* into vitamin A". This is the scientific equivalent of acknowledged experts suggesting that Snow and Bowden 'didn't know their bio-chemistry'.

Of vitamin C, Hellbron and Morton state that "Drs. Bowden and Snow state that when they are able to record the absorption spectrum of

pure vitamin C, they will be able to test its identity with either initiated narcotine or hexuronic acid. This is so true as to be obvious".

Closing their response, Hellbron and Morton write simply that the claims of Snow and Bowden "have no precise meaning".¹¹⁴ Once again it is important to step back and analyze this disaster from today's vantage point. It would be trite to categorize biology and biochemistry as encyclopedic in magnitude and complexity but Snow and Bowden showed little comprehension of its scope. However, at that time, intellectual territory was not as guarded as it is now. They just needed a 'guide' to show them around the geography and to protect them from pitfalls along the way.

In retrospect it is still a major regret in modern chemistry that simple photochemical reactions have not worked out in a way that might have seemed possible in principle. Most chemical reactions are irradiated thermally. That is, heat is applied so that molecules are made to go faster and in so doing to collide with each other, hoping that on average the right 'bits' will break off or the right fragments will attach themselves. Of course, inevitably, the molecule breaks in the wrong places; thermal degradation gives unintended bi-products. A more efficient way would be to cut the bonds exactly where you want. No molecular-sized scissors are available but if we shine light of exactly the right frequency (this was achievable before 1950 only by filtering out the 'wrong' frequencies) we can in principle cause

a particular bond in a molecule to vibrate so energetically as to break quite precisely.¹¹⁵

Attention was quick to focus on Snow and Bowden. The controversy is recounted by Brand's comments on the experiment which claimed to convert beta-carotene into vitamin A.

Beta carotene, the molecule responsible for the color of carrots, is abundant and available so that its conversion into the vitamin would have been of considerable importance in the pharmaceutical industry. Bowden and Snow claimed that the conversion took place when carotene was irradiated in a hydrocarbon solvent in an atmosphere of nitrogen. In dismissing this claim, Heflbron and Morton pointed out that Vitamin A is an alcohol - a property established in 1931, the year preceding the Bowden-Snow experiment - and so could not possibly have been produced from carotene under oxygen-free conditions. The argument was unanswerable, as Snow later conceded: 'we thought we could produce certain vitamins by using...light, but that wasn't right'. Now we know that vitamin A is formed from carotene by enzyme action but not by irradiation.¹¹⁶

Snow and Bowden were thus careless and once again had not done their homework - they were unaware that in 1931 the chemical constitution of vitamin A was virtually settled. Snow must have been horrified that his blunder was committed in full view of the President of the Royal Society. Referring to this period of his life Snow wrote that "I was extremely miserable. Everything personal and creative, seemed to be going wrong."¹¹⁷

The trauma of these errors of judgement was represented clearly in The Search. Asking 'what am I to do?', Miles (i.e. Snow) received clear advice.

'That's quite clear.' Macdonald lit his pipe. 'You've got to rehabilitate yourself. Which will take a longish time. You've got to accept the assistant directorship if they offer it to you....You've got to work absolutely steadily, without another suspicion of a mistake. You've got to let yourself be patronized and regretted over. You've got to get out of the limelight. Then in three or four years you'll be back where you were; though it will be held against you, one way or another, for longer than that. It will delay you getting into the Royal, of course. That can't be helped. You'll have a lean time for a while; but you're young enough to get over it.'¹⁸

Bowden, of course, took the advice, rebuilt his career and became an FRS. Snow did not. But by 1935 he knew that he would have leave science.

During this same period, Snow wrote articles in such periodicals as the Cambridge Review and carried out work with Rawlins on the visible spectra of transition metal complexes. The hypothesis was that the spectral bands of complexes correlated one-to-one with the transitions of the free metal cation in the gas phase. This basic idea commanded considerable

attention at the time but Snow and Rawlins (who had published previously in the area) gave no indication of having known the frontier work in this field that had been done by Hans Bethe,¹¹⁹ by Sauer,¹²⁰ or to the implications that these papers later came to be seen to have in terms of spectral analysis. In Brand's view

it is difficult to believe that the failure to mention [this] work is simply a lapse of courtesy: instead, it appears to represent a careless indifference towards the work in other laboratories....¹²¹

Another form of spectroscopy in which Snow did research was conducted near the ultra-violet spectra of ethylene and certain of its relatives. This work was done with Allsopp and Eastwood. While in retrospect the tone of the research results can be seen to be somewhat hesitant, this is understandable as one had previously attempted to analyze rotational substructure in the spectrum of a molecule of such size and complexity before. Nevertheless, despite their hesitation, the methods which they pioneered in this work remained current for several years.¹²² In the context of its period, this was probably Snow's best work. It showed more judgement, patience

and imagination than any of his previous work. Of course, we must not forget that a considerable portion of the credit may well belong to Eastwood whose later accomplishments suggest that his contribution may well have been decisive. In a footnote to their paper, Snow and Eastwood suggested possible future work¹²³ which - had they pursued - could have been quite significant. But they did not pursue this line of work, and Snow was to leave primary scientific research altogether. In the end, Snow knew his scientific career was a failure. As he wrote in The Search, in "a sense, I myself have lived by my wits since I was eighteen; a failure in an examination, a bad start in research, a mistaken choice - and I should have been a schoolmaster all my life".¹²⁴ This, to Snow, meant failure. And thus once he had become a Tutor at Cambridge, coupled with his scientific research experiences, he knew he had to leave science behind.

Thus in sum, a number of things can be said of Snow's scientific research. He did perform some good science however he was far from being the "brilliant physical chemist....whose work on photochemistry in the solid state could easily have opened up for him a new field of research" as Bernal said during the 'Two Culture Debate' in 1962.¹²⁵ But Snow knew this. As he said, "I was not good enough." "I should have made quite an adequate scientist, but not a great one." "I should only have been happy in Cambridge if I was an academic of the class of [Bernal, Rutherford, Kapitza and Hardy] - which I should never have been, even if I had tried."¹²⁶ Certain-

ly he was well thought of by such eminent personalities as Blackett and Gowlin-Hopkins, but this was more for his affable nature, overall intellect, scepticism of dogma and his ease around powerful or important people than for his prowess as a researcher. Clearly, he was a competent technician as he would have needed to be in order to be awarded a Cambridge doctorate. But importantly, and equally clearly, an overall assessment of Snow's research reveals that his work was uneven, he was impatient, that his judgement was sometimes impaired by his attraction to the idea of making a major contribution to science and that he would never have been a major scientific force.

As to why he was so anxious to associate himself with the Cavendish instead of being satisfied with being simply a 'physical chemist' from Cambridge, the answer is most assuredly buried within the powerful cognitive and subtle political values espoused by that scientific community which Snow was to admire. Cognitively, many Cambridge researchers felt that even if they weren't working under Rutherford, they were at least playing a part of the second scientific revolution. As Snow said not long before his death, although he didn't work at the Cavendish, he knew that it was an important time and he regularly went to the Kapitza Club meetings. They were exciting.¹²⁷ And politically, Snow was well aware that

the general atmosphere [of Cambridge at the time] was vaguely liberal, [and] strongly international.¹²⁸

Moreover, the friends whom he 'idealized' (from Bernal whom he met in 1928, to Blackett whom he met in 1930 along with Hogben, Crowther and Gregory, Hardy whom he met in 1927 to the Huxleys whom he met in 1929) were all quite far to the intellectual left, but not the trade union left.¹²⁹ Snow was also on the left of the Labour Party, but he was always less adamant about mass movements than his friends.¹³⁰ These influential scientific friends kept hoping that Snow would see "the light and really throw [his] weight in, [to the political reformation of the inter-war period] but [he] never did."¹³¹ While Snow saw the left as the only practical option at the time, he was also "genuinely sceptical" of anyone resembling an ideologue. But a more important explanation of Snow's scientific affiliation related to his early impression of the progressive nature of modern physics versus the supposedly unprogressive character of chemistry. This point was driven home by Bernal, underscored by Hardy and fictionally recollected by Snow in a conversation between Arthur Miles (i.e. Snow) and Leo Constantine (i.e. Bernal).

"Why is chemistry the most conservative of sciences? Because it's got no mathematical basis," he said promptly.

"You mean", I said, "that there's nothing to test the new ideas by? And the old ones have all the force of tradition behind them. Back to Kolbe, as it were?"

"Any science without mathematics is bound to be conservative. Physics is just the opposite. New ideas get a hearing. I'm a physicist by temperament

myself, you know. Only I didn't get a mathematical training'.¹³²

This was Snow talking candidly of himself, although what he was describing was certainly no 'revolution' in any Kuhnian sense. More, the work of such figures as Bohn had - through spectroscopy - begun to effectively marry chemistry and physics. Snow, it can be said with some certainty, was a physicist by temperament - trained (to some degree) in advanced mathematics by G.H. Hardy. In Snow's eyes physics was both scientifically and socially progressive. This was reflected repeatedly in such novels as The Search. For example,

When Sheriff or I assumed, as we so often did, that science was inevitably going to change the world, and that we were optimistic because of it, Hunt protested: 'I can't understand the way you two believe.' 'Don't you see', Sheriff would break out, 'that science has got the future in its hands? It will make people live longer, give them leisure, give them power; why, we shall soon have Nature at our mercy. Isn't that enough for you?....We're getting the power, and that's making our civilization the first stable one there's been. It's because its the first civilization that has got hold of science - not enough yet, but enough to give it power. Call it plumbing if you like, but its making us unique. And as well as that, we've got scientists: the first collection of people in the world who've been trained to be honest and detached about the things they see. They've vowed honesty and detachment, and that's something staggeringly new.'¹³³

Beyond this, through extensive tutoring by Hardy during 1929-1930, Snow learned the necessary advanced mathematics to "understand more physics than most physicists".¹³⁴ Thus, in Snow's own mind he was clearly - and without any doubt - one of the generation that changed - and would continue to change - the world.

None of these observations regarding the limitations of his scientific career would have come as a surprise to Snow. Indeed, in later life he insisted that "by vocation I was a writer".¹³⁵ In an occasionally enlightening series of interviews conducted in 1978, Snow affirmed that as a teenager he was convinced that, one day, he would be a novelist; that there was never any burning desire to become a scientist - rather, that it seemed the easiest way of making a decent living in the 1920s; to escape the economic surroundings of provincial Leicester. Science was something that came easily to him. But he knew that, for himself, he could not have stayed on at Cambridge.

[Going to Cambridge as I did] was a nice way to earn a living in the thirties; out of what I got from various sources, about £1200 a year, I lived like a well-to-do bachelor....I knew I was going to write.¹³⁶

Furthermore, and contrary to the still dominant perception of many of Snow's readers,¹³⁷ Snow's literary career does not in any way represent a radical break with science, or a crisis period in Snow's

professional life. We know that from the earliest period, while still at the University College in Leicester, Snow's interests were diverse and he was clearly not intending to pursue science as his career. Writing was to fill this bill. As a teenager and well into his Cambridge days, Snow had taken an active part in debating societies, had done a considerable amount of writing for such school periodicals as The Newtonian (1923-25) and The Luciad (1926-28) and had in fact written his first novel (Youth Searching) which was never published and of which the sole two copies were destroyed by Snow and his, then, girlfriend.¹³⁸ So, we can surmise that when Snow left Leicester in 1928, he had no real intention of pursuing a career in scientific research. Although his intellectual excitement over science was real and sincere, he was much too preoccupied with people and the world around him to be able to focus entirely on science. Although he was never to officially break with science - gaining authority and self-definition by identifying himself as a scientist as late as 1978 whilst speaking at the University of Texas at Austin - there can be no doubt that he did migrate away from it, perpetuating a more deeply seeded self-defining marginal status which was bestowed on him by his status as being a postgraduate student in physical chemistry from the Provinces.

There can be no mistaking the fact that science - that is to say scientific knowledge, the social style of its community, and its relationship to society - deeply influenced Snow's values and life-long realist's outlook. By

the time Snow's training in science was complete his literary, scientific and political realism had become importantly coextensive. How Snow conducted this translation of his early observation that scientific facts were the result of mental and social constructs into his sense of the importance of science was significant indeed. This is particularly true as it illustrated both his affiliation with the social relations of science movement while at the same time demonstrating clearly his differences with those factions.

While colleagues such as Bernal and Huxley argued about the importance of science in society, Snow adopted a subtly different approach and quietly argued instead on behalf of the importance of science to the individual. The distinction for Snow was an important one. To speak of 'society' was too macro a concept, Snow felt. It carried with it too high a level of aggregation to be able to usefully make initial observations. And as a political concept, it led too often to a confrontational style which was unproductive.¹³⁹ To someone such as Snow whose own successes had come by studying the fundamental units of matter (atoms and molecules) and by working as an individual within the power centres of social systems, such advances as we can make in life could only be thought of at the level of the individual. For example, it is here that political change can be made; it is here that people live, think and experience; it is here that any direct meaning or knowledge of the world can be held; and it is here that science can

have its greatest impact. Such ideas Snow expressed in terms of the second scientific revolution (i.e. 1900-1925).

In an unpublished series of notes for talks he was invited to give at the Massachusetts Institute of Technology and at New York University, Snow wrote succinctly that:

the scientific revolution is already performing, and has in fact partly performed, a structural transformation of modern democracy and on Man's idea of himself.¹⁴⁰

By this latter note, Snow meant nothing unduly complicated but intended, quite bluntly, to question what we - as individuals - are like, how far removed from the rest of animal life we are, and in what sense are we responsible for our actions.¹⁴¹

In posing these questions, Snow could be perceived as asking what were, for him, uncharacteristically philosophical questions. However, while the questions raised are undoubtedly subtle, Snow - in posing them - never left his basic realist framework. His reasons for raising them was due to his sense that in "modern", "advanced", or "urban" society,¹⁴² (which he defined as those societies in which "most people have enough to eat,... [where] there are houses to accommodate them, where - by and large - they are almost completely literate, and where children have some education"),¹⁴³ there was a growing sense that "civilization is slipping backwards".¹⁴⁴ This,

he noted, often translated itself into an inarticulate 'anti-science' sentiment. But this was the wrong response to our technological world which was based on false hopes. What Snow offered in his discussions of science was "a bit of non-utopian thinking".¹⁴⁵ What he delivered in practice was a modified version of the Radical social function of science rhetoric which he recited in his best Bernalian voice. Although this was not to reflect Snow's most creative and unique contribution to the modernist debate, it did serve as the basis for what was distinctively Snowian realism. But in sketching out his *prima facie* argument, Snow defined his basic elements simply and conventionally: science was "the attempt to understand the natural world" and technology was the "attempt to alter and control the natural world".¹⁴⁶ However in setting up these categories, Snow failed to critically examine either the usefulness or integrity of the categories themselves, or their implications for social development.¹⁴⁷ From time to time, Snow would become vaguely aware of these shortcomings but this only resulted in him burying his assumptions or building arguments which did not directly depend on them.

Snow's flawed assumptions arose out of a common, still popular, but only partially useful distinction between science and technology.

That is a deliberate choice. I could have said applied science, but increasingly I have come to think that that is misleading. The relation between [science and technology] is extremely complex...In some domains the two activities fuse and the frontier

between them disappears. In others the separation is complete.¹⁴⁸

This distinction was made for essentially two reasons: firstly in order to redress what Snow recognized as "a profound confusion in the popular mind"; and secondly to underscore his conviction that science holds a special and irrevocable status in human activity. Both stances are flawed.

In the West, one meets quite a strong wave of feeling which is called for short-hand purposes anti-science....It is most active among people living exceptionally comfortable lives in the material sense....'Anti-science' is a protest against the possibilities of nuclear war, the dangers of pollution of the atmosphere, the hazards of nuclear waste, the devastation of the countryside, the inhumanity of motorways....Of course it is not really anti-science. It is anti-technology.¹⁴⁹

But in so saying, Snow was attempting to protect the sanctity of science by clinging, definitionally, to two artificial categories. To anyone familiar with science policy trends, as Snow was, terms such as 'science and technology' can only be of use in the broadest terms. Closer examination of the research function reveals, far more practically, a blurred continuum of activity as is represented by basic and applied research, experimental design and development, process and product innovation, technology transfer and diffusion - each one of which is, in itself, definitionally problematic. This

recognition is now widespread.¹⁵⁰ Today all research is still an act of enlightenment. However as governments continue to insist on the importance of the market-organized research system, researchers and research administrators have had to learn to adjust to the commodification of science. Snow knew this but choose not to admit it - preferring to recall what he remembered as the 'Golden Age' of science. To Snow, in this weakened line of thinking,

Science as science doesn't present any practical problem. It is international as no other human activity can be. Nearly everyone would agree that it is worth doing. It is one of the beautiful things that humans can do.¹⁵¹

And why? Because, he argued,

No one can deny its progress....No sane and informed person doubts that our scientific picture of the world is richer and more accurate than it was fifteen years ago - and that in fifteen years time it will be richer and more accurate still. The certainly of progress freshens the air which scientists breathe....[it] assures them that they are not wasting their lives.¹⁵²

Thankfully, Snow was not to build these assumptions into his larger framework although trace elements of it are frequently encountered. Much more importantly to Snow was his overall view of the importance of

science. Speaking of the ancient past, Snow reflected, in his best Bernalian voice, that

The revolutionary changes in human life have all been technological....Agriculture was somehow happened upon 9 to 10 thousand years ago....It meant the beginning of what we term civilization. Human life didn't change much for the overwhelming majority of the human race until only a few generations ago. Then there was a quantum jump....[and men] learned to develop machines and make industrial products on a mass scale.¹⁵³

These changes were "on the whole, technological as opposed to scientific".¹⁵⁴

"The first industrial revolution was largely the result of clever craftsmen; people with the mechanical gift; people who knew the material; people....who weren't scientists in any sense...."¹⁵⁵ However, we are currently going through another change which has far greater implications for the way in which we think and live, and which Snow foresaw. This change "springs, not from technology but, from science....[The] really exciting things which are about to happen to us now are coming from science into hardware in an astoundingly short time".¹⁵⁶ These were to come from quantum physics, molecular biology, and computing science. And as Snow perceptively understood, these changes would have a far greater impact than any conscious political decision for these changes would directly affect Man's changing idea of himself.

In a very basic sense, Snow saw science as being responsible for dismantling our longstanding anthropocentric beliefs, and in giving us a clearer (and still evolving) sense of who we, as individuals, are. This has taken time, but has been a great lesson in humility which has deeply affected our common wisdom.

Men in the Renaissance didn't realize that their own conception was changing. A few were saying that man was the measure of all things. [This was] a great piece of vanity but [was] nevertheless the first clear statement of individualism....In the same fashion, our successors may possibly look back upon us and detect, as we can't, that something new was stirring. Something which would in time make human beings think more gravely, more stolidly, about their condition, wouldn't make them exuberantly happy but might give them a stouter place on which to stand.

Men have looked at the stars from the dawn of history, have wondered, and have often felt awe. Three hundred years ago Pascal, one of the most of introspective thinkers, said 'the silence of the infinite space terrifies me'. Now the development of cosmogony has told us much more, and more exactly, about the infinite spaces. Our planet is one insignificant speck going round a minor sun. There are billions of such suns dotted round a universe so enormous as to be unimaginable. There are, no doubt, very large numbers of planets similar to the earth - though not quite so many as one would have thought. Life, human life, may be a bizarre chance, but statistically it seems as certain as statistical thought can take us that similar life, the same kind of bizarre chance must have happened a good many times elsewhere. The trouble is, we may never know. The distances are so vast that even messages are unlikely to reach us, if such are ever going to be sent. My own guess is that we shall go on living in

isolation and ignorance, not knowing what other kinds of intelligent life are like. And our life will go on until finally the sun has the fate which we can observe happening to other suns. This is an extension of those features of the human condition which existentialists refer to as absurd. But that is a literary flourish. This is the only life we know, and human beings will go on enduring it and sometimes enjoying it.

Yet this certainty of our cosmic insignificance is a very long way from the time when we were assured that the earth was the fixed centre of all around us. No sensitive person could now say that man is the measure of all things. A lot of our conceit has gone. Insensibly now more quickly, our idea of ourselves is changing. Much of this change, spelled out to us [by science] is not entirely comfortable. And yet, in the long run, it will be to the good. The great shocks to human confidence have come through the demolition of false hopes. The idea of man as a special creation was another edifice of conceit, and when that was shattered much security went. People had to search for another place to stand. Our idea of ourselves has now changed enough for us to find a stable place to stand.¹⁵⁷

But in so far as science has revised our conception of where we are in the universe and of who we are genetically, a change of greater proportions which affects the role or place of the individual in society is also being changed by science. Some of this change will be perceived for being either good or evil. Through the continuing rapid development and diffusion of computers, for example, it may well emerge that none of us will need to sign or have cheques in the near future. To many this kind of change will be positive. At the same time, it is possible that we will have computers

which can take account of what each of us is doing. It may track all of our income and all of our expenditures; it will make doing income tax much easier while making the avoidance of income tax very difficult. In this sort of case, convenience is riding on the back of very serious questions about technology and individual rights to privacy, but always there are the good and the evil aspects. Nevertheless in the view of many technology and labour theorists including Carlota Perez and Harry Braverman¹⁵⁸ (which Snow anticipated concurred) it seems "inevitable that perhaps 10% of the population (of the advanced industrial nations) is going to work much harder and 90% is going to work much less". The serious implications of a society based on 'non-work' are manifest.¹⁵⁹ Speaking to a reception at the British Embassy in Washington in 1966 and encapsulating what was, for him, the necessary condition which actively defined the active and socially meaningful individual - the modern individual - Snow noted that:

I believe that it is good that people should in fact not have to work like beasts of burden, as we must remember that all men have worked (except a tiny fringe who are not statistically significant) since the species first developed. This, I believe, is a good thing and a much greater thing than the disadvantages that I am now going to annunciate. But there are disadvantages. It is all very well for us. We have anterior resources. Most of us like the jobs we are doing, and although we have to work too hard we can put up with it. But imagine what a large population is going to be like if in fact work, which was once the purpose of life, is taken away from you. Now purpose is the salt [sic] of life. Most people are unhappy if they are not given it. I can't

help thinking that here, before it happens, we ought to be using every scrap of imagination to imagine this gigantic biological-sociological problem which [we] are going to be faced with soon....[For example] I believe that some of the American and British pre-occupation with sex is precisely because the purpose of life has tended to disappear. You must have some existential moments by which to pass your time. I believe that a kind of boredom and despair even may come upon people if we cannot find any liveable and purposeful non-work for people to do. I believe that non-work...is going to be one of the great problems of the next generation....[This, plus] the lack of identity that people are likely to feel....[if] in fact the computers [along with molecular biology and physics] are really at work, and if you really are part of an enormous mechanism, then I suspect that it may be true that the individual personality will seem less important; the individual will, the individual responsibility, may get dangerously less.¹⁶⁰

But this is no reason for despair. Indeed quite the contrary is true.

Science and technology embody elements of both good and evil. It brings great benefits, but has a knack of unexpectedly stabbing you in the back. This is true even of what seems to be the most benevolent of technologies - medicine.

This is a technology which spreads most quickly over the planet. The length of a human life has increased dramatically since I was young. Fewer children die in infancy. No one with a spark of human feeling can doubt that those are great [and] good things. No decent person could wish they hadn't happened. Medical technology more than any other has been kind to the human race. And yet of course these blessings are also responsible for the growth of the

world's population which may undo all we are trying to achieve.¹⁶¹

Here Snow did not even touch on the important questions raised by contraceptive technologies or the morality of sustaining human life by technological means, but they are clearly not questions for the faint of heart. These types of questions, which surround and press in on us daily, presents the greatest challenge to our intellect and our will. This in itself is cause for great excitement as it imbues us with an urgent sense of purpose and identity. Although it is true that "we can only do little things....that is no reason for not doing [that which we can do] as strongly as [possible]."¹⁶² In so doing - in attempting to define and re-define what it is to be human - we cannot deny the existence of technology. "Technology, properly used, is the only weapon....at hand."¹⁶³

It is this qualifying phrase - 'properly used' - that is of particular importance here and which runs as a central thread in Snow's thinking since, at least, 1938. Because of the peculiarly scientific character of our age, Snow reasoned, "scientists are the most important occupational group in the world today. What they do is of passionate concern to the whole of human society."¹⁶⁴ And hence

in a time like this, scientists would be less than human if they did not consider their responsibilities.¹⁶⁵

These responsibilities are especially great because most decisions in an open society are made as a result of closed politics and not by open groups of people. And with those most vital of decisions, by which Snow meant those decisions by which we live or die, the process is becoming infinitely narrower. "It does not seem that there are any advantages other than speed. The possibility of errors in judgement is greatly increased. [And] what is worse, the spread of indifference, of a kind of contracting out of the whole world of decision making, has spread widely through society. This is part of the despondency of our time....

Isn't it possible that the computer age will add to the bad effects of [decision making]? That is, the number of people who are going to be informed about decisions is going to become still smaller?¹⁶⁶

Thus, with regards to the reality of science - its community, knowledge, and rigour - Snow posed what is by some estimates the ultimate question: "how are we going to restore a widely-based individual judgement?"¹⁶⁷ He is sure that it can be done. But it will not be based on false hopes. As we have already said: the findings of science are ethically neutral: or as Snow would awkwardly say, 'non-moral' or 'morally un-neutral'. It is true that published research results can be used for good or evil. But the activity of science is far from being morally neutral as questions of practical ethics always lie in what to do next. Research which is yet

to be completed, or which is yet to be undertaken cannot be undertaken without a commitment of will and resources. The population at large, including scientists themselves, must firmly come to know this. As Snow phrased it:

Science can no more prevent itself producing poison and high explosive than a cure for diabetes or the steam engine....It is admitted that much research is directed consciously and entirely towards producing means of destruction. Whether an individual scientist takes part in such a work is a problem for his own conscience.¹⁰⁸

But, in speaking of the imminent outbreak of World War II, Snow drove his point home:

Any utopian solution, in which it is hoped that science or scientists will not co-operate in war can be rejected as a dream. But that does not eliminate the responsibility of scientists in trying to prevent war....Living in a world of crisis [scientists] have been compelled to learn that war is a symptom of society's sickness, not a single phenomenon on its own account. To understand the causes of war, in order to prevent it, we must understand society itself: in particular we must understand the change in the world since....science enabled the whole scale of industry and organization to change....Until that change is understood, and until those powers of....science are directed consciously to the benefit of the people of the world, human life will be a precarious business at best.¹⁰⁹

To this end, Snow conceived of a modern realist mechanics for the human condition at la fin de millenium. At its centre was the credo of Richard Gregory, G.H. Hardy and J.D. Bernal to which Snow was exposed at Cambridge:

we must know as much of the social relations of science as we do of science itself.¹⁷⁰

science [can no longer be] very remote from human intricacies, human problems....¹⁷¹

But animating this view - in addition to the understanding of the emergence of science as a qualitatively different engine of change in both the public and the private spheres - was Snow's privileged focus on the individual over society; on the need for purpose in life, an appreciation for the force of will in society as well as for a sense of rational judgement and responsibility. Even though Snow had left scientific research by the late 1930s, science had provided him with all of these elements and had immeasurably improved his life. As he said of his own life, science

had been more important than money, love, or security....¹⁷²

But in so doing - in seeking a balance between his own public and private persona - Snow had been able to realize the importance of personal politics

in modernity's public affairs. In examining how social change could be generated by rational individuals, Snow developed what could best be described as a pervasive and highly individual 'politics of reason'. But nowhere is Snow's political perspective seen more clearly than in his literature.

CHAPTER SIX

PERSONAL POWER AND PUBLIC AFFAIRS

men must know that
in this theatre of man's life
it is reserved only for God and his Angels
to be lookers on.

Francis Bacon¹

We live, as we dream - alone.

Joseph Conrad²

In what is still an influential depiction of 'the political novel', Stendahl wrote that "politics in a work of literature is like a pistol-shot in a concert" (something loud and vulgar which cannot be ignored).³ However, in so far as this is true, then Snow's work must be seen as something of a departure, for at no point in his writings - all of which deal with overtly modern and political themes - is the reader distracted by the stark intervention of partisan politics,⁴ nor is the reader forced to cater to the thoughts of an ideologue.⁵ Politics is too sustained and too subtle a theme in Snow's fiction and non-fiction for either of these.⁶ Politics, in Snow's thought, is transparent yet ever-present. It is the medium of the struggle of modernity, of aesthetics and of rationality. Indeed, Snow's sense of the political in fiction leans more towards the definition of the political novel provided by Morris Speares.⁷

In Snow's fiction we find the novels of ideas, involvement and of direct observation. They record the character and the significance of social change in a scientific/atomic age. They gauge the tensions and the shifts that occur as a result, especially within the establishment...all so that the implications of these changes for individual life and the social form can - at least - be better understood and - and best - be acted upon or used.⁸

In many ways it is a pardonable error to assume that, since Snow spent a total of 22 well-placed years in the service of the British Government, and since his novels parallel modern historical events,⁹ that his work must therefore be directly and obviously political. But this would be a gross overstatement. It is true that Snow did actively pursue a first-hand experience of politics. As he himself said in the preface to his book on The Realists, such "experience can only be learned first-hand".¹⁰ Indeed it was this desire to gain first-hand knowledge of politics that brought Snow, in March 1963, to ask Maurice Edelman, a Member of Parliament, if he could "prowl around the House [of Commons]" so that he might "get it right" in writing Conscience of the Rich.¹¹ He once again alluded to his interest in the political disposition of modern society when he wrote in a personal note to Prime Minister Harold Wilson upon his resignation from the Ministry of Technology in 1966 that "you have given me a most privileged ring-side seat". Certainly Snow's pursuit of direct experience was in part driven by his literary requirements. But this was also driven by Snow's considerable ambition, by his desire to permanently escape his own social history and 'boy from the midlands' social background,

and by his attraction to - indeed by his sheer fascination with - society's ~~machinery of power. For beyond these, Snow rarely - if ever - directly~~ discussed matters of politics - even though he could be heard, as late as October 1970, addressing local Labour Party meetings in London.¹²

In part, Snow's avoidance of formal ideology and political criticism is traceable to the fact that he was bound to the service of British Government between 1940-44, 1945-60 and 1964-66. This required that he not directly discuss matters of politics. As he put it in Public Affairs:

I had been thinking about [politics] for a good many years....but I hadn't been free to express myself in public. This was because....I had been a public servant....I was bound by the obligations and conventions of the public service. It is an old, and on the whole valuable, convention that one doesn't make statements which bear directly on politics....[Anything I have said in public has been] within the rules.¹³

Learning, and then playing within, the rules of modern society was a very important part of Snow's world-view, and identifying the rules was a central aspect of Snow's political realism. As such, what a close reading of Snow's work reveals is, not a close documentary of Whitehall, but rather an articulate view of social change within mass society in which his non-utopian notions of 'the good life' and 'the good person' inform each other. In so doing, Snow never adopted the position of a political theorist in the manner of a Raymond Williams, a George Orwell or a Frank Raymond Leavis. Indeed,

evidence suggests that Snow's knowledge of formal social and political theory was almost non-existent, and that his reaction to the 'English Dreamer' ideas of Leavis and T.S. Eliot¹⁴ was strongly intuitive. Indeed, as a study of Paul Boytinck's authoritative bibliography reveals, Snow chose to review hundreds of books dealing with fiction, science, history, and history of science, but only twice - in the case of Raymond Williams' Culture and Society and Jean Paul Sartre's Iron in the Soul - did he review anything remotely associated with the social or political theory of modern society.¹⁵ Nevertheless it is clear that Snow himself was very much engaged in his own coming to terms with the broad political realities of the twentieth century, and in attempting to say something publically (through his literature) about these realities.

Perhaps nowhere else is Snow more firmly anchored as a political realist than in his own operative definition of 'politics' as "the power relationships of men in organized society".¹⁶ In so saying, he can be clearly identified with the traditional concerns of political realists - the art and transparent exercise of power, and the balance of power between private and public spheres.¹⁷ As those caught in the struggle of modernity already know, this does not come freely - as Snow emphasized and as we shall discuss. One freedom or responsibility is the next person's prison. But Snow - as a liberal political realist - did not wish to celebrate power. Rather, he meant to approach an understanding of it so that it could be used in the service of individuals.

More specifically, Snow sought (and, for himself at least, found) degrees of freedom within the confines of social institutions and responsibility. Yet he was never to forget the essential tension which exists between freedom and responsibility. His vision of 'the good society' reflected these values as the values of a vibrant civilization - independence, intellectual freedom, and individuality.

To liberal political realists such as Snow, the world must be seen as a thoroughly human place in which skillful people can, and must, work to create an open society.¹⁸ The realist also never believes that the State can ever provide or establish the conditions for goodness. It can only promote the conditions for happiness. In so far as this is true, political realists hold a deep-seeded belief in the possibility of social reform - but the responsibility for this change must rest with individuals while the form that change takes must be defined by the parameters of existing social institutions. Thus it is not surprising that Snow rejected proposals for radical social reform which came from 'the English Dreamers' as Snow refused to entertain any critique which sought social change on the back of an antithesis of scientific-industrial society.¹⁹ Nevertheless, Snow was well aware of the growing tensions of the modern Metropolis, and, through his framework, he did try to comprehend "the growing moral discontent of the West"²⁰ that modernity implied.

Like many other critiques of the modern condition, buried deep within Snow's assessment lie strong conceptions of progress, rationality, and history - but, for Snow, conceptions of history leaned less towards Walter

Benjamin's notion of "revolutionary nostalgia" and more towards Stendahl's "*promesse de bonne heure*". This tendency's animating character is most visible through his fiction - through Snow's 'New Man'.

But this is not to suggest that his assessment of modernity was fixed or static. Indeed, the optimism which Snow derived from his progressive images of science and which typifies his early-to-middle years underwent a decisive transformation over time and left Snow with a darkening vision of society. As Saguna Ramanathan has noted,²¹ the combination of science, aesthetics and politics which had once given Snow his sense of vigor, insight and public attraction had, by the end of his life, diminished in their explanatory capacity of the modern world. We will briefly discuss this aspect in the following chapter. For the moment however, it is important to understand Snow's perspective of the public sphere.

Snow rejected any assessment of modern public affairs which failed to comprehend the nature and growing influence of science. By ignoring science in this way, the successful mediation between the individual and society could not be effected. Snow's views of the importance of science should be clear. As we have seen, Snow argued that:

the scientific revolution is already performing, and has in fact performed, a structural transformation of modern democracy....²²

As a result of this simple fact, Snow argued, science must begin to be taken into account in any realistic attempt to progressively comprehend the nature of our contemporary condition. He underscored this view on numerous occasions saying, for example, that;

Whatever happens to us, our fate in the next fifty years depends on how far society can adjust itself to the new power science has put into its hands....Our culture will be a very mandarin affair unless it includes a knowledge of the most important single force in human affairs.²³

But nowhere did Snow make a more articulate presentation on this theme than in his Science and Government and in his 1971 Preface to his book, Public Affairs.

When Snow's three Godkin Lectures at Harvard University on November 29th, December 1st and 2nd 1960 were published in April 1961 under the name Science and Government,²⁴ they engendered a discussion which - while not as heated as those which surrounded the Reale Lecture - was nonetheless immediate and which seemed to have far-reaching importance for the futures of advanced Western nations. This was largely due to the fact that it touched on the national policy questions which had been recently and urgently brought to the fore by such events as the launching of Sputnik by the Soviet Union in 1957. Moreover, it was recognized that what Snow had to say dealt with the fundamental choices that nations had made

in the recent past and were sure to make in the future: choices such as those taken in England and the U.S.A. in 1940-41 to work on the fission bomb; or that taken in 1945 to go ahead and use the fission bomb; or the choice taken later in the 1940s to make a fusion bomb; or those taken in the United States and the Soviet Union regarding intercontinental missiles. In the Harvard lectures, and in order to discuss the current affairs of immense public import, Snow explored the relationship of science and scientists to the functions of government during World War II. In so doing he proposed several considerations for the future role of science in both periods of crisis and healthy democracies generally. In the course of Snow's lectures he clearly demonstrated why the New York Times had dubbed him a "story teller for an atomic age". Even at this level, the link between Snow's non-fiction and fiction cannot be broken.

The tale which Snow tells in Science and Government focuses on two men and two choices.²⁵ The men are Sir Henry Tizard, F.R.S. and F.A. Lindemann who, as Lord Cherwell, became "the right-hand man and grey eminence of Winston Churchill...."²⁶ Close friends since 1908, Tizard and Lindemann were to become bitter enemies by the 1930s. As the head of a government committee which was set up at that time to study air defences, Tizard was in the ascendancy of his career. Indeed Snow claimed that without Tizard, Britain would never have developed Radio Detection Finding (RDF), which later became known as RADAR, in time for the August-October 1941 Battle of Britain. But in May 1940, when Churchill became Prime

Minister and Lindemann became his scientific advisor, Tizard was quickly relegated to a comparatively minor scientific-military function.

The most important row between Tizard and Lindemann came in 1942 on the subject of strategic bombing. In that year a paper was issued by Lindemann (who was now a Cabinet member) claiming that the British bombing offensive must be directed essentially against German working-class homes. Although the ethics did not seem to bother Tizard, Snow asked

What will people of the future think of us? Will they say....that we were wolves with the minds of men? Will they think that we resigned our humanity? They will have been right."

Tizard and his allies were more concerned that Lindemann's calculations of the effect of such bombing were overly optimistic. He claimed, in fact, that Lindemann's claim that a total concentration of the bombing effort would destroy 50% of Germany's houses was 5 times too high. Indeed, P.M.S. Blackett claimed that it was 6-7 times too high. Tizard pushed the minority view and argued that a different strategy needed to be developed. Within the prevailing atmosphere which had the "faint but just perceptible air of a witch hunt" he was regarded as a defeatist. Lindemann won the debate and strategic bombing was "put into action with every effort the country could make."²⁷

Lindemann's policy was a failure as Tizard and Blackett predicted it would be. Indeed, post-war surveys indicated that the estimates used

by Lindemann were, in fact, 10 times too high! As Tizard wrote after the war, "no one thinks now that it would have been possible to defeat Germany by bombing alone....The effort in manpower and resources that we expended on bombing Germany was greater than the value in manpower of the damage caused."²⁸ Tizard believed to the end of his life in 1959 that, had he been listened to, the war could have been ended earlier and with less cost. "As one goes over the evidence," Snow stated, "it is hard not to agree with this."

From this story, Snow extracted a number of warnings for the industrial nations to consider. No nation's government science is 'freer' than any other's, nor are its secret scientific choices. "So we find ourselves looking at the classical situations of closed politics".²⁹ The relationship between Lindemann and Tizard is "the purest example of court politics"³⁰ - the attempt to exert power through a man with a concentration of power. Tizard's authority was over when he called on 10 Downing Street in 1940, and Lindemann - as Churchill's chief science advisor - "had more direct power than any scientist in history". Roosevelt also had a 'court', but no scientist ever became as intimate with him as Lindemann had with Churchill. Fortunately, Snow noted, Hitler kept his power all to himself. The relationship between Lindemann and Churchill thus - although noble and admirable in some ways - resulted in bad judgements in public affairs. "Bold men protested to Churchill about Lindemann's influence, and were shown out of the room".³¹

Although Snow conceded that there are no easy answers to the problems concerning the use of power in closed politics, he nonetheless believed that there are things that we must avoid in the future. He put these points quite simply. "I think most of us would agree that it is dangerous to have a solitary scientific overlord. It is specially dangerous to have him sitting in power, with not scientist near him, surrounded by politicians who think of him, as some of Churchill's colleagues thought of Lindemann, as the all-wise, all-knowing Prof."³² Even if the advisor is a Tizard or a Blackett, a Vannevar Bush or an Allan Bromley, the "obvious dangers outweigh the vestigial possibility of good.

Nevertheless, having said all this, Snow did believe that scientists should be allowed to be more active in all levels of government. At a somewhat superficial level, this position may seem paradoxical, but in reality it is simply a reassertion of Snow's emphatic belief in the responsibility of the intelligent and articulate individual to participate as fully as is possible in the shaping of society. Snow was also, of course, supporting the revision of British government practice to separate the science service from civil service within the government, as it allowed little migration of scientists into the mainstream bureaucracy during their careers. But more philosophically, at a time when society is clearly deeply troubled, the scientists, Snow felt, have something which society could make good use of - foresight. "I am not saying, of course, that scientists have foresight, and no one else has" but "science, by its very nature, exists in history....Scientists have it within them

to know what a future-directed society feels like....science itself, in its human aspect, is just that."³³ I have no doubt that Snow would have considerable difficulty in making such a strident claim today at a time when science has become tied to funding and missions that are influenced by the government or industry. But nevertheless, within the temporal context of these lectures, Snow's claim that bureaucrats, managers, and administrators have become masters of the short-term solution - that they had, in effect, created the need for scientists who could bring their gifts of foresight to problems of government decision-making - fell on interested and receptive ears.

In an appendix to Science and Government published in 1962, Snow slightly extended his argument to say of the military-*qua*-nuclear threat that

the longer I think about the way decisions have been taken, are being taken, and will continue to be taken, the more frightened I get.

We are forced to depend, "much more than is healthy for society" on the scientific judgement of a comparatively small number of men....Whatever we do, [narrow reliance as we had with Lindemann] must not [be allowed to] happen again."³⁴

Undoubtedly Snow's most succinct expression of the need for an understanding of the relationship between science and politics by both scientists and politicians came in 1971. In the Preface to his Public Affairs, Snow summarized his concerns as follows:

1. We - that is, most of the people in the world - are moving into great dangers. One is the possibility of thermonuclear war....
2. These dangers have been brought about by technology, or what we now call applied science: that is, our ability to understand, control and use certain features of the natural world. Technology has two faces, benign and threatening....
3. The only weapon we have to oppose the bad effects of technology is technology itself. There is no other. We can't retreat into a non-technological Eden

which never existed. We can't look into ourselves and take comfort from any doctrine of individual salvation....It is only by the rational use of technology - to control and guide what technology is doing - that we can keep any hopes of social life more desirable than our own; or, in fact of a social life which is not appalling to imagine.

4. This being so, people will have to understand what technology applied science, science itself is like, and what it can and cannot do.

5. The scientific decisions made inside government are, and will be increasingly, of critical importance. Often they have been taken by inadequate methods, or worse than that.³⁵

Of course this view runs counter to the views of such dystopians or Jacques Ellul - who had published his views in 1964. Ellul denied that major transformations in politics, economics, culture and ethics can have a significant impact on technology. Here particularly Ellul argued that humans really have no free choice over whether technology grows or how it grows. As he said:

at the present time, technique has arrived at such a point in its evolution that it is being transformed and is progressing without decisive intervention by man.³⁶

Underlying Snow's passages lies a more complex perspective which Snow brings to bear on the changing character of public affairs, and the way in which science and personal involvement is infused into the process of social

change itself. But in so doing, and as these passages suggest, Snow did not advance the views of technological utopians who sees the cure to social evils lying in the need for more technology. While he did see the scientific breakthroughs of this century as having profound social, political, and personal impacts,³⁷ Snow was also very early in recognizing the now widely accepted idea that problems which are essentially social and political in nature cannot be solved through technology.³⁸ Solutions to such problems can only be achieved by active individuals who have a deep understanding of the changing character of the age.

This character, which also implicitly contains both a revitalized and a revised social contract between the individual and society, is distinguished by developments beginning in the modern scientific revolution. As Snow pointed out, these included electronics, atomic energy, automation and cybernetics. "Materially", as he said, "our lives are bound by these developments".³⁹ Conceptually, as we suggested earlier, this is also fundamentally true.

However, Snow's conception is not unproblematic. Working on the basis of the Godkin Lectures and Public Affairs alone, we do not get a clear notion of the practical mechanics of Snow's views on science and social change. For instance if we were to extrapolate from his view that scientific decisions should not be left to the control of a very small number of individuals then are we correct in thinking that Snow thought widespread scientific

literacy and subsequent public participation in the policy process is a viable solution?

Although many have assumed that this is the case, Snow never went so far as to explicitly endorse this case. In fact, as Jon Miller, Kenneth Prewitt and Morris Shamos have all independently and authoritatively illustrated, while the level of scientific literacy in a population undoubtedly has important implications for science policy decisions in a democracy, the reality is that no individual today can hope to acquire and maintain a mastery of more than a very few political issues at any one time. Thus the modern citizen who chooses to follow political affairs opts for political specialization - that is, they select out of myriad issues those few in which he or she is willing to invest the time and money that is necessary to become and remain informed. The need for specialization springs from a combination of three basic forces. First, participation in the political process is but one of the many demands on the time of contemporary men and women. That many adults choose to devote a smaller share of their time to political affairs, in favour of more attractive and personally satisfying alternatives, can be seen in the steady decline of public participation in the political system over the last four decades. Even presidential elections, in the United States which command the highest level of public concern and participation attract a surprisingly low proportion of the eligible adults.

Second, the specialized information that is required to be knowledgeable about almost any given political issue is increasing rapidly. Issues

involving science fall into this category, as do most issues on the national political agenda.

Third, as our national political agendas become increasingly complex, it is also increasingly difficult to identify science as a discernible issue. Science and technology have become implicated in a spectrum of public policy issues from acid rain to trade. Thus hoping that a public will become sufficiently sophisticated to both follow science and participate in those policy issues in which science is implicated is simply not realistic.⁴⁰

All three forces work to narrow the political horizon, and thus deny - if this was indeed Snow's intention - the possibility of having a scientifically literate, publically active population. However on the other hand, if we were to extrapolate from Snow's view in the opposite direction and suggest that what he really proposed was a narrow concentration of power in the hands of scientists, then - not only would the whole point of Science and Government have been missed but - to so suggest would be to give Snow little credit for originality as this is a theme that John Kenneth Galbraith dealt with quite extensively in The New Industrial State as did Thorstein Veblen more than fifty years before him; i.e. the rise of technological elites and the growing primacy of expertise in modern society. Clearly neither perspective is adequate in trying to appreciate Snow. Thus, in order to finally grasp the full character of Snow's perspective on politics we must move beyond the Godkin Lectures and Public Affairs.

Snow said of his original conception of the Strangers and Brothers novel sequence in 1935 that

I had....a certainty of the major themes - in short-hand terms:....man-in society (including politics, but somewhat more than that), [and] man-alone.⁴¹

The distinctions between Snow's meaning of politics and that of other critics, all of which rest essentially on differing conceptions of the changing social contract between the individual and society, can be clearly seen.⁴²

As we have suggested earlier, Snow recoiled vehemently against the response to modernity offered by both Bloomsburian aesthetics and by the English Dreamers, arguing that these "intellectual luddites" acted as if "they wish[ed] the future didn't exist".⁴³ Snow totally rejected conceptions of "mass culture" or "mass society". 'Mass' notions were, in Snow's eyes, not only homogenizing culturally and erosive to the individual, but he also saw it as failing to realistically acknowledge the limited potential of individual action and of being acquiescent to the weight of an impermeable conception of 'social structure'. In rejecting the category and reality of 'mass society', Snow refused to accept - in a cynical fashion - the central themes of modernity: alienation and exile, even though the 'stranger' that he refers to in his sequence title was intended from the start to deal with the modern alienated condition.⁴⁴

This is not to say that Snow was blind to the problems of urban living. Indeed, Snow fully recognized the Metropolis as a cite of angst, and sympathized with the plight of the stranger in the modern world:

Nevertheless, Snow was not willing to relinquish his sense of social hope to angst. For Snow, the constructive potential of rationality was too powerful and too positive to ignore. As he argued - against both academic theorists and the condition that they describe:

Alienation is a smart verve word for a condition which is common among disaffected people anywhere. There are some people who will never comprehend their world; never be able to come to terms with it; never be able to get either the joys of fellowship or the joys of their own individual life....I cannot accept this fashionable....despair.⁴⁵

To Snow, despair - whether it manifests itself at a private, social or political level - is the most erosive of moods. It totally negates any possibility of progress or improvement. As he put it,

despair is a sin....It removes any chance of action, small as it might be.⁴⁶

Action which is based on despair is perhaps the most ugly manifestation of unprogressive behaviour which displays the schism between the private and public persona. Speaking in 1970, Snow stated unequivocally that

If you are performing as an anarchist, on the good graces of your parent's income, or on the good graces of the water and electricity services, this is real hypocrisy....Anarchy is not a respectable proposition. Or even an interesting one.⁴⁷

Clearly in such cases, Snow saw the working definition of modern society in these actions as being distorted in their highly unrealistic depictions of contemporary social change, perhaps ideologically based, and dangerously romantic.

At no point does the *raison d'être* for Snow's analysis of public affairs lie directing in countering specific assertions made by various cultural critics. Snow was never so anchored in the present as to address his disagreements to such individuals.⁴⁸ His is, instead, a much more diffuse, difficult and future-oriented *raison d'être* which arises from his growing sense of the apparent abdication of social responsibility in Western society and the active general apathy expressed towards formal political influence by newly disenfranchised groups (such as students) as well as by growing numbers of the mainstream citizenry. (Indeed, it only becomes possible to clearly locate the sources of Snow's own angst after 1968 during which time the student protests, the 'hippie' movement, the Chicago Seven trials, and the apparently general collapse of social order all signalled to Snow a crisis in his own conceptual framework.) Speaking as an observer of the state of public affairs

in the West, Snow - referring in passing to the Second Law of Thermodynamics - suggested that:

the depressed mood of the West may be a mixture of frictions, lack of decisions, self-woundings of a plural society; and the idleness and acedia, the gloomy apathy of affluence - all tending to maximum entropy or "mix-upness". This is not the whole of our mood, and naturally it is not constant, but it is there somewhere in the hinterland of many minds, and it is enough reason to be depressed.⁴⁹

However, in recognizing these problems Snow nevertheless rejected the analyses of romantics or counter-culture gurus. Snow's own response implicitly addressed each of the points highlighted by these thinkers. He recognized - at a deeply personal level - that aspects of human life appear to be tragic, such as the fact that *on mourra seul*,⁵⁰ but these are inexorable realities over which we have no control. We should only expend our energies on things that are within our power to change. As Snow said in The New Men:

to Martin it was jet-clear that, despite its joys, individual life was tragic: a man was ineluctably alone, and it was a short way to the grave. But believing that with stoical acceptance, Martin saw no reason why social life should also be tragic: social life lay within one's power, as human loneliness and death did not, and it was the most contemptible of the false-profound to confuse the two.⁵¹

Snow's refusal to abandon social hope, progress and social reform represents a steady commitment to cultural continuity and traditional wisdom (standing on the shoulders of others, as in science). But in so saying, it is important to recognize that these are not static or frozen in time - curios under glass. Instead, they are part of a dynamic, reiterative process. They are powerfully augmented in an ongoing fashion by new knowledge and assimilated into new forms of social organization. Thus what is truly tragic is if we allow ourselves to believe, even for a moment, that life is elsewhere - that we cannot affect the process of change. Putting it rather strongly, Snow believed that "if you don't live in society, you are a fraud."⁵²

Snow believed fundamentally that the exploration of the individual necessarily means the study of Man in society. Because he found that most men, if not all, can be understood adequately only if both the public and the private sides of their lives are examined, his analysis attempts to examine those interactions between Man and society. In Strangers and Brothers, life is a continual balance between the necessities and demands of social institutions and the needs and potentialities of individuals. Snow saw Man's fulfilment - including His own - as coming through his participation in society.⁵³ In Snow's series, then, it is not surprising that those who do not choose to live in a truly social life are anomalies - either world renouncing saints (like Martineau in George Passant and The New Man) or neurotics (Roy Calvert - who appears in The Light and the Dark, The Masters, George Passant, and Time of Hope).

In attempting to move towards a progressive understanding of contemporary public affairs and a realistic reconciliation of the private and public self, Snow's first concern was to examine the terms for a new balance between the legitimate claims for personal power. In order to do so he not only appealed to the level of theoretical abstraction which is often used to discuss the process of social change itself, but he also convincingly addressed the minutiae of decision-making in both its corporate and moral dimensions.

Snow began by establishing the basic premises which he adopted, and which he maintained throughout his career. Principle among these premises is that the relationship between the individual and society is symbiotic. Paraphrasing - or rather extending - Jacques Ellul's observation, there can be no disembodied social (or technical) change,⁵⁴ social change was, for Snow, entirely the result of the actions of individuals. The oppressive weight of institutions, such as colleges, research labs, or government departments, is not (in Snow's view) intrinsic to the institution but is more the result of a power matrix of individuals, institutions and histories.

A second reciprocal premise is that, apart from a core psychological character and predisposition, an individual's existence is created within the flux of society which embraces the full range of experience - from the construction of our physical and political environments to the organization of our ideas.⁵⁵ Snow's belief in the sociality of Man was well-grounded as Man was seen as gaining significance principally through his mastering and

manipulation of symbols, be they mathematical or linguistic.⁵⁶ This understanding was very much one of Snow's generation, and was represented by such diverse individuals as John Dewey who, in 1900, observed that "the individual mind is becoming defined by the social";⁵⁷ and Lord Annan who, discussing the rise of modern social science in 1959, noted that:

Nothing marks the break with Victorian Englandmore decisively than modern sociology....They no longer deal with "the individual" as the central concept in terms of which society must be explained. They [see] society as a nexus of groups....[which is] determined [by] men's actions.⁵⁸

Both of Snow's underlying premises are present throughout the range of his writing. However it is only when Snow defines his use of politics, as he did in 1961, that we can fully begin to discern the nature of his world view. This definition - which equates politics with "the power relationships between men in organized society" - is the key to Snow's reconciliation between public and private man, and to its limitations.⁵⁹

Snow began his conceptualization with a rather weak notion of "the individual" who, he says rather quixotically, is free:

nearly all of us....feel in a queer sense free, if we are in a set of circumstances that we know, however depressing that set of circumstances may be....[To] an extent, you're your own man....⁶⁰

The essential parameters of this condition are clear:

we all live our lives in terms of immediate existence; how are we getting on with our partners, what's happening to our children, what's happening to those closest to us, the state of our health, everyday success or the reverse - and so on.⁶¹

However these descriptions of what Bertrand Russell called "the atomized units of society"⁶² hardly seem capable of being either the basis for meaningful power relationships or the empowered rational actors who will achieve Snow's vision of social reform . In order to bolster them, Snow elaborated somewhat by injecting both realistic encouragement:

It is no use to project a future from a base of false hopes.⁶³

and an acknowledgement of strong social constraints:

How free are you to choose your work? From day to day? From week to week? From year to year? How free are you to explain it? How free are you to say what you think about it? How free are you to earn your living through your work? In your own country, in other countries, anywhere in the world? These couldn't be more simple and matter of fact questions.⁶⁴

Even these however fail to direct us. Indeed the missing ingredient of Snow's reformist equation is the belief that:

the moment you abstract man from society you don't make him any more interesting, you don't make him deeper, you make him more trivial.⁶⁵

Snow posed this proposition in a way that clearly appeals to the reconciliation of the public and private selves by asking:

in our world, can a man feel even remotely reconciled with himself unless he has tried to do what little he can in action?⁶⁶

This apparently simple query is itself a derivative of an ancient piece of rabbinical wisdom which Snow first came across in the 1930s at Cambridge and which inspired both his actions and his approach to action throughout his life. It reads:

If I am not for myself, who am I? If I am for myself
alone, what am I? If not now, when?⁶⁷

However it is through this sentiment that Snow importantly imbues his conception of "individual" with the quality of personal ambition. Personal ambition transforms our passive condition of "free will" into an active agent for change - or, what Snow called "acts of will" - through decisions.⁶⁸

Taken together, it is these judgements that collectively focus all of Snow's social critique and creative writings into a central conviction that Man's relevance only becomes manifest when (a) he is actively engaged in a quest for rational control over the social world around him, and (b) he is defined as a member of formal and informal organizations. Illustrating these principles we find, in Strangers and Brothers, George Passant asking the senior solicitor:

Did you make these people realize that I was acting
as a private person?

to which he replies:

My dear Passant, you ought to know that one can't draw
these distinctions.⁶⁹

and in The Search:

Get an unimportant job - and have an unimportant sort of life.⁷⁰

Frederick Karl amplifies this point, saying that in his fiction:

Snow....wants to show man functioning in the larger world, not man praying or playing, but man working and making, *homo faber*.⁷¹

Jerome Thale comments more generally, but at the same time recognizes the implied converse that in order to have an important life - in Snow's social terms - you must get an important job. Thale writes that:

Snow's fiction exemplifies the sociological truism that our sense of identity comes most strongly from our jobs. Lewis Eliot's work is at the centre of his personal life, and is the source and occasion of many moral crises which form his character. It is through work that he meets friends, and even his relations with his brother are strongly affected by their jobs.... As we see Lewis Eliot at the various stages of his career, we always know exactly where he stands in the professional hierarchy.... This is true even of the minor characters - they are identified in terms of their positions in professional and institutional hierarchies.⁷²

In part this reliance on one's affiliation and place in the hierarchy echoes Snow's fixation with his own transcendence through British class society and on the difficulty of his rise. But also it represents a realistic

acceptance of the character of the modern working world. However in so doing it suggests, within Snow's conception, the subservience of the worker to the dominance of the organization. Snow paid tribute - not to coal miners, secretaries and clerks, but - only to those who decide to become actively and rationally engaged in the operation of public institutions. Professionals would recognize themselves immediately in Snow's work. For Snow, particularly in his earlier period, the involvement of such people is the only progressive route to social change.

In some ways paralleling Jean Paul Sartre's view of the *artiste engagé*, Snow ascribed to the individual a moral responsibility - a redemptive role for curing the world of alienation.⁷³ Again, however, this is not the "radical transformative role of the intellectual" that Aronowitz, Giroux and others have called for.⁷⁴ Instead Snow argued that Man must constantly come to terms with himself in every act. In so stating Snow demonstrated his keen awareness of the fact that everyday life forces choices. The fact that a person can actually recognize the choices involved is, to Snow, an indication of his maturity. Often the decision itself is secondary to the realization that it has to be made. Accordingly, the burden of decision is the sole heroism that Man is ever called upon to bear. What Snow sought here - between his rational actor and modern society - was a fine balance indeed.

Snow's 'heroism of decision' is effectively available to all members of society, however, it only becomes an constructive form of social change when it can be combined with a sense of duty to one's friends and to one's

fellow Man, and when it can be engaged within the important, i.e. transformative, institutions around us.

For Snow, it was largely through professional occupations (or, at least, 'professional-style' behaviour) that a positive social and political position is gained. In today's context, this may seem rather commonplace. However the rapidly growing 'technocracy' (a phrase which was first introduced by J.D. Bernal in 1939)⁷⁵ was only beginning to become evident in Snow's developmental years. The period saw the growth of professions - most notably of a professionalised scientific research. These trends did not escape Snow's notice and served only to reinforce his view of the formative powers of the scientific revolution. Clearly, as we now recognize, the professions have come to be rigorously institutionalized within the capitalist system, influence many of the important decisions made within the system and wield a growing social power. Scholars as diverse as John Kenneth Galbraith and Cecelia Tichi have documented that it is these professional technocrats who are actively engaged in the process of changing the forms and conditions of our organizations, our environments, and our consciousness.⁷⁶ But in Snow's earlier and most optimistic period he had no doubts that he would himself join the heroic scientific profession, gain influence and bring about change. Typical of such self-assessments can be seen in such conversations as those found in Strangers and Brothers in which Snow says "I was making my way"⁷⁷ or as he himself is advised by the young, but established, local dentist, Arthur Morcom, that "I know that you want to help your friends from being kept

under. But you won't have the power to do it 'till you're firmly established yourself. Isn't it worth while to wait 'till then?'.⁷⁸

However, as Snow came to know in maturity, professional status does not in itself confer greater personal liberties, freedom or influence. Indeed in Snow's view, professionalism can - with the sole exception of the scientific professional - have the opposite to desired effect.

As Snow came to realize, the level of additional personal freedom that accrues to those with professional status is limited, and over time (as the individual moves deeper into the organization) this only becomes more so. While it is true that those in certain occupations, such as law and medicine (and here, Snow should have included science), are more or less free to choose to practice in other countries (thus giving them a slightly wider range of freedoms regarding their working lives), the impact of various mechanisms associated with professionalism is highly restrictive. The effect of codes of ethics, conduct and practice - not to mention the responsibility or *de facto*

contractual obligation that a professional has to his client - is to normalize and strictly monitor behaviour. As Snow succinctly put it, evidencing his partial understanding of this:

Professionalism....soon establishes a whole domain of acts you may not perform and things you may not do....⁷⁹

Here Snow's assessment has the attractive air of realism which comes of a man who seems to understand the way the world works. He recognized that decision-makers - i.e. largely professional who are in positions where some degree of power can be acted out - rely heavily on traditional wisdom, and on the values and rationality that their occupational backgrounds bring, although Snow himself never became fully aware of the ideological content of science or of his own training. But increasingly, Snow argued, decision-makers are having to deal with, and rely on, the fruits of cognitive wisdom (which is part of scientific wisdom) in addition to traditional wisdom.⁸⁰ Indeed, as we have seen, this was the central point of Science and Government.

The observations made by in Snow's Godkin Lectures are clearly attractive, extending several of the positions made during debates on the relationship between science, government and society which were made during the 1920s and 1930s. Lying beneath Snow's advice is a vision for the future reform of political power. This model was of Snow's privileged scientific

profession. Exemplifying this view, Sheriff exclaimed enthusiastically in The Search:

We're getting the power, and that's making our civilization the first stable one there's been. It's because it's the first civilization that has got hold of science....⁸¹

As Snow put rather baldly:

the scientific profession....gives us what we can call a model of what concrete or matter of fact freedom means".⁸²

For Snow, the reasons for this were quite clear:

By and large, the professional scientists have the possibility of acting more freely than any other collection of human beings on this earth. Answering my simple questions, they can say that as soon as they are out of their ordinary training or apprenticeship, that they can choose what kind of work to do. Their subjects for research are, at least in principle, at their own disposal....[The] scientists are entirely free as a rule, to publish what they have done, how and when they please. They can handle the results of their work however they like. Unlike other kinds of creative person, they are not normally immersed in any kind of commercial complex....There is another factor which separates the professional scientist decisively from the rest of us. Their skill is international in the fullest sense.⁸³

Much of this statement is frozen in the Cambridge of the 1930s - before the involvement of government and industry in scientific research that we have today.⁸⁴ Snow's view was in many ways congruent with the sentiment of the period. As Don K. Price wrote in his 1965 classic The Scientific Estate:

scientists, even those who have no other political interest, are interested in freedom. They are manifestly concerned for the freedom of their own researchThey like to believe that the inner spirit of scientific research is one of freedom, that the processes of scientific research require freedom, and that therefore the political influence of science must be in the direction of freedom - not merely for scientists but for Mankind."⁸⁵

However, what Snow clearly did not understand was the changing social contract which has emerged between science and politics. Science has, in effect, entered its 'post-heroic phase'.

As Thomas Kuhn has suggested, modern science has indeed become a profession complete with codes of ethics, behaviour, hierarchies, social legitimacy, and so on. However in so doing a sharp dichotomy has been made between "revolutionary" and "normal" images of sciences with the vast majority of scientific research now being comprised of normal or routine science. Clearly, while Snow's own research must be classified as being 'normal', his public vision of science was 'revolutionary'.⁸⁶ But today, such a clear-cut bifurcation may no longer be tenable. Indeed while Snow recognized that professionalization could curtail personal freedoms, he could not bring

himself to extend his understanding of this to the scientific profession itself. He retained his view of science as an open activity despite the fact that the professionalization of science was essentially the outcome of twin sources: that is extra-scientific pressures (demands from government, industry, the military, and so on) which were attempting to mould science to social need, and demands from within science aimed at developing broad-based social acceptance for scientific research and social influence for scientific knowledge. Thus what he did not fully appreciate was that the professionalization of science is itself a manifestation of the existence, at a deeper social level, of a principle of exchange which, it is often said, is the hallmark of modern industrial society. In the case of science, professionalization was a way in which groups with specialist expertise were able to obtain a degree of autonomy in return for delivering some other social good. This was an important development, not least because in adopting professionalization as a route to social legitimation scientists gave tacit acceptance to the validity of the principle of exchanging knowledge for something. Perhaps, as Snow intuitively understood and illustrated in fiction, all industrial societies achieve cohesion by means of a more or less complex network of exchange relationships. But it cannot be denied that such exchange relationships have come to be very narrowly interpreted because of the general presence of an experience with the production and sale of commodities. As many scholars have already noted, the march of industrialization has been, in some respects,

the march of commodification. In such a society even Snow's knowledge producers could not expect to be treated differently.⁸⁷

The limited recognition of the restrictions inherent in professionalization, and of their propensity to increase in weight and complexity as the system they support expands, forced Snow early on to realize that "most of the open decisions of society aren't made by single people....[but rather go] through the minds of very large numbers of people and [collect themselves] in points of decision-making."⁸⁸ In addition, Snow had come to understand that the decisions that mattered - the decisions that could affect the direction of social change - were not made in the open society at all but rather took place in the realm he called "closed politics".

On the occasion of Snow's Godkin Lectures, he outlined three forms of closed politics which are evident throughout modernity and the Strangers and Brothers series of novels. These he called committee politics, hierarchial politics and court politics.⁸⁹ Of committee politics, he wrote:

The archetype of all these is the kind of committee where each member speaks with his individual voice, depends on his personality alone for influence, and in the long run votes with an equal voice.⁹⁰

He defined hierarchial politics - that is, the politics of the chain of command, of bureaucracy and of large industry - as follows:

To get anything done in any highly articulated organization, you have got to carry people at all sorts of levels. It is their decisions, their acquiescence or enthusiasm (above all the absence of their passive resistance), which are going to decide whether a strategy goes through in time.⁹¹

This is a form of politics which has not yet received the attention it needs, if one is going to have any feel for how an elaborate organization is supposed to operate, but for how it does in fact. It cuts across all kinds of romantic stereotypes of official power. The top bosses of great corporations like General Motors or General Electric, or their English equivalents, could not act even if they wanted to, could not act by the intrinsic nature of their organization, like the proprietors of a small film company.⁹²

The form of politics Snow called court politics is defined as "attempts to exert power through men who possess a concentration of power".⁹³

The Tizard-Lindemann affair was, for Snow, a case in point of court politics. Lindemann and Winston Churchill "really did work together on all scientific decisions and on a good many others, as one mind".⁹⁴ Lindemann had no official position, and yet he made his unofficial position obvious

by holding his interviews in 10 Downing Street, or by threatening Churchill's intervention. Bold men protested to Churchill about Lindemann's influence and were thrown out of the room. Before long everyone in official England knew that the friendship was unbreakable, and that Lindemann held the real power. Before long also men had accustomed themselves to that degree of power and jumped up behind it; for an overwhelming majority of men find a fascination in

seeing power confidently used, and are hypnotized by it. Not entirely through self-seeking, though that enters too.⁹⁵

Snow concludes:

In all closed politics the three forms I have isolated - committee politics, hierarchial politics, court politics - interweave, interact, and shift from one to the other. This is independent of the objectives, which may be good or bad; it is simply the way men have to operate in order to get anything done at all. I do not mean that as satire. Satire is cheek. It is the revenge of those who cannot really comprehend the world or cope with it....So far as I have been able to observe anything, this is how the world ticks - not only our world, but also the future world one can imagine....It seems to me important men of good will should make the effort to understand how the world ticks. It is the only way to make it tick better.⁹⁶

These ultimately are the themes animating both Snow's fiction and his 'new man' ideal. The individual. Reason - based on international peer review, critical and honest intelligence. Personal power. Ambition. Closed politics. Social reform. It is clear from Snow's impressive perspective that what he presents to the reader is not just an articulate examination of important modern British social history. He also succeeds in constructing what in some ways is both a classical and a transitional modern hero in the form of the "public men" he chooses to portray. He does so, not because he feels he must counter the arguments of the aesthetic and political experi-

mentalists but, to help reveal the rational inner workings of the institutions that are most likely to be responsible for future social directions. As we have seen, in order to fulfill the demands of his chosen framework, Snow almost exclusively selected the university and research laboratory as well as the government department as his principal sites for the investigation of these themes. As he said: (Indeed as he said of all these sites): a college is a society of men.⁹⁷ Animating these sites in a way that no other modern author has is Snow's array of characters who are, almost exclusively, professional men - "public men" through whom social change and social stability is effected. Through these individuals, Snow portrayed the issues of our time, their struggle with modernity and in so doing addressed - and attempted to reconcile - the private self with the public man.

The fictional character of this investigation lies in Snow's portrayal of real choices which must be made by individuals: for example, the ambitions of professional men who are faced directly with ethical choices (as in the case of Charles March who must choose between a life at the Bar with a comfortable family fortune and life as a public physician with low wages and social esteem); or moral choices (as in the case of Martin Elliot who is a physicist working on the Atomic Bomb and who must come to political, practical and personal terms with America's use of the weapon, and subsequently with the new image of science which the War has delivered); or personal limitations (as with the scientist, Arthur Miles, who - after years of dedication to the dream of running a research laboratory - abandons the

dream because of an error of judgement in research); or with the limitations of others who are close to you (as with Lewis Eliot and his friends, Jack Cotery and George Passant, who irrevocably succumb to sensuality and idealism while Lewis helplessly watches on).⁹⁸

Snow's first novel, Death Under Sail (1932), brought critical attention to him as a novelist - as indeed it should have as this novel is a fine exercise in the genre of detection fiction, but it was with New Lives For Old (1933) that Snow's concerns were really initiated. A rather heavy-handed science fiction tale of biochemistry, ageing and the discovery of a rejuvenating agent, this book - which is obviously written in the style of H.G. Wells⁹⁹ - nevertheless contains an interesting reference to "consciousness" which was preoccupying Snow during this period...."consciousness of motive, awareness of one's emotions and those of the people around one, perceptions of the reasons behind the actions that human beings do."¹⁰⁰ The topic of the book may seem, by today's standards, stiff and farfetched but it was sufficient to bring reviewers of this anonymous publication to identify Snow as "one of the cleverest of our younger scientists".¹⁰¹

The story concerns the discovery of a hormone which would rejuvenate the human race. It is also concerned with the ethical effect that the discovery had on its discoverers: the not insignificantly named Professor Billy Pilgrim and his young co-worker David Callan, and on their friends and colleagues. Among the major problems created by the fictional rejuvenation process was the discovery that the hormone is more effective in men than in

women. Thus men seek out younger wives and lovers and the family unit ceases to exist. As well, the rejuvenating process became class structured: the poor die at the age of seventy or so while the rich - by paying one thousand Pounds - live on. A social revolution ensues and both Pilgrim and Callan struggles with the implications of their work. Foreshadowing the growing pessimism which descended on Snow in his later life, a character in the novel the sociologist named Bock, writes in his notes - a document entitled Statistics of the First Ten Years of Rejuvenation - that:

Unless one realizes how unlike one, and how like one, other human beings are, then there's no chance of recovery from an inferiority which is the dominant note of most of our lives.¹⁰²

In the end Callan himself says that:

I don't know whether science is important, or not, or anything. But if anything is important, then this work of mine [research] is - and if there is any hope for humanity at all, then science and art are the most important things that man can do.¹⁰³

The book illustrates unmistakably that the achievements of science have important social and political impacts and must therefore be governed by understanding and reasoned individuals.

Extending these preliminary examinations on consciousness and motivation in a science-influenced world, Snow explored the fictional world of personal power and decisions more directly in The Search (1934). The hero of this tale, which in part is based on Snow himself, is Arthur Miles. The story tells with great passion and energy the emergence of Miles' love for science.¹⁰⁴ The tension of the story becomes focused on his dreams for success in research (which include having a laboratory under his leadership at a very young age). This expresses the inner tension felt by all professionals of ability and ambition. While Miles sees his goal with clarity he is fully conscious of the costs. Initially the cost is Audrey Tennant, a girl who Miles probably should have married but whom, instead, he lost. A more important tension to Snow (and to Miles) is the ongoing need to reconcile ultimate truth (which is broader than scientific truth or knowledge) with human happiness. The power of the young intellects who are "finding their way" is made clear throughout. For example, in the midst of studying for exams and caught up in the excitement of the new physics, Sheriff says to Miles:

The people who have the power in their hands. Look at them. They're not like you, Arthur. They're not wider than the average. They're infinitely narrower.

"That's not fair, I said".

It's fairer than your picture of bright clear minds -
and everyone else in darkness.¹⁰⁵

The Search also provides Snow's first attempt to reflect directly on idealism and to reveal his awareness of the changing social organization of science which was taking place in the 1930s. Both of these come principally through the portrayal of J.D. Bernal in the character of Leo Constantine.

As we have already argued, Snow's view of idealism was that it more often than not provided "considerable heat but little light".¹⁰⁶ However, Snow was quick in the 1930s to acknowledge the wide continuum that idealism and intelligence could share. Elaborating on this, Miles characterized the personalities with which he would have to deal in matters of personal politics and human affairs as follows:

These verities seemed to me to fall into two main types. Perhaps this was a shape I imposed for myself and corresponds to nothing real; but they are types observed often enough before in human affairs and I still believe that they are not entirely artificial. Applying them to scientific thinking, I should call the first the problem-solving type; minds which choose out of the world 'round them a certain piece of experience and drive through to an explanation. The probing, analytical and pragmatic minds, which at their best can reach the heights of Rutherford and Darwin....In everyday affairs it is probably the commoner type of mind, and so the performances of its highest exponents seem familiar and easy to most

of us....which means that we under-estimate them unduly on the principle that what is not mysterious cannot be profoundly admirable. The second type, the abstracting mind, of which Constantine is an example, gets perhaps more than its share of admiration just because it is difficult for most of us to argue with, speaking as it does a different mental language from our own. These minds do not drive through a portion of experience; they wait for experience to make itself into shapes in their minds, they assimilate and correlate, find resemblances in different things, differences in similar things. At their best, in Faraday, Einstein, or, in my generation, Constantine, they are the great generalizers; at their worst they are infantilely fantastic and removed from all reality.¹⁰⁷

Furthermore:

[Constantine] was sympathetic, even interested; but irritably I was thinking how he and I saw people with different eyes, how individuals 'round him were shapes in an abstraction. A clever, wonderfully intricate, beautifully coloured abstraction of an ideal world - but that was his vision of things, and it was so alien to mine that he might have been speaking in a language I did not understand.¹⁰⁸

Reflecting on his distrust of idealism and on his belief in the need for a realistic understanding of how social change is effected by people Miles writes of his wife's parents:

They were ineffectual because their human beings were ideal; we may be ineffectual, but our human beings must at least be real. We want a liberal culture; but it has got to be based on human beings

driven by their fears and desires; human beings who are cruel and cowardly and irrational, with just a streak of aspiration....¹⁰⁸

One aspect of the changing social organization of science is portrayed in The Search through the focus on the establishment of a new research institute in Crystallography. Miles wants the Directorship. The senior Constantine was pushing hard for it. His was the new vision of science. Within this portrayal we can see the early crystallization of Snow's marriage between science and politics. It is all here; the personal ambition and politics, the vision, the public affairs. Here is a classic example of what Snow called committee politics. Snow's explorations in consciousness (New Lives For Old) are here revealed as mature, yet exuberant. The conversation at one of the meetings of the deciding Board goes as follows:

"For my part", said Austin, "I am in favour of Institutes of this nature. With safeguards. Such obvious safeguards as attaching them, both formally and in fact, to some University. We must see that an Institute doesn't become a research factory, doesn't altogether lose the atmosphere and contrast of a University."

"That's exactly what we do want to lose", Constantine burst out...."It's exactly that which will keep our scientific organization medieval, even when our individual science is years beyond its present level. Why should we pay all this lip service to Universities?....[they are] cluttered up with superstitions and religion and morals and social barriers, and [they add] on a little science as patronizingly as they dared."

We've got a problem here, a definite problem, which is the job of the Institute to solve."

Fane spoke over his shoulder, smiling: "I'm afraid I've not Mr. Constantine's faith in prior thought. If a thing's been done before we may not get the best, but we know how to avoid the worst."

"That's what you mean by tradition?" said Constantine quickly. Fane nodded.

"There might be more pretentious definitions. We ought to admit, though, that there is no end to tradition. Where you're dealing with something quite new, qualitatively new, different from anything we've ever had before; I know we usually pretend it isn't new, and smuggle it under the wing of our tradition. Like science in the University. But its an inept and frightened and inefficient way of doing things." Constantine's head was flung back, and his eyes were looking, not at Fane or any of us, but into the distance.

"Somehow we rub along," said Desmond. "Patch up the system here and there. We put Institutes into Universities and call them university labs. It seems to work."

"Our friend Desmond is right", Austin boomed. "That is the way we introduce our changes, unobtrusively, discreetly - why, anonymously, almost".¹¹⁰

For Snow, this would always ultimately be the essence of directed social change. The individual, bringing his or her intelligence to bear on public affairs, working with others, and pushing a result or outcome that - perhaps is revolutionary or incremental - to the outsider appears anonymous.

In the end, something like Snow in research, Miles commits an error in judgement and loses the Directorship. It becomes clear to him that

he had been placing his science second to his ambitions. In a painfully honest passage of inner conflict and moral decision which one cannot dissociate from Snow's own life, Miles says - after being told that he was being offered the Assistant Directorship:

I ought to get out of science. There is nothing for me now. Not for years. Macdonald was right (I resented him for being right). With patience and penitence and effort [I might get an Institute]....Why should I be patient and penitent? Why should drab and jealous men....get me in the end? Make me have a respectable success - after working respectably enough, dully enough. I should be tamed as everyone else was tamed. Either I got out of science or else I had to be patient and conform. If I got out, what could I do? I cannot afford gestures. Money and leisure I must have. I want them for themselves - and forthe freedom of which they are a sign....What can I do?....Industry? Scientific industry?....Scientific journalism?....It was a bad time to be unattached. Perhaps the world will never recover from this collapse (it was the August of 1931). Whatever I do, there will be some unpleasant years. In science the unpleasant years will be safe....Yet to think of going back. Watching the dullards gloat. Working under Tremlin. Having everyday a reminder of the old dreams. It occurred to me that I'd forgotten my devotion to science. It occurred to me that I had no devotion to science.¹¹¹

The Search stands today as one of the great novels of its kind, and certainly one of Snow's best. It brought the Nobel Prize winning physicist, I.I. Rabi, to write that it is "a novel that describes the world of science as lived by scientists from the inside".¹¹² Although in The Search Snow

succeeded in expressing his concerns and symbolically examining the dilemma of modern man who has pushed back the frontiers of his knowledge to little spiritual advantage, Snow claimed it was a "false start" in his literary career. His true start was to be Strangers and Brothers.

The subject of personal power and public affairs is strongly reflected throughout Snow's novel sequence. In discussing the theme of 'possessive love' which Snow sometimes referred instead of personal power and which Snow also identified in 1935 as being one of his key concerns, what he focuses on is ego domination or dependency between individuals. There are many examples of this kind of relationship throughout the series between pairings of individuals whom Snow has us watch closely. However the most important relationships center on Lewis Eliot: his relationship with his manic-depressive (and ultimately suicidal) wife, Sheila Knight, is one where the domination of wills, the exertion of power, and the willful denial of the self are paramount. There is no mutual trust. On the other hand, a more satisfactory relationship exists between Lewis and his second wife, Margaret, which is symbiotic and which is based on mutual respect.

Lewis also has deep relationships with George Passant, Roy Calvert and Charles March. George is a flawed idealist to whom Lewis is nevertheless deeply attached and of whom he says, registering thanks and deep indebtedness for encouraging him to go into Law and inspiring him with social hope:

Where should we have been, if George had not come to Eden and Martineau's? Where should we have been? We, the poor and the young. By birth we fell into the ragtag and bobtail of the lower middle classes. Then we fell into our jobs in offices and shops. We lived in our bed-sitting rooms....lost among fifty thousand houses in the town. The world seemed on the march, we wanted to join in, but we felt caught.¹¹³

Roy Calvert, a young and brilliant Orientalist at Cambridge who, at the outset of The Light and the Dark, notices that Lewis Eliot (quite apart from his frantic schedule of both teaching Law at Cambridge and consulting in London for an industrial firm) is troubled and urges him to confide in him. Lewis does so and tells Roy about his tortuous and unpredictable marriage to Sheila. The unburdening serves as a much needed release for Lewis, but the two are brought even closer when Roy reciprocates - telling Lewis of his own deeply troubling melancholic seizures. The bond between them grows to the point that they are nearly inseparable. In Roy's restless search for inner peace he tries to immerse himself in books and research, religion, people, and political dogma (fascism). Despite professional success and an intense intelligence, nothing seems to relieve his melancholia and he losses his life as a RAF bomber - a job which he transferred to from the comparatively safe Intelligence Branch, despite the fact that the new job was known to have the highest death rate in the service and despite what appeared to be his growing happiness in marriage with a new son.¹¹⁴ In trying to come to terms with this, Snow acknowledged that in some people, such as Roy, "a hereditary flaw"

is present which forces them into a fruitless search for something outside the self¹¹⁵ and which can't be overcome - regardless of will. In Roy's case,

he seemed to want to surrender his will, to be annihilated as a person".¹¹⁶

In many ways Lewis Eliot's summary of the relationship between Lewis Eliot and Roy Calvert can also serve as a description of private power:

We knew each other all through now, and we depended on each other more than we had ever done....We were each in distress, in our different ways we were hiding it....We needed to be looked at by eyes that had seen everything, would not be fooled, were clear, and pitiless, and whose knowledge was complete; we needed to the compassion of a heart which had known despair. So we turned to each other for comfort, certain that we should find knowledge, acceptance, humour, and love.¹¹⁷

Just as George Passant dominates Strangers and Brothers and Roy Calvert dominates The Light and the Dark, Charles March dominates The Conscience of the Rich in which the theme of possessive love is introduced through Mr. Leonard March's relations to his own son.¹¹⁸ Lewis Eliot and Charles meet while studying Law. They take their exams together, one moving into the offices of Herbert Getliffe and the other into the offices of Hart, an influential March relative. Charles, because of his status, always has work and is very profitable. Lewis, on the other hand, strives to get work from

Getliffe - but has yet to learn "the ropes" or gain acceptance. Charles knows all the ropes and in some ways - because of his traditional Jewish upbringing, the family wealth, his father's leading reputation in Law and, hence, his network of connections - owns the ropes. But Charles is not being satisfied simply by fulfilling his father's expectations. From this basic sketch of the novel unfold three major crises. The first is Charles' rejection of a career at the Bar in favour of medicine. Charles puts it most clearly:

The Bar represented part of an environment that I can't accept for myself....If I stayed at the Bar, I should be admitting that I belonged to the world - of rich and influential Jews. That is the world in which most people want to keep me.

The second is his marriage to the liberal, Ann Simon. The third is the threat to the social standing of the March family, brought on by Ann, by exposures of wrong-doing in the Communist paper, The Note, to which she contributes regularly. All crises, in effect, are brought upon the family by Charles. What is important in this triadic relationship between Lewis, Charles and Leonard is the acting out of wills in a turbulent time against social barriers and traditional norms.

The whole March hierarchy, reigned over by Leonard March who retired at the age of thirty-two to become a philanthropist, is structured to perpetuate its traditions. This is done not by religious fervour but by the expectations, responsibilities and guilt imposed by Leonard on his family, and

especially on Charles: i.e. by private power. Leonard no longer understands the world around him. He has previously suffered a loss of pride in the marriage of his two daughters: Evelyn, to a Jewish writer of uncertain means; and Katherine, to a gentile academic scientist - Francis Getliffe (brother of Herbert Getliffe, the lawyer, for whom Lewis works). And thus he will not tolerate any further abuse from his children, especially Charles upon whom his hopes for the family's future were pinned and who both turned his back on the chosen profession and planned to marry "a communist writer". The present is too straining for him. As he says to Lewis Eliot - dressed in a suit jacket - at one of his stuffy Friday soirees when he appears in a dinner jacket:

You mustn't mind my appearance. I'm too old to change my ways. You're all too bohemian for me. But when my children refuse to bring any of their friends to see their aged parent if they have to make themselves uncomfortable, I'm compelled to stretch a point. I'd rather have you not looking like a penguin than not at all.¹¹⁹

In an excellent piece of drama, Conscience of the Rich maintains a level of tension which is rarely achieved in modern fiction. The split between Charles and his father, which is developed with subtlety and mastery by Snow, brilliantly represents not only the complex tension between social, political and economic institutions in Britain during the 1930s, but also manages to be indicative of the splits between the rich and the poor, the

conservative and the liberal, and between generations. But in the final analysis what Leonard March is fighting against is the loss of power and protection over those he loves. As Lewis Eliot humorously recounts after a March family crisis:

They left out what none of us would find it necessary to tell in a family story: the fact that there was deep feeling in the quarrel....That Katherine, arguing with her father, felt more overawed and frightened than she could admit; that Mr. March felt a moment of anxiety, such as we all know as we see someone beginning to slip from the power of our possessive love.¹²⁰

What Snow demonstrates here is that, at least in this instance, his understanding of interpersonal relations, private power and ambition is thorough and truly compelling.

As has already been said, the themes of closed politics are best demonstrated through the novels The New Men, The Masters, The Affair, and The Corridors of Power. The New Men has already been mentioned. While the complete study that these books alone deserve is beyond the scope of this study, a sketch can certainly be provided of the committee, hierarchy and court politics found. In each of these four novels Lewis Eliot is either part of, or party to, political activities in which both personal power and public affairs are at stake. In the case of The Masters - which has been called the "most popular" and the "most self-contained novel of the series"¹²¹ - the personal

power struggle is between Paul Jago and Thomas Crawford. The public affair is the eminent election of a new Master for the Cambridge College.

Working within the high structured and organizationally layered environment of the college, Snow provides a range of characters through which to animate the politics of social change. Chrystal, an established scientist, is an empire builder who is "still capable of losing himself in hero-worship".¹²² Arthur Brown is managerial and thrives on having a position of respect within the college.¹²³ Winslow, the bursar, is wealthy, aloof and singularly unpopular.¹²⁴ Nightingale peaked too early intellectually and is, as a consequence, consumed with envy, bitterness and insecurity in middle age.¹²⁵ Jago, the senior tutor, is mercurial; "a man of deep feeling and passionate pride".¹²⁶ Despard-Smith, a cleric whose spirit has long dried up, lives out his days in bitterness and disappointment over the lack of recognition given him by his peers.¹²⁷ And finally M.H.L. Gay, the elder Fellow, is among the most spirited of the group. Lewis Eliot is, of course, a junior Fellow along with Roy Calvert. The year is 1937.

The novel begins with its central drama. The Master of the College, Vernon Royce, is - without knowing it - dying. He believes he has only an ulcer and will be back in charge at the beginning of term. The Fellows are told by Royce's wife, Lady Muriel, that he in fact has inoperable cancer.¹²⁸ A replacement must be made ready to step in for the sake of the College. The choice very quickly comes down to two men of very different sensibilities and skills; Jago or Thomas Crawford - or as Nora Graves has

observed, the humanist and the scientist -¹²⁹ and the remainder of the novel is essentially an observation of the Fellows agonizing over their choice, and the implications of what their decision will have for themselves and the College.¹³⁰

Arthur Brown, the manipulator and tactician *par excellence* presents Jago's name as Royce's successor to his closed group composed of Lewis, Calvert, and Chrystal. Nightingale - a theoretical chemist - is later added as is the nuclear physicist, Walter Luke. Upon his return from Switzerland Francis Getliffe is greatly disturbed both by the suggestion of Jago and by Lewis' support for him. Getliffe makes plans for another candidate and a second faction immediately develops which submits the physiologist Crawford. In quiet support are Winslow, Despard-Smith and Gay.

The characteristics, accomplishments and aspirations of the thirteen Fellows, interspersed by reports of the Master's condition, influential visits by the industry tycoon Sir Horace Timberlake, and finally the death of the Master, give momentum to the book in much the same way that the manoeuvring and shifting of allegiances lend suspense. All the while Lewis communicates his fresh view of the politics within a closed society of men.

In so doing, Snow continues his development of themes: of acts of will and being involved in affairs; of not being radical, but realistic; of having ambitions quietly fulfilled and of making a difference. Speaking of Brown and Chrystal, Lewis says:

These two were the solid core of the College, I thought. Year by year they added to their influence; it was greater now than when I first came four years before. It had surprised me then that they should be so influential; now that I had lived with them, seen them at work, I understood it better.¹³¹

For, though they were the least conceited of men, they had complete confidence in their capacity to "run things". Between them, they knew all the craft of government. They knew how men in a College behaved, and the different places in which each man was weak, ignorant, indifferent, obstinate or strong. They never overplayed their hand; they knew just how to take the opinion of the college after they had settled a question in private. They knew how to give way. By this time, little of importance happened in the College which they did not support....They accepted the world around them; they had no doubt they were being useful in the parts they played. As they piloted their candidate through a Fellowship election, or worked to secure [a sizeable benefaction] from Sir Horace, they gained the thrill that men feel at a purpose outside themselves....[In] College they formed the active, if sometimes invisible, part of a progressive government.¹³²

Snow portrays the force of ambitions and the vision that some have of how to make changes in society. Of Jago he says:

[he] enjoyed the dramatic impact of power, like Chrystal; but he was seeking other things as well. He was an ambitious man, as neither Brown nor Chrystal were. In any society, he would have longed to be first....He longed for all the trappings, titles, ornaments and show of power....[But] there was something else. He had just said to Chrystal "we can make this a great College". He believed that there were things that only he could do. Money did not move him in the slightest; but there was a quality

pure, almost naive, in his ambition. He had dreams of what he could do with his power.¹³³

But Lewis cautions, saying - in a way that reflects of Jago - that:

Envy and pique and vanity, all the passions of self-regard: you could not live long in a society of men and not see them often weigh down the rest.¹³⁴

Both Crawford and Jago are cautiously considered by the other camp. Calvert considers Jago's appeal to be the fact that he's "a man who knows something about himself. And is appalled. And has to forgive himself to get along".¹³⁵ In reply to Francis Getliffe's statement that Jago was not a distinguished scholar and was not what a Master should be¹³⁶ are countered by Elliot who says that "it's not so much what he's done as what he is, and as a human being there's a great deal in him".¹³⁷ Chrystal simply states: "Jago would do".

Of Crawford, Brown says he would be a disaster.¹³⁸ As a scientist he "wouldn't lift a finger for any of us".¹³⁹ "He'd have no feeling. And no glow. And not a scrap of imagination."¹⁴⁰ Getliffe, "a radical, like many scientists of his generation", counters that Crawford is one of the best biologist alive.¹⁴¹ The choice for Master is between the scientist described as "confident, impervious, conceited, self-assured" and a humanist who is said to be "sympathetic, emotional, anxious, and liberal". It is clear, however, that

the pivotal question does not rely on the simple distinction between the fields of arts and sciences. As the authoritative M.H.L. Gay puts it:

I should never give a second's thought to such a question....I have never attached any importance to boundary-lines between branches of learning. A man can do distinguished work in any, and we ought to have outgrown these arts and science controversies before we leave the school debating society.¹⁴²

An influential factor leading to the ultimate choice of Crawford over Jago however is the increased income for the College which comes from Sir Horace Timberlake. His somewhat less than scholarly nephew is a student at the College and the implication is that if the Tutors can get him through then Sir Horace might be interested in making a substantial benefaction. He "relished the power of giving or withholding money"¹⁴³ and he makes the conditions quite clear:

I'm only thinking aloud, you know what I mean. But it seems to an outsider that you haven't anything like your proper number of fellowships. Particularly on what I might call the side of the future. You haven't anything like enough fellowships for scientists and engineers. And this country is dead unless your kind of institution can bring out the first-rate men. I should like to see you have many more young scientific fellows. I don't much mind what happens to them, so long as they have their chance. They can stay at the university, or we shall be glad to take them in industry. But they are the people you want.

"Even the possibility of a benefaction is exciting," said Jago. "But I do agree with my colleagues. If the fellowships were limited to one subject, it would change the character of our society."

"You will have to change the character of your society in twenty years", said Sir Horace...."History will make you. Life will make you. You won't be able to stop it...."¹⁴⁴

Echoing this point from another perspective, Lewis says:

We talked about personal politics, of which, not only in the college, we had now seen a good deal. One point struck us both: will, sheer stubborn will, was more effective than cunning or finesse or subtlety.¹⁴⁵

The Affair, which takes place fifteen years after The Masters, portrays a similar struggle. Snow's setting is once again the College and again he examines the inside workings of closed politics. But this time - instead of electing a Master - the focus of Snow's novel is to show that justice (or rather, the decisions of a rational society) eventually triumphs despite the moral shakiness of the individuals who make the decisions.

The object of the story is Donald Howard, a young scientist who is accused of fraud and who, six months previously, had been dismissed from the College. He had been elected as a Fellow on the strength of research results presented in a dissertation under the supervision of the late C.J.B. Palairot. Howard - who is a Marxist, a wimpy character and a rather

unspectacular scholar¹⁴⁸ - never makes any claims in his defence. Howard's wife has pressed for the case to be re-opened. Lewis Eliot is drawn in as an expert in Law. The principal investigators are asked to re-consider the evidence of the case which hinges on a diffraction photograph.

At the outset, there is a very high degree of agreement within the College. The majority are satisfied that justice has been done: that Howard had engaged in "a piece of simple unadulterated fraud". The discovery came when two American researchers published in Nature that they hadn't been able to replicate the results of Palaret and Howard. Closer investigation by Skeffington and Nightingale shows that the photo - one of a series - had been enlarged to show the desired effect. The first note of discord comes from Skeffington who tells Lewis and his brother Martin after the college Christmas dinner that he believes the story of Laura Howard. Martin and Lewis are subsequently convinced enough to consider the case further. The dissenters are permitted to re-examine the late professor's papers which had been willed to the college. The process from this point is almost identical with those described in The Masters and The New Men. By December 28th, Lewis and Martin are convinced that an injustice has taken place. However there is a great deal of reticence amongst the Fellows and it takes until February for the trio to convince enough Fellows of the merits of their concern to have the Master issue a memo to the Court of Seniors authorizing the re-opening of the case. Of Skeffington, Lewis says:

I was thinking, Skeffington was a brave and honourable man. He had not had an instant's hesitation, once he believed that Howard was innocent. He was set on rushing in. Personal relations did not matter, his own convenience did not matter, nor how people thought of him. Both by nature and by training he was single-minded: the man had his rights, one had to make sure that justice was done. Yet, inside that feeling, there was no kindness towards Howard.¹⁴⁷

The proceedings drag on with arguments between factions trying, on the one hand, to ensure justice and, on the other hand, to ensure the stability of the conservative college (that is, keep it out of the papers, keep an unlikeable sort out of the College, and so on). The exasperated College of Seniors unhappily explodes at one point:

Now we listen to the voice of Science, disinterested and pure, the voice of Intellect at its highest.¹⁴⁸

while Tom Orbell (who started this appeal with his Lewis-Laura Howard dinner in London in September) also criticizes the proceedings by crying:

God knows I don't like Howard, but was one word said last night, was one word even thought, about the man himself? It was so de-humanized it made my blood boil. Have they forgotten what it's like to be human?¹⁴⁹

Lewis simply observes that he had forgotten "how intense and open the emotions could show in a closed society".¹⁵⁰ The events parallel those in earlier novels: faction meetings, dinners, formal hearings, High Table discussions, and so on.

The real edge of mystery enters the story when the photo in question goes missing. Lewis and Skeffington reason who could have both wanted the picture removed and had access to the Palairret Papers. At length Nightingale, who was pictured as the ageing and bitter bachelor in The Masters, now is portrayed as a happy individual - married and Bursar of the college. He still retains his personal qualities (pride, meticulousness) and in his college position he is beyond reproach. It is only the retired Paul Jago who can convince Arthur Brown that the present Nightingale is just as capable of removing the photograph for his own purposes as the former Nightingale who had slandered Jago's wife, thus causing her attempted suicide. After all, as a successful Bursar Nightingale would not wish anything to cloud the distinguished reputation of Dr. C.J.B. Palairret, F.R.S. who had just left the college £35,000 and in whose name Nightingale is planning to construct a college building. In the final analysis, Howard is proven innocent. Collective reason has delivered both practical and abstract justice over individual morals and prejudice.

Thus, throughout Snow's fiction, the themes of possessive love (private power) and closed politics in the intersecting guise of committee, hierarchy and court politics, are all consistently dealt with. What Snow

examines is the relationship between personal power and public affairs. What he examines is the motivating consciousness of social change embodied in the individual who - unlike the contention of many modernist writers - does not simply possess "free will" but is dramatically responsible for each "act of will". These are meaningful decisions of which the mature, rational person is constantly aware and which are most often tied to the fulfilment of personal ambitions. These ambitions are associated with both the inner tension for self realization and definition, and with the selfless urge to contribute to the shaping of the human condition. Professionalization, of which so much concern has been expressed, is - for Snow - but a social and political adaptation to the realities of the world so that individuals may fruitfully continue to pursue their ambitions. Snow recognized the emerging character of the twentieth century as being associated with science and its products. He also recognized the tightening bureaucratization of the West but, unlike others, he did not see the government departments, university colleges or professional offices which had come to dominate as being either impermeable to people or inalterable. Social change, for Snow, was simply a matter - albeit a complex matter - of sheer will. Snow's success and significance is in presenting, with realism and drama, the complexity, potential and chance implied in life. Change for Snow, however, did not in any way imply a rejection of the capitalist system. Indeed there is every indication that he was fundamentally sympathetic to it - attributing its apparent distress during this century initially to a natural reticence to come to terms with the new

character of the age; and subsequently to the undisciplined growth of unbridled "liberal values which placed the individual above all else".¹⁵¹

Of course, many would argue that 'unbridled' liberalism and 'unbridled' capitalism are indeed coterminous, and they would thus use Snow's remarks to argue that he was deeply a representative of mid-20th century conservative thinking. But this would be to miss his ultimate point. Like so many other liberal-socialist intellectuals such as John Maynard Keynes, Snow believed that the agritalistic economic system and the democratic political system could be humanized in such a way as to encourage the further development of the individuals' sense of individuality while not reneging their social responsibilities. This, Snow believed, could be done in such a way as to mitigate against the fragmenting - aesthetic, cognitive and political tendencies that represent the struggle that is modernity.

SECTION 4

EPILOGUE

CHAPTER SEVEN

C.P. SNOW AND THE STRUGGLE OF MODERNITY

Literature deteriorates only to the extent
that people deteriorate.

Goethe

C.P. Snow's conception of the individual self, of the nature of personal power, and of social change were all very much geared towards the struggle of modernity. His efforts were persistently in pursuit of the grounds upon which a reconciliation between the private and public sphere could be affected. His sustained effort to bring three major dispositions of modern life - literature, science, and politics - together in a realistic framework is one of the most significant efforts of the twentieth century. In his work, we are presented with an impressive understanding of each discrete component - both as it operates in isolation and as it relates to the larger world. Snow knew that thought was a beacon, not a life-raft, and that to confuse the two functions would be tragic.

There is no question here as to the importance of C.P. Snow's work. At the very least, his fiction ought to be read by successive generations of readers. His lectures ought to be required readings in university curricula. They are not only enjoyable and insightful but they speak directly to the condition of modernity. But in so saying we must realize the limitations of his writings and weight that modernity come to

represent in his framework. Snow knew that there could be a tragic error if thought was ever allowed to take a rigid mold too soon - if it was allowed to chose a destiny, like a Calvinist, in infancy instead of waiting for the wisdom that comes with maturity. But this was the very crevice into which he himself fell.

Snow never permitted himself to be caught up in the rapture of causes. He did however start his career with a measure of hopefulness. He refused, throughout his life, to admit to the power or utility of despair. The hopefulness of Snow's youth is widely evident (from the title of his novel Time of Hope, to the sheer optimism of his decision in 1935 to embark on a project that would consume thirty five years of his life and energy). As Saguna Ramanathan's critical introduction to Snow's novels has shown, the phrase Time of Hope itself carries with it a sense of transition and ultimate decline. The novel slowly unfolds its events and experiences that time has brought, and takes with it the hopefulness that has come with youth. This sense of decay underlies Snow's later novels in which a deepening pessimism is evident. Snow recognized this many times by noting that Man is alone. He also recognized this within himself in his preface to Public Affairs. His was a slow, eroding, cynicism that perhaps first is really noticeable only with the publication of Corridors of Power.

The reasons underlying Snow's 'darkening vision' will never be fully understood. But some of their likely causes and effects can be

suggested. Snow's unique career was one which thrived on its proximity to power and action. The time he spent in the labs at Cambridge imbued in him a blend of knowledge and experience which would never leave him and which would always be portrayed in light of 'the heroic'. The time he spent in government endowed him with an 'insiders view' of policy-making and public affairs that few of us have been privileged to see. These together gave Snow a tone of authority which fed his writing - but which didn't advance his framework. As Snow aged and began to spend more time on the lecture circuit (and away from his work), the proximity between the corridors of power and himself grew. The once constant stream of process insights began to dry. While Snow could be privy to the decision process he was creatively empowered. But as he slowly lost contact with the centre of power, he also lost his insightful edge which made his fiction so believable. The bouts with melancholia and depression which his friends supported him through grew more frequent. The distance between Snow, the completion of the project that he began decades before, and the fast moving world of science and politics grew and Snow was brought face to face with current events (student protests for example). His framework no longer seemed able to accommodate all that it was intended to embrace. By 1964, Snow was able to write in a letter to Harold Wilson that "I no longer believe that individual human people can have a decisive effect."¹

This slow collapse of Snow's realist framework manifests itself in what is effectively two sides of the same flaw. In the end, Snow's realism was too late in acknowledging that the sorts of organizations in which he had spent most of his life are only accessible to a very small group of people and the people who can have a decisive effect within these institutions is even smaller. Furthermore, Snow never seemed to overcome his aversion to radical or extreme behaviour - even though he was sometimes sympathetic to it in his youth. He never finally revised his conviction that the radicals working outside of organizations could ever have any appreciable and positive effect on the direction of social change. In part, this aversion to radicalism explains his reaction to Bloomsbury. Clearly, Snow's conceptual framework underestimated the relevance of mass society. It was also largely blind to the systematic connections between 'massification' and the *avant-garde* experience. If the study of the struggle of modernity is also to be a study of modern culture - and not just of chosen sections from it - then it must realize that the silences of modernity are as meaningful as its voices. However, equally as important - and as Snow relentlessly reminded us - the promise of enlightenment remains before us as an incomplete project. In order to embrace the potential of enlightenment at both a personal and social level modernity must somehow recover a relationship with cognition, responsibility and decision. Otherwise, we will have to surrender to history altogether.

But in no way must this erosion of hope be construed as a failure on the part of Snow. After all is said and done, what we effectively find in Snow is the voice of our *zeitgeist*. He was aware of the dangers presented to the individual on a daily basis. He was alive to both the tensions and potentialities of our period. Thus his efforts to achieve self-definition - to mediate between his own public persona and his private desires establish him as full participant in modernity. His own heroism of decision acts as a progressive model to those who are in search of totality. And yet, he was ultimately unable to sustain the reconciliation. He too ultimately collapsed under the weight of modernity. His full recognition of his own condition only came with a darkening vision which had been present in his framework all along and which had framed his unconscious sense of marginality within the technological urbanscape. But as such, Snow's effort and experience brought him face to face with the central tendencies of the struggle of modernity.

Thus in closing it can be said of Snow, using his own words, that "our idea of [him] has now changed enough for us to find a stable place [for him] to stand. Not so flattering, but much less immune to shock and supported by the firmest truths that we can discover. Truths, even bleak truths, are safer than false hopes."²

ENDNOTES

NOTES - CHAPTER ONE

1. See Martin Jay, Marxism and Totality, Berkeley, University of California Press, 1986; Daniel Bell, The Cultural Contradictions of Capitalism, New York, Basic Books, 1976; and Christopher Lasch, The Culture of Narcissism, New York, Warner, 1979.

See also Jurgen Habermas, The Philosophical Discourse of Modernity, Cambridge MA., M.I.T. Press, 1987; Lawrence E. Cahoone, The Dilemma of Modernity, Albany, State University of New York Press, 1988; William E. Connolly, Political Theory and Modernity, New York, Basil Blackwell, 1988; Timothy J. Reiss, The Discourse of Modernism, Ithaca, Cornell University Press, 1982; David Frisby, Fragments of Modernity, Cambridge MA., M.I.T. Press, 1986; David Kolb, The Critique of Pure Modernity: Hegel, Heidegger and After, Chicago, University of Chicago Press, 1986; Eugene Lunn, Marxism and Modernity, Berkeley, University of California Press, 1982; Michael H. Levinson, A Genealogy of Modernism: A Study of English Literary Doctrine, 1908-1922, Cambridge University Press, 1984; and "The Fate of Modernity", Special Issue of Theory, Culture and Society, 2, 3, 1985.

2. See the Special Issue of Theory, Culture and Society (Volume 2, Number 3, 1985) on "The Fate of Modernity".
3. See Janet Wolff, "The Invisible Flaneuse: Women and the Literature of Modernity", in Theory, Culture and Society, 2, 3, 1985, p. 37-48.
4. For a discussion of the public and private function in a civil society, see Philip Hansen, A Critical Philosophy and its Critical Limits: The Aesthetic Dimension of Hannah Arendt's Political Thought, Ph.D. Dissertation, University of Toronto, 1981, forthcoming from Polity Press (London).
5. Emile Durkheim, The Elementary Forms of Religious Life, trans. Joseph Ward Swain, New York, 1965, p. 489-490; Georg Lukacs, History and Class Consciousness, Cambridge MA, M.I.T. Press, 1971, p. 198; Lucien Goldman, "Interdependencies Between Industrial Society and New Forms of Literary Creation", in Cultural Creation and Modern Society, trans. Bart Grahl, St. Louis, Telos, 1976, p. 77.
6. Jurgen Habermas, op.cit., p. 6-7.
7. Krishan Kumar, Utopia and Anti-Utopia in Modern Times, Oxford, Blackwell, 1987, Chapter 6.

8. Irving Howe, "The Idea of the Modern", in Irving Howe (Ed.), Literary Modernism, New York, Fawcett, 1965, p. 34.
9. Michael Walzer, Obligations, Cambridge MA., Harvard University Press, 1970, p. 21.
10. See Allan Bloom, The Closing of the American Mind, New York, Simon and Schuster, 1986; E.D. Hirsch Jr., Cultural Literacy: What Every American Needs to Know, New York, Houghton and Mifflin, 1987; William J. Bennet, Our Children and Our Country, New York, Simon and Schuster, 1988; and Christopher Lasch, The Culture of Narcissism, New York, Warner, 1979, p. 175.

The new reconstitutive liberalism, however, is showing hopeful signs for re-emergizing the conception of the individual.' Stuart Hall, A Hard Road to Renewal: Thatcherism and the Crisis of the Left, Oxford, Polity, 1988.

11. Daniel Bell, The Cultural Contradictions of Capitalism, New York, Basic, 1976; Jurgen Habermes, 'Modernity -- An Incomplete Project', op.cit., p. 8.
12. Hugh Kenner, The Pound Era, Berkeley, University of California Press, 1971; Harry Levin, "What Was Modernism?", in Refractions, New York, Oxford University Press, 1960; Irving Howe, "The Culture of Modernism", in Decline of the New, New York, Horizon, 1970.
13. On the level of aesthetics, our dominant image of modernity has become one which is closely associated with a very small cadre of *avant-garde* artists. Indeed many leading cultural critics have, for many decades now, actually equated modernity with the literary and visual *avant-garde*. Frank Kermode, Hugh Kenner and Irving Howe, for example, have tended to use the terms interchangeably. As Howe as written, "the modernist writers and artists constitute....an *avant-garde*. Irving Howe, Decline of the New, New York, Braziller, 1970, p. 15. However useful for analytical purposes, this demarcation is far too limiting for any understanding of modernity as a pervasive condition. It artificially separates the artistic impulse from the socio-cultural totality which is its source and thus has become coopted by modernity. If the artistic strategies of modernity and the *avant-garde* could be reduced to the level of pure linguistics, then one might be justified in attempting such a narrow and all-inclusive 'theory of modernity'. But one cannot. As Peter Burger has argued in his Theory of the Avant-Garde, our aesthetic view of modernity has changed from being a view which promoted creative innovation to one which thrived on cultural negation. In so doing, aesthetic modernity -- narrowly conceived -- has lost its concern with the

status of art is society. It has lost, in effect, its urge to totality. And in so doing, it has rejected an essential postulate of modernity that accepts interpretation and creation are essentially political -- politics has become the absolute horizon of modernity. It is thus inauthentic for the strategists of narrow modernism to claim exclusive insight into our contemporary condition exclude other possible interpretive strategies. As we will discuss in some detail realism -- notably literary, scientific and political realism -- also has much to usefully say to us about the struggle of modernity and about our personal guests for totality in a period in which both the conceptions and the reality of 'the individual' is being radically altered.

14. Lionel Trilling, Freud and the Crisis of Our Culture, Boston, Beacon, 1955, p. 102.
15. See Leo Marx, The Pilot and the Passenger: Essays on Literature, Technology and Culture in the United States, New York, Oxford University Press, 1988; Lisa M. Steinman, Made in America: Science Technology and American Modernist Poets, New Haven, Yale University Press, 1987; and Cecilia Tichi, Shifting Gears: Technology and Culture in Modernist America, Chapel Hill, University of North Carolina Press, 1987.
16. C.P. Snow, "The State of Seige". This address was first delivered as the John Findley Green Foundation Lecture at Westminster College, Fulton, Missouri, in 1968. It was subsequently published in school magazine. This quote is taken from page 203 of Public Affairs, New York, Scribner's, 1971.
17. Lionel Trilling, "A Sense of the Past", in Ed Primeau (ed.), Influx: Essays on Literary Influence, New York, Kennikat Press, 1977, p. 23.
18. Hugh Kenner, The Mechanic Muse, New York, Oxford University Press, 1987, p. 10.
19. Ibid..
20. Charles Baudelaire, The Painter of Modern Life, And Other Essays, trans. by Jonathan Mayne, New York, Phaiden, 1965, p. 1-5, 12-24.
21. It seems that Snow told Nolan of Macmillan Publishing's plan for a unified series of Strangers and Brothers. Nolan then offered to paint covers for some of the series. These resulted in the covers for The Masters, Corridors of Power as well as The Affair and Homecomings (which feature the same cover).

22. These are quoted from The Redfern Gallery Presents Sidney Nolan, London, May 1955, p. 12.
23. See Paul Boytinck, C.P. Snow: A Reference Guide, Boston, G.K. Hall and Co., 1980; William Cooper, C.P. Snow, London, Longmans Green, 1959; Robert Gorham Davis, C.P. Snow, New York, Columbia University Press, 1965; Nora C. Graves, The Two Cultures Theory in C.P. Snow's Novels, Unpublished Doctoral Dissertation, University of Southern Mississippi, Hattiesburg, 1967; Robert Graecen, The World of C.P. Snow, Scorpion Press, Suffolk, 1962; Frederick Karl, C.P. Snow: The Politics of Conscience, Carbondale, Southern Illinois University Press, 1965; Saguna Ramanathan, The Novels of C.P. Snow: A Critical Introduction, London, Macmillan, 1978; Jerome Thale, C.P. Snow, London, Oliver and Boyd, 1964; Ruth M. Walsh, C.P. Snow: Poet of Organizational Behaviour, Unpublished Doctoral Dissertation, University of South Florida, 1976.
24. Robert Fulford, in a conversation with the author, Toronto, September, 1989.
25. "Snow's role was to combat [traditional aristocratic ideologies] in the name of science and technology, in what I think Leavis rightly describes as a kind of neo-Wellsianism. His literary traditionalism (defense of realism and suspicion of modernism) go along, I think, paradoxically, with since realist aesthetics are also part of the Wellsian package." Personal letter to the author from Terry Eagleton, March 1, 1984.
26. John Halperin, C.P. Snow: An Oral Biography, Brighton, Harvester, 1984, p. 60.
27. This is reported in William L. Shirer, The Rise and Fall of the Third Reich, New York, Norton, 1960. Snow's names appeared as 'Charles Snow - scientist' and 'C.P. Snow - novelist'.
28. These were Nights Ahead, The Fool of the Family (1949, co-authored with William Gerhardt), Family Party (1951 (co-authored with Pamela Hansford Johnson), Her Best Foot Forward (1951), Spare the Rod (1951), The Pigeon with the Silver Foot (1951), To Murder Mrs Mortimer (1951), and The Young and Ancient [sic] Men (1952).
29. The Strangers and Brothers sequence of novels is made up of Strangers and Brothers (1940 - later retitled George Passant), The Light and the Dark (1947), Time of Hope (1949), The Masters (1951), The New Men (1954), Homecomings (1956), The Conscience of the Rich (1958), The Affair (1960), Corridors of Power (1964), The Sleep of Reason (1968), and Last Things (1970).

Novels which stand outside the series are Death Under Sail (1932), New Lives For Old (1933), The Search (1934), The Malcontents (1972), In Their Wisdom (1974), and A Cost of Varnish (1979).

30. Paul Ricoeur, Hermeneutics and the Human Sciences, Cambridge, Cambridge University Press, 1981; John B. Thompson, Critical Hermeneutics, Cambridge, Cambridge University Press, 1984; Paul de Man, op.cit..

NOTES - CHAPTER TWO

1. See, for example, the novels by William Cooper in which the main character is based on C.P. Snow. Scenes From A Provincial Life, Scenes From A Metropolitan Life, and Scenes From A Married Life.
2. Saguna Ramanathan, op.cit..
3. Snow tended to portray his family roots as being lower than they actually were in fact. This was confirmed in an interview with Philip Snow in Angmering, Sussex, May 1989.
4. The actual address was 40 Richmond Road, Leicester. See Philip Snow, Stranger and Brother, London, Macmillan, 1982, p. 2.
5. John Snow, Snow's great grandfather in many ways represented the ideal of Jeremy Bentham and Samuel Smiles' Victorian 'Self-Help Movement' credo in which the Mechanics' Institutes Movement played an important role. See John de la Mothe, Ideology and Scientism: Educational Aspects of Scientific Associations in England, 1650 -1852, Unpublished M.A. Thesis, Concordia University, Montreal, 1982, p. 131-179.
6. See Philip Snow, op.cit., p. 11-12 and Harold Silver, "Aspects of Neglect: The Strange Case of Victorian Popular Education", in Oxford Review of Education, 3, 1977, p. 57-69.
7. Philip Snow, op.cit..
8. As a result of his bankrupt status, Snow's father could not own any real estate or property. This was confirmed in an interview with Philip Snow in Angmering, Sussex, May 1989.
9. Jack Simmons, Leicester: Past and Present - Volume 1, Ancient Borough to 1860, London, Eyre Methuen, 1974, p. 184; and Jack Simmons, Leicester: Past and Present - Volume 2, Modern City, 1860-1974, London, Eyre Methuen, 1974, p. 151.
10. George Dangerfield, The Strange Death of Liberal England, Paladin, London, 1972; Richard Bentley, The Liberal Mind: 1914-1929, Cambridge, Cambridge University Press, 1977.

11. Chris Baldick, The Social Mission of English Literature, London, Oxford University Press, 1983; Gary Werskey, The Visible College, London, Allen Lane, 1978.
12. This was a phrase Snow was to use often while lecturing in the United States between 1960 and 1979 regarding science and its relationship with and government. In these talks 'science' nearly almost meant 'physics and biochemistry'. Note the title of Snow's final book: The Physicists: The Generation That Changed the World". For a discussion of 'radical science' see the work of Gary Werskey, The Visible College, op.cit.; and Marcus Gilbert, The Social Relations of Science Movement, Unpublished M.Sc. Thesis, Sussex University, 1971.

For Snow's scientific research see Nature and the Proceedings of the Royal Society during the period 1929-1935. These are discussed in depth in Chapter Five.
13. C.P. Snow, Richard Aldington: An Appreciation, Heinemann, London, 1938; "Science and Conscience: A Letter From Mr. Aldington", in Discovery, N.S., 1, No. 9, Cambridge, December, 1938.
14. Leon Edel, Bloomsbury: A House of Lions, New York, Avon Book, 1979; Richard Deacon, The Cambridge Apostles, New York, Farrar, Straus and Giroux, 1985.
15. Noel Riley Fitch, Sylvia Beach and the Lost Generation, New York, Norton, 1985; Shari Benstock, Women of the Left Bank: Paris, 1900-1940, Austin, University of Texas Press, 1986; Humphrey Carpenter, Geniuses Together: American Writers in Paris in the 1920s, London, Unwin and Hyman, 1987.
16. G.H. Hardy was a member of both the Society of Apostles and the Heretics' Club which, at the time, was under the leadership of P.M.S. Blackett, and among J.D. Bernal's favorite books was James Joyce's Ulysses. Aside from such minimal contacts, however, the 'two cultures' actually existed at Cambridge. They were, in fact, cherished and nurtured for their elitist qualities.
17. Reference here is made to Snow's Strangers and Brothers series as well as to Walter Benjamin's Theses on the Philosophy of History.
18. Gary Werskey, "British Scientists and 'Outsider Politics, 1931-1935", Science Studies, 1, 1971.
19. Shari Benstock, op.cit..

20. Leo Marx, From Pilot to Passenger: Essays in Literature, Technology and Culture in America, New York, Oxford University Press, 1988.
21. William W. Lowrance, Modern Science and Human Values, New York, Oxford University Press, 1985.
22. Tony Benn, Out of the Wilderness, London, Hutchinson, 1987.
23. Hugh Kenner, The Pound Era, Berkeley, University of California Press, 1971.
24. Eric Hobsbawm, Industry and Empire, Harmondsworth, Penguin, 1977.
25. Jerrold Seigel, Bohemian Paris, New York, Viking, 1986.
26. Ian Watt, The Rise of the Novel, London, Hogarth Press, 1987; Raymond Williams, The English Novel, London, Hogarth Press, 1984.
27. E.J. Hobsbawm, op.cit..
28. Keith Pavitt, Technological Innovation and British Economic Performance, London, Macmillan, 1980.
29. Eric Hobsbawm, op.cit.; Christopher Freeman, The Economics of Industrial Innovation, London, Frances Pinter, 1986.
30. Modris Eksteins, The Rites of Spring: The Great War and the Birth of the Modern Age, Toronto, Lester and Orpen Dennis, 1989.
31. C.P. Snow, The Conscience of the Rich.
32. D.H. Lawrence, Kangaroo, Harmondsworth, Penguin, 1980, p. 54.
33. Quoted in Boris Ford (editor), The Modern Age, Harmondsworth, Penguin, 1978, p. 14.
34. Quoted in ibid..
35. Ruth Benedict, Patterns of Culture, New York, Norton, 1934, p. 18.
36. The scientific community at this time held themselves to be principally an open, international community. See Gary Werskey, op.cit..
37. T.E.B. Howarth, Cambridge Between The Wars, London, 1978, p. 27.
38. These statistics were provided in May 1987 by the Central Statistics Office (London), and by the University Statistical Record (Cheltenham).

39. Malcolm Cowley, Exile's Return: A Literary Odyssey of the 1920s, New York, Viking, 1951, p. 38.
40. Quoted in Andrew Sinclair, The Red and the Blue: Intelligence, Treason and the University, London, Weidenfeld and Nicholson, 1986, p. 21.
41. Clive Bell, Civilization: An Essay, London, Chatto and Windus, 1928, p. 221.
42. Arthur Koestler, quoted in Clive Bell, ibid., p. 41.
43. Wyndham Lewis, "Kill John Bull With Art", in Outlook, XXXIV, July 18, 1914, p. 74.
44. W.H. Auden quoted in Robert Hewison, Under Seige: Literary Life in London, 1939-45, Newton Abbott, Reader's Union, 1978, p. 1.
45. Cyril Connolly, Enemies of Promise, London, Routledge and Kegan Paul, 1938, p. 14.
46. Ibid., p. 23.
47. Cyril Connolly, in Horizon, December, 1940, p. 6.
48. George Orwell, Collected Essays, Volume Two, Harmondsworth, Penguin, 1976, p. 137.
49. C.P. Snow, Strangers and Brothers, p. 206.
50. This was the phrase he used in a New Statesman article from October 1940.
51. New Statesman, December 14, 1940, p. 13.
52. Mrs Robert Henley, "The Liquidation of the Free-Lances (By One of Them)", in New Statesman, 1946.
53. C.P. Snow, "A New Means of Destruction", in Discovery, Cambridge, September, 1939.
54. Quoted in Robert Hewison, Under Seige: Literary Life in London, 1939-1945, p. 31.
55. George Orwell, The Collected Essays, Journalism and Letters of George Orwell, Volume One, Edited by Sonia Orwell and Ian Angus, London, Secker and Warburg, 1968, p. 73.

56. Quoted in Robert Hewison, Under Seige: Literary Life in London, 1939-45, p. 23.
57. Susan Compton, British Art in the Twentieth Century, London, Prestel, 1987.
58. The phrase 'cubist of letters' was a title given Stein by The New York Times. Stein's diary recollections of Fry and Bell are quoted in Humphrey Carpenter, op.cit..
59. Lesley Johnson, The Culture Critics, London, Routledge and Kegan Paul, 1979.
60. Andrew Sinclair, op.cit., p. 17.
61. Richard Deacon, op.cit..
62. Michael Holroyd, Lytton Strachey and the Bloomsbury Group, Harmondsworth, Penguin, 1971, p. 53.
63. Ibid., p. 53.
64. T.E. Hulme, "Grafton", in Further Speculations, January 1914, p. 114, 115, 117, 118.
65. Julian Symons, Makers of the New, p. 32.
66. Ibid., p. 32, 45, and 60.
67. January 1914.
68. Ezra Pound, Sculpture, p. 68.
69. Manifesto, Blast, June 1914, 1, 7, 148. Among those associated with Vorticism were the Imagistes Richard Aldington and H.D. (Hilda Doolittle).
70. F.T. Marinetti, "A Futurist Manifesto", in New Age, 15, May 7, 1914, p. 16.
71. F.T. Marinetti, The Observer, June, 7, 1914, p. 7.
72. Ezra Pound, "Vorticism", in Fortnightly Review, XCVI, 1914, p. 461; Wyndham Lewis, "The Melodrama of Modernity", in Blast, 1 June 1914.

73. I. Bernard Cohen, Revolution In Science, Harvard University Press, Cambridge MA., 1986; Peter J. Kuznick, Beyond the Laboratory, Chicago, University of Chicago Press, 1987.
74. Gary Werskey, The Visible College: A Collective Biography of British Scientists and Socialists of the 1930s, Unpublished Doctoral Dissertation, Harvard University, 1977, p. 20.
75. Interview with Sir Herman Bondi, Churchill College, Cambridge, May 1987.
76. Marcus T. Gilbert, op.cit..
77. Werskey, op.cit., p. 21.
78. Robert Merton, The Sociology of Science, Chicago, University of Chicago Press, 1977; Thomas Kuhn, The Structure of Scientific Revolution, Chicago, University of Chicago Press, 1977.
79. G.H. Hardy, The Mathematician's Apology, Cambridge, Cambridge University Press, 1980, p. 34.
80. C.P. Snow, A Variety of Men. Snow points to Rutherford's lack of sensitivity in questions regarding applied science by using as example his 1933 prediction that the world was not to expect a new source of energy to emerge from the splitting of the atom. Others, including Andrew Sinclair however, have suggested that Rutherford was fully aware of the possible applications of atomic energy but made his statements in order to dampen press speculation. Indeed, Rutherford found the results so disturbing that he forbade any publication of the results until they had been proved. See Andrew Sinclair, op.cit., p. 51.
81. C.P. Snow, Chemistry, in H. Wright (ed.), Cambridge University Studies, 1933, London, 1933, p. 103.
82. Government expenditures on science grew from roughly £0.5 million in 1912 to more than £4.0 million in 1938. See Philip Gummett, Scientists in Whitehall, Manchester, Manchester University Press, 1980.
83. Gary Werskey, op.cit.; Andrew Sinclair, op.cit..
84. See Philip Gummett, op.cit.; Norman Vig, Science and Technology in British Politics, London, Pergamon, 1968.
85. Andrew Sinclair, op.cit., p. 26-31.

86. Hardy Papers, No. 137, p. 4, Archives of the NUScW and AScW, Warwick University, cited with permission.
87. Quoted in Richard Deacon, op.cit., p. 94.
88. See correspondence between Julian Huxley and C.P. Snow. I am grateful to the Julian Huxley Archives, Rice University, Texas.
89. Michael Polanyi, "The Republic of Science", in Knowing and Being, edited by Marjorie Greene, Chicago, University of Chicago Press, 1969.
90. Quoted in an interview with Gary Werskey in London, May 26, 1987.
91. Read Bain, "Scientist as Citizen", Social Forces, 11, March 1933, p. 413-414.
92. B.E. Schaar, "Scientific Method and Social Relations", Science, December 16, 1932, p. 555-556. In 1937, Waldemar Kaempffert reflected similarly on scientists' behaviour during the world war, recalling "the days of the war when even supposedly objective scientists lost their heads". [Letter from Kaempffert to James McKeen Cattell, November 18, 1937, Cattell Papers, Library of Congress.]
93. "Science - and Other Values", in New Republic, September 16, 1931, p. 114.
94. Thomas Kuhn, op.cit.; See also E.J. Dijksterhuis, The Mechanization of the World Picture, Princeton, Princeton University Press, 1986.
95. Watson Davis expressed this commonplace attitude when he wrote, "The remakers of civilization, the true molders of history, whose names so seldom are found in the chronicles of history, are the investigators engaged in scientific research. They are the catalysts of civilization". Watson Davis, "Science and Civilization", in Watson Davis (editor), The Advance of Science, New York, Garden City, 1934, p. 369.
96. In discussing 'scientific optimism', Gerald Holton wrote, "a comment attributed to Anne Roe comes to mind: On looking back at her book and distinguished studies on the psychology of scientists, she is said to have commented that the one thing all of these very different people had in common was an unreasonable amount of optimism concerning the ultimately successful outcome of their research. Whereas the stereotype of the humanists is that of a rear-guard group, gallantly holding up a flag of a civilization that is now being destroyed by barbarians, the scientists tend to feel that the most glorious period of intellectual history is about to dawn, and they will be there to make it

happen. As C.P. Snow has said, they have the future in their bones." Gerald Holton, The Scientific Imagination: Case Studies, Cambridge MA., Harvard University Press, 1978, p. 230.

97. Calder was the Herald's science correspondent in September and October of 1933. P.M.D. Collins, The British Association for the Advancement of Science and Public Attitudes to Science, 1919-1945, PhD dissertation, Leeds University, 1978, Chapter 4.
98. P.M.D. Collins, op.cit..
99. J.B.S. Haldane, Daedalus, or Science and the Future, London, Kegan Paul Trench Trubner, 1924, p. 4.
100. Bertrand Russell, Icarus, or the Future of Science, New York, Dutton, 1924, p. 62-63.
101. Julian Huxley, Scientific Research and Social Needs, London, Watts, 1934, p. ix. Quoted in Collins, ibid., p. 71.
102. Julian Huxley, The Listener, October 11, 1933, p. 527.
103. Julian Huxley, Scientific Research and Social Needs, London, Watts, 1934, p. 149.
104. Julian Huxley, The Listener, January 3, 1934, p. 25.
105. Ibid., p. 908.
106. The Listener, January 3, 1934, p. 25.
107. Ibid..
108. The Listener, October 11, 1933, p. 526.
109. The Listener, January 3, 1934, p. 24.
110. The Listener, December 20, 1933, p. 942.
111. Gary Werskey, "Nature and Politics Between the Wars", Nature, Vol. 224, November 1, 1969, p. 462-472.
112. P.M.D. Collins, op.cit..
113. Roy MacLeod, quoting an article from Nature, 104, November 6, 1919, p. 257, in his article "Resources of Science in Victorian England: The Endowment of Science Movement, 1868-1900", in Peter Mathias (ed.),

- Science and Society, 1600-1900, Cambridge, Cambridge University Press, 1972, p. 162.
114. Richard Gregory, Discovery, or the Spirit and Service of Science, London, 1919, p. 50.
 115. Gary Werskey, op.cit., p. 38-39.
 116. Werskey does not use the 'rationalist' category. See Gary Werskey, "British Scientists and 'Outsider Politics', 1931-1945", in Science Studies, 1, 1971, p. 63; P.M.D. Collins, op.cit..
 117. Gary Werskey, op.cit., Chapter 6; see also his "Outsider Politics", passim.
 118. Gary Werskey, "Radical Cambridge: Left-Wing Scientist in the 1930s", unpublished mimeo, February 1971.
 119. C.P. Snow, "Rutherford and the Cavendish", in John Raymond (ed.), The Baldwin Age, London, 1960, p. 247.
 120. Gary Werskey, op.cit., p. 207-210.
 121. Neal Wood, Communism and British Intellectuals, London, Gollancz, 1959, p. 79n.
 122. Joseph Needham, "Forward", Science at the Cross Roads, 2nd Edition, London, 1971, p. ix.
 123. J.D. Bernal, The Social Function of Science, Cambridge, M.I.T. Press, 1982, p. 406, and p. 393.
 124. Hyman Levy, Modern Science: A Study of Physical Science in the World Today, London, 1939, p. 97.
 125. Sir Norman Lockyer, the first editor of Nature, was the first Chairman of the British Science Guild. Sir Richard Gregory followed Lockyer into both positions. See W.H.G. Armytage, Sir Richard Gregory: His Life and Work, London, Macmillan, 1957.
 126. Snow was an acquaintance of Gregory and Hopkins, and was a friend of Huxley's. See the Huxley-Snow correspondence in the Huxley archives of Rice University, Texas.
 127. Quoted in Neal Wood, Communism and British Intellectuals. London, Gollancz, 1958, p. 142.

128. Rainald Brightman, 'Progressive Science and Social Problems', Nature, 134, September 1, 1934, p. 301.
129. Rainald Brightman, 'Industrial and Social Interactions', Nature, 134, October 13, 1934, p. 550.
130. Ibid..
131. Marcus Gilbert, op.cit., p. 53.
132. Ibid., p. 119.
133. Gary Werskey, 'Nature and Politics Between the Wars', Nature, 224, 1969, p. 466, quoting from the Nature leader of January 1932.

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1. The official name of the Cambridge Rede Lecture is the 'Sir Robert Rede Lecture'. The endowment was left to the University in 1524 by Sir Robert Rede who was the Chief Justice of the Common Pleas between 1506-1519. He had been a member of Buckingham College, a precursor to Magdalene, and afterwards a Fellow of King's Hall. The income of the Trust in 1914 was £9.9s.0d. The Lecturer is appointed by the Vice-Chancellor before the end of Michaelmas Term, and is required during his term in office to deliver one free lecture in Full Term at a time and place to be established by the Vice Chancellor. The Lecture, even today, is open to all comers without ticket.

In 1959, the Rede Lecture was held on Thursday May 7th at 5 o'clock at the Senate House which is the official meeting place of the University where degrees are conferred. The seating capacity of the Senate House is 360. However, local newspapers reported that the Lecture was to a "crowded audience", so - with standing room accounted for - there may have been as many as 400 present at Snow's talk. Reports also note that a unusual interest in the lecture was shown by the University's literary coterie.

2. See Arthur Kroker, Technology and the Modern Mind, Montreal, New World Perspectives, 1986; and John de la Mothe, "Everywhere the Electric: Science and Literature in the Age of the Cyber", in Canadian Journal of Political and Social Theory, May 1989, p. 166-174.
3. Jonathan Arac, Wlad Godzich and Wallace Godzich (Eds.), The Yale Critics: Deconstruction in America, Minneapolis, University of Minnesota Press, 1986.
4. See Dean W. O'Brien, "Between Two Cultures", in Donald Vandenberg, Theory of Knowledge and Problems of Education, New York, Illinois Books, 1969; Harry Wagshal, New Society? New Education?; Montreal, H.G. Press, 1979; Special Issue of The Journal of Higher Education on "The Liberal Arts College: Adaptation to the 1980s", Allan O. Pfnister and Martin J. Finkelstein, Ohio State University Press, 1984; and Henry Petroski, "Technology is an Essential Component of Today's Liberal Arts Education", in The Chronicle of Higher Education, November 14, 1984, p. 88.
5. "The Two Cultures", New Statesman and Nation, October 6, 1956, 52, No. 1334, p. 413-414; "Britain's Two Cultures: A Study of Education

in a Scientific Age", London Sunday Times, March 10, 1957, p. 12; "Britain's Two Cultures: A Revolution in Education", London Sunday Times, March 17, p. 5; The Two Cultures and the Scientific Revolution, Cambridge, Cambridge University Press, (May) 1959; reprinted in 2 parts in Encounter, 12, No. 1, July 1959 and 13, No. 1, July 1959; and "Two Cultures", in Science, 130, No. 3373, August 21, 1959.

6. "The 'Two Cultures' Controversy: Afterthoughts", in Encounter, 14, No. 2, February 1960; "The Two Cultures and the Scientific Revolution", in Library Journal, 85, No. 13, July 1960; "Education and Sacrifice", in New Statesman, 65, No. 1679, May 17 1963; "The Two Cultures: A Second Look", in the Times Literary Supplement, October 25, 1963; and The Two Cultures and a Second Look, Cambridge, Cambridge University Press, 1964.
7. See Paul Boytinck, C.P. Snow: A Reference Guide, Boston, G.K. Hall and Co., 1980.
8. References to 'Snow's two cultures' which do not reference the germane ideas of his lecture can be found in books as well as in such leading periodicals as The Sciences, New Scientist, Science and Public Policy, The Chronicle of Higher Education, The Times Literary Supplement, Bulletin of Science, Technology and Society, and The New York Review of Books. Marginal periodicals also refer superficially to Snow's thesis. See, as an example, Border/Lines, Spring, 1988.

Recent books that have come across my desk and which cryptically refer to Snow in this way include Maurice Goldsmith, The Science Critic: A Critical Analysis of the Popular Presentation of Science, London, Routledge and Kegan Paul, 1986; George Levine (ed), One Culture: Essays in Science and Literature, Madison, University of Wisconsin Press, 1987; Ludmilla Jordanova (ed.), Languages of Nature: Critical Essays on Essays on Science and Literature, New Brunswick, Rutgers University Press, 1987; Krishnan Kumar, Utopia and Anti-Utopia in Modern Times, London, Basil Blackwell, 1987; and Leo Marx, The Pilot and the Passenger: Essays on Literature, Technology and Culture in the United States, New York, Oxford University Press, 1988.

9. Paul Ricoeur, Interpretation Theory: Discourse and the Surplus of Meaning, Fort Worth, Texas Christian University Press, 1976, p. 21.
10. Paul de man, Blindness and Insight, Minneapolis, University of Minnesota Press, 1983, p. 110.

11. For some recent examples, see for Bulletin of Science, Technology and Society, Special Issue on "Technology and Literature", 7 No. 4, 1987; Essays in Arts and Sciences, "Science and Technology in Modern British Fiction: The Two Cultures", 8, September 1984; Science and Public Policy, 11, June 1984; The New York Review of Books, "Two Cultures Are One Too Many", December 14, 1986; The Chronicle of Higher Education, "The Two Cultures and Scientific Books", 1987; Border/Lines, "Radical Science", Spring, 1988; and "Physics and Fiction: Order From Chaos", in The New York Times Book Review, April 21, 1985, p. 1.
12. See for example Lawrence E. Cahoon, op.cit.; Leo Marx, op.cit.; and George Levine, op.cit., (Editor).
13. Witness for example, The Two Cultures in Contemporary Education, held at Simon Fraser University, Canada, February 1982; The Two Cultures and Science Studies, held at Queen's College, Oxford University, July, 1984; and Bridging the Gap: The Two Cultures Revisited, held at Douglass College, Rutgers University, January to March 1986.
14. See John R. de la Mothe, Science, Technology and Society: A Network Directory of Teaching and Research in Canada, the United States and the United Kingdom, Ottawa, Science Council of Canada, 1982.
15. Robert Gorham Davis, C.P. Snow, Columbia Essays on Modern Writers, No. 8, New York, Columbia University Press, 1965, p. 5.
16. Nora C. Graves, op.cit..
17. Aldous Huxley, Science and Literature, London, Chatto and Windus, 1963, p. 5.
18. Gertrude Himmelfarb, "In Defense of the Two Cultures", in The American Scholar, Vol. 50, 1981; and Marriage and Morals Among the Victorians, New York, Alfred Knopf, 1986.
19. Lance Schachterle, "What Really Distinguishes the 'Two Cultures'?", in Annals of Scholarship, New York, 1986, p. 91; George Levine (editor), op.cit., p. 3.
20. Lord Sherfield, "The Adventures of an Innumerate in the World of Science and Technology", in Science and Public Affairs, No. 1, London, 1986, p. 14.
21. Raymond Williams, "Foreward", in Ludmilla Jordinova (editor), op.cit., p. 11.

22. H.L. Nieburg, in Science and quoted on the cover of Gerald Holton (ed.), Science and Culture, Boston, Beacon, 1965. This collection contains essays by such prominent scholars as Herbert Marcuse, Edmund Leach, Talcott Parsons, Harvey Brooks, Margaret Mead, Don K. Price, Daniel Bell, Rene Dubois and Oscar Handlin.
23. Snow's friend William Cooper argued the contrary view; that "the fact that Snow has such a wide experience and understanding of life in England naturally gives what he writes a peculiar authority: his style, simple, unaffected and moving is such as to make what he writes immediately recognizable as plain truth." in William Cooper, C.P. Snow, London, Longmans and Gree, 1959, p. 37.
24. F.R. Leavis, The Two Cultures? or the Significance of C.P. Snow, New York, Pantheon, 1963, p. 29.
25. Edward J. Bloustien, "The 'Two Cultures' Debate: Implications for Education and Public Policy", at Rutgers University, Bridging the Gap: The Two Cultures Revisited seminar series, March 3, 1986.
26. November 20, 1936, p. 904.
27. Such as St. Andrew's University and the University of Oklahoma at Norman.
28. Interview with Maurice Goldsmith, London, June 1987.
29. Philip Snow, op.cit.. This point was reasserted by Philip Snow in an interview in Angmering, Sussex, May 1989.
30. C.P. Snow 'The First Excitement that Knowledge Gives', in Discovery, Cambridge, 2, # 13, April 1939.
31. J. and D. Needham, 'A Crystallographic Arrowsmith', in Nature, 134, December 8, 1934, Supplement, p. 890.
32. Ibid..
33. Ibid..
34. C.P. Snow, The Two Cultures and the Scientific Revolution, New York, Cambridge University Press, 1959, p. 17-18.
35. This lecture was succinctly reviewed by Mary Simpson, "The Snow Affair", in Bulletin of the Atomic Scientists, XIX, April 1963, p. 32.

36. See Harvey Brooks, The Government of Science, Cambridge MA., M.I.T. Press, 1968, p. 88-89; Don K. Price, "The Scientific Establishment", in Gilpin and Wright (eds.), Scientists and National Policy-Making, New York, Columbia University Press, 1964, p. 25, and 144-173.
37. C.P. Snow, "The Two Cultures", The New Statesman and Nation, October 6, 1956, p. 413. All references which follow unless specifically noted are to this page.
38. See Marshall McLuhan, Laws of the Media, Toronto, 1984; Ithial de Solla Pool, Technologies of Freedom, Cambridge MA., M.I.T Press, 1984; B.W. Powe, A Climate Charged, Oakville, Mosaic, 1984; B.W. Powe, The Solitary Outlaw, Toronto, Lester and Orpan Dennys, 1987.
39. C.P. Snow, "The Leavis Case and the Serious Case", in the London Times Literary Supplement, July 9, 1970, p. 739, column 3. It is interesting to note in this context that Stephen Hawking, the remarkable Cambridge cosmologist, has predicted the end of science within the first two decades of the next century, should the problems of the Grand Unified Theory be resolved.
40. All quotations here are from C.P. Snow, "The Two Cultures", in The New Statesman and Nation, October 6, 1956, p. 413-414.
41. Formal agreement to give and publish the 1959 Rede Lecture, was reached on December 19th, 1958 by Snow and H.S. Bennett (for the Syndics of the University Press, Cambridge).

For his efforts, Snow received the sum of 9 guineas which was the same fee as it was when the Lecture was established in 1525. See footnote 1 above.

The exchange of letters regarding Snow's invitation to give and publish the Rede Lecture took place between September 1958 and August 1959. These reveal a small but interesting dispute between Snow and the Press regarding the unacknowledged appearance of excerpts in Encounters and the Saturday Evening Post. I am grateful to Philip Snow and the Humanities Research Centre at the University of Texas at Austin for allowing me access to these letters. The correspondence between Snow and the Secretary of the Press, R.J.L. Kingsford, is especially interesting.

42. Snow notes this in his first footnote.
43. C.P. Snow, The Two Cultures and the Scientific Revolution, New York, Cambridge University Press, 1959, p. 4-5.

44. Ibid., p. 5.
45. Ibid., p. 3.
46. Ibid., p. 5-6.
47. Ibid., p. 9.
48. Ibid., p. 10.
49. F.R. Leavis, Two Cultures? The Significance of C.P. Snow, London, Chatto and Windus, 1963, p. 36.
50. C.P. Snow, op.cit., p. 11.
51. This constitutes section 3 of the Rede Lecture.
52. C.P. Snow, op.cit., 1959, p. 31.
53. Ibid., p. 31.
54. Ibid., p. 33.
55. Ibid., p. 23.
56. Ibid., p. 12.
57. Ibid., p. 25.
58. Ibid., p. 26-27.
59. Ibid., p. 8.
60. Ibid..
61. Ibid., p. 29.
62. Ibid., p. 6.
63. Ibid., p. 6-7.
64. Ibid., p. 27.
65. Ibid., p. 23.
66. Ibid., p. 12.

67. Michael Yudkin, "Towards One Culture?", Cambridge Review, 82, No. 2008, June 10 1961, p. 600-605.
68. Jon Cohen, "The Too Cultured", First Person, 1, No. 3, Spring-Summer 1961, p. 57-58.
69. Lloyd Fallers, "C.P. Snow and the Third Culture", Bulletin of the Atomic Scientists, 17, No. 8, October 1961, p. 306-310.
70. For a complete bibliography of the debate see Paul Boytinck, op.cit..
71. Norman Cousins, "The Third Culture", Saturday Review, May 7, 1966, p. 42. This criticism is somewhat difficult to maintain given that a standard examination technique in our education systems relies on the 'compare and contrast' types of question.
72. Lloyd Fallers, "C.P. Snow and the Third Culture", Bulletin of the Atomic Scientists, October 1961, p. 301.
73. Martin Green, "A Literary Defence of the Two Cultures", Kenyon Review, Autumn, 1962, p. 735-736.
74. C.P. Snow, The Two Cultures and the Scientific Revolution, op.cit., p. 16, 17, and 45. However, Snow did argue (in his Preface to his 1958 New York edition of The Search) that it made no sense to even suggest that everyone should be made into scientists or technologists. In A Second Look, Snow also mentioned molecular biology as another example.
75. Ibid., p. 13.
76. Richard Wollheim, "Grounds For Approval?", The Spectator, August 7, 1959, p. 168-169.
77. This lecture was given on February 28, 1962 in the Hall of Downing College. Although no journalists were allowed into the lecture, Leavis had leaked copies of his text to the press. He sold a handwritten copy to the editors of The Spectator who in turn secreted a copy to Snow, asking for his consent to print it. Snow considered taking legal action but instead agreed it should be printed. He wrote to Leavis on March 5 to ask for a copy of his final address, but evidence that a first class row was about to take place appeared in The Times on March 1 and The Sunday Times on March 4. The lecture appeared in full on March 9 in The Spectator.

78. F.R. Leavis, op.cit., p. 6.

79. Ibid., p. 9.

80. Ibid., p. 10.

81. Ibid., p. 11.

82. Ibid., p. 12-13.

83. Among those who championed Snow were: J.D. Bernal, William Gerhardt, J.H. Plumb, Dame Edith Sitwell, Stephen Toulmin, Susan Hill, J.D. Scott, Lord Boothby, Denis Lant, Anthony Storr, Lovat Dickinson, J.D. Bodington, G. Reichardt, Peter Green, G. Fraser, Ronald Millar, Sir Oliver Scott, Arnold Haskell, Michael Ayrton, and Bernard Miles.

Among those who championed Leavis were: Charles E. Raven, J.N.A. Guinness, Geoffrey Wagner, T.T. Roe, Remington Rose, Oswald Harland, Robert Kabak, and Neville Denny.

84. J.D. Bernal, letter, The Spectator, March 23, 1962, p. 365.

85. C.P. Snow, The Two Cultures and A Second Look, Cambridge University Press, 1964, p. 54-55.

86. Ibid., p. 62.

87. C.P. Snow, op. cit., 1959, p. 9.

88. C.P. Snow, op.cit., 1964, p. 68.

89. F.R. Leavis, Two Cultures? The Significance of C.P. Snow, London, Chatto and Windus, 1962, p. 38.

90. C.P. Snow, op.cit., 1964, p. 64.

91. A most insightful and useful assessment of Snow's hypothesis can be found in Leo Marx, "Introduction to the Two Cultures Debate", seminar delivered at Rutgers University, January 20, 1986.

92. Both can be found in J. Robert Oppenheimer, The Open Mind, New York, Simon and Schuster, 1955.

93. Alfred North Whitehead, Science and the Modern World, New York, New American Library, 1964, p. 175-176.

94. Quoted in Peter Stransky and William Abrahams, Journey to the Frontier, London, 1966, p. 46.
95. Matthew Arnold, "Literature and Science", in Prose of the Victorian Period, William E. Buckler, (ed.) Boston, Houghton Mifflin, 1958, p. 486-501.
96. See Loren R. Graham, Between Science and Values, New York, Columbia University Press, 1981.
97. T.H. Huxley, "Science and Culture", in Prose of the Victorian Period, William E. Buckler, (ed.), Boston, Houghton Mifflin, 1958, p. 526-537.
98. Leo Marx, op.cit.; Lynn White Jr., "Science and the Sense of Self", Technology and Culture, 1984.
99. Lynn White Jr., ibid., p. 3.
100. Leo Marx, ibid..
101. Ibid..
102. As we discussed in Chapter 2, the reactions of the literary community to the modern world were in fact quite energetic and diversified. Moreover, had someone used a similar technique to stereotypically refer to the scientific community, Snow himself would have responded very strongly against its validity, both in terms of fact and in terms of technique.
103. The major Luddite attacks were carried out in the years 1811-1817 in three areas of England: the West Riding, south Lancashire and Nottingham. Three trades were involved: the croppers (which was a skilled trade responsible for trimming, cleaning, pressing and shearing wollen cloth), the cotton weavers, and the framework knitters. The croppers were a section of the working class who had a reputation amongst the owners for being the least manageable group within this industry. They were regularly reported in the scholarly and historical literature as being "independent". The croppers had sufficient control over their work to impose fines on any owners who attempted to avoid any of the cloth finishing procedures and, in addition, a committee of workers themselves adjudicated all complaints by the owners about the quality of their work.

Luddite demands on management include the gradual introduction of work-displacing machinery accompanied by alternative employment, taxes of 6d per yard for machine-dressed cloth with the money going

to an unemployment fund, a legal minimum wage, controls on sweated labour of women and children, prohibitions on shoddy work, and the right to legal trade unions (a right which had been removed by the Combinations Act of 1799).

The acts of the Luddites, while terrifying to the middle-class onlookers of the time, developed out of a previous background of a combination of parliamentary lobbying and controlled direct action in the workplace. In the years immediately preceeding the insurrection, workers in the clothing trades maintained trade union integrity by a variety of methods: for example, they boycotted workers who undersold their labour. Over the period 1803-1806, the workers made repeated attempts to use existing legal statutes to control the introduction of new machines. The Yorkshire croppers, for example, spent between £10,000 and £12,000 on legal fees at a time when the average annual wage for a skilled cropper was £75. The destruction of machinery itself only began in 1811 after attempts at political action through the parliamentary route had failed. Even so, the machine breaking was carried out in a reportedly disciplined and almost military fashion. Destruction of machines was confined to wide frames which made inferior goods at lower prices, only cheaply made goods were slashed, Luddite bands were financed out of Trade Union funds, renegade bands severely dealt with, etc..

See David Albury and Joseph Schwartz, Partial Progress: The Politics of Science and Technology, London, Pluto Press, 1982; Eric Hobsbawm, The Age of Revolution, London, Sphere 1977; and E.P. Thompson, The Making of the English Working Class, London, Penguin, 1968.

104. E.P. Thompson, Ibid., p. 594.
105. For a review of these developments, see John R. de la Mothe, Ideology and Scientism, op.cit..
106. C.P. Snow, op.cit., 1959, p. 60-61.
107. This is quoted from an English seminar at New York University, 1968 and communicated in a letter to the author from A.H. Nicholson dated January 14, 1985. See also Snow's Recent Thoughts on the Two Cultures, An oration delivered at Birkbeck College, London, December 12, 1961.
108. Philip Snow writes that "[Snow] was also too busy to accept an invitation from the Prime Minister Harold Macmillan, to serve on the Robbins Committee on Higher Education, although it was a matter close to his heart." p. 127.

109. Edmund Husserl, The Crisis of European Sciences, Evanstown, 1970.
110. Leo Marx, op. cit..
111. See David Albury and Joseph Schwartz, op.cit., p. 40-41.

NOTES - CHAPTER FOUR

1. Claudine Chonez, "A qui les lauriers des Goncourt?", in Marianne, December, 1938. The quote used here refers to Jean Paul Sartre.
2. J.P. Stern, On Realism, London, Routledge and Kegan Paul, 1973, p. 113.
3. See Milan Kundera, 'Conversation with Milan Kundera on the Art of the Novel', in Salmagundi, 73, Winter 1987.
4. Recent authors have convincingly typified liberalism as being the deepest political voice of modernity. See for example Nancy Rosenblum, Another Liberalism, Boston, Harvard University Press, 1988; and John A. Hall, Liberalism, London, Paladin, 1988.
5. See, for example, Georg Lukacs, The meaning of Contemporary Realism, London, Merlin, 1979; Georg Lukacs, Theory of the Novel, London, Merlin, 1976; and especially Georg Lukacs, Studies in European Realism, London, Merlin, 1970.
6. See William Leiss, The Domination of Nature, New York, George Braziller, 1972; Edmund Husserl, Crisis of the European Sciences, New York, Beacon, 1978; Georg Lukacs, Studies in European Realism, London, Merlin, 1976.
7. For an interesting discussion on these points see, E.J. Dijksterhuis, The Mechanization of the World Picture, Princeton, Princeton University Press, 1986 and John Ziman, The Forces of Knowledge, Cambridge, Cambridge University Press, 1982. For an interesting application of these ideas, see Leo Marx, "Developing a National Science Culture: What Kind of Knowledge Do We Need?" in John R. de la Mothe, Science and Technology Policy Under Free, (Technology in Society), New York, Pergamon, 11, 2, 1989.
8. The suggestion is that the novel form has been surpassed by images. See, for example, Arthur Kroker and David Cook, The Postmodern Scene: Excremental Culture and Hyper-Aesthetics, Montreal, New World Perspectives, 1987.
9. For especially interesting discussions on this theme see Nancy Rosenblum, op.cit.; John A. Hall, op.cit., Benjamin Barber, The Conquest of Politics, Princeton, Princeton University Press, 1988; and Stuart Hall,

The Hard Road to Renewal: Thatcherism and the Crisis of the Left, Oxford, Polity Press, 1988.

10. Oxford English Dictionary, Compact (Micrograph) Edition, Volume 1, New York, Oxford University Press, 1971, page 1296, definition 4.
11. Quoted in "Conversations with Milan Kundera on the Art of the Novel", in Salmagundi, Winter 1987, p. 1.
12. Milan Kundera, The New York Review of Books, March 6, 1988.
13. Snow wrote, "I had the idea out of the blue--in what seemed like a single moment--in Marseilles on 1 January 1935....I was staying in Marseilles for the night, having flown down from London, and was off on a boat to Italy the next day. I was extremely miserable. Everything, personal and creative, seemed to be going wrong. Suddenly I saw, or felt, or experienced,....both the outline of the entire Strangers and Brothers sequence and its inner organization, that is, the response or dialectic between Lewis Eliot as observer and as the focus of direct experience. As soon as this happened, I felt extraordinarily happy. I got the whole conception....in a few minutes."
14. William Cooper, C.P. Snow, London, Longman, 1959.
15. In an often told story, related to me by Maurice Goldsmith, one evening in 1948, Snow encountered Leonard Russell, the book editor of the London Sunday Times, in a corner of the Saville Club. Snow brooded unfavorably on the new fiction of sensitivity and 'plotted its overthrow'. Russell was sympathetic. Soon after, Snow handed Russell an article entitled "Credo" which further articulated his views. A short time later, after reading the paper, Russell sent Snow a telegram offering him a regular column reviewing fiction for the Sunday Times. Snow accepted.

Snow began as book reviewer for the London Sunday Times on January 9, 1949 and held the post until December 18, 1952. In his public statement of resignation, Snow observed that he found it impossible to maintain indefinitely his "interest in any kind of new fiction". It is thus somewhat prophetic that when Snow took up the post of book reviewer for the Financial Times nearly two decades later, he reviewed primarily non-fiction.
16. C.P. Snow, "Science, Politics and the Novelist: Or, The Fish and the Net", in Kenyon Review, 23, No. 1, Winter, 1961, p. 1-17.

17. Snow's attack on the modern novel began as early as 1932 when, in his early novel, Death Under Sail, Snow's principal character reflected on "the extraordinary prudery of the Irish Catholic" and who went on to find it "responsible equally for....censorship in Boston, gang warfare in America [and] Mr. James Joyce...."
18. C.P. Snow, "The English Realist Novel", Moderna Sprak, 51, 1957, p. 269.
19. Despite Snow's literary perspective, it is absurd to suggest that he named his main, autobiographical character, Lewis Eliot, as a jibe to Wyndham Lewis and T.S. Eliot. Both of these writers almost entirely escaped Snow's direct invective.
20. C.P. Snow, Richard Aldington, op.cit..
21. Richard Aldington, "Science and Conscience: A Letter From Mr. Aldington", in Discovery, 1, 9, December 1938, p. 421-424. Snow reciprocated with a 26 page pamphlet entitled Richard Aldington: An Appreciation. Snow planned to include Aldington in a second volume of Variety of Men which was never written.
22. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 5. This is consistent with what we now refer to as the modernist period. See Julian Symonds, Makers of the New: The Revolution In Literature, 1912-1939, London, Andre Deutsch, 1988; Hugh Kenner, The Mechanic Muse, London, Oxford University Press, 1987.
23. C.P. Snow, Ibid., However as we discussed in Chapter Two, the origins of the modern novel can be placed more helpfully in the late nineteenth century and pre-1914 years.
24. C.P. Snow, "Storytellers for the Atomic Age", in The New York Times Book Review, January 30, 1955, p. 1.
25. C.P. Snow, "Books and Writers" in Spectator, London, 185, 6378, September 22, 1950, p. 320.
26. Ibid., p. 5.
27. Ibid., p. 1.
28. J.P. Stern, On Realism, London, Routledge and Kegan Paul, 1973.
29. C.P. Snow, The Realists, London, Macmillan, 1978, p. 8.

30. M.M. Bahktin, The Dialogic Imagination, Edited by Michael Holquist Jr., Austin, University of Texas Press, 1981. This account of the novel corresponds to similar claims made by Ian Watt in The Rise of the Novel (London, Chatto and Windus, 1957), Georg Lukacs, The Theory of the Novel (Cambridge MA, M.I.T. Press, 1971) and Edward Said, Beginnings: Intentions and Method (New York, Basic Books, 1975).
31. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 5.
32. See Marshall Berman, op.cit..
33. Ibid., p. 5; C.P. Snow, "Storytellers for the Atomic Age", op.cit., p. 1; This was confirmed and expanded upon in an interview with H.S. Hoff in London, May 1987.
34. C.P. Snow, "New Trends in First Novels", Sunday Times, December 27, 1953, p. 3.
35. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 9.
36. Ibid., p. 3.
37. Ibid., p. 6.
38. Ibid., p. 10.
39. Ibid., p. 9-10.
40. See C.P. Snow, Trollope, London, Macmillan, 1975; and C.P. Snow, The Realists, London, Macmillan, 1978.
41. C.P. Snow, "Books and Writers", op.cit., p. 82.
42. Frederick Karl, op.cit., p. 16.
43. Snow's favorite example of this was Joyce's Finnigan's Wake. A more current example might be the poem-novel by Renata Adler's Pitch Dark, New York, Random House, 1987.
44. "Conversation with Milan Kundera on the Art of the Novel", op.cit., p. 3.
45. See, for example, Maurice Merleau-Ponty, Phenomenology of Perception, New York, Basic, 1962.
46. See Karl Popper, "Scientific Reduction and the Essential Incompleteness of All Science", in Francisco Jose Ayala and Theodosius Dobzhansky

(eds.), Studies in the Philosophy of Biology, Berkeley, University of California Press, 1974.

47. Rubin Rabinovitz makes just such a claim. See his "C.P. Snow vs The Experimental Novel", in Columbia University Forum, Fall, 1967, 39.
48. This view is suggested, but not fully articulated, in Bernard Gendron, Technology and the Human Condition, New York, St. Martin's Press, 1977, p. 4.
49. William Cooper, "Reflections on Some Aspects of the Experimental Novel", International Literary Annual, 2, 1959.
50. Donald Davie, Remembering the Thirties (A Poem).
51. C.P. Snow, "The English Realistic Novel", op.cit., p. 269. Snow was especially fond of William Cooper in whose novels - namely Scenes From A Provincial Life (1950), The Struggles of Albert Woods (1952), Young People (1958), Scenes From A Married Life (1961), Scenes From A Metropolitan Life (1982), and Scenes From A Later Life (1983) - Snow appears as a principle character. Cooper was a life-long friend of Snow's who wrote C.P. Snow for the British Council Writers Series (#113) in 1959. After Cambridge, Cooper became a physics schoolmaster in Leicester. He was then drawn into the Signals Branch of the R.A.F. and thus into the work on technical personnel which formed the basis of a post-war career in the Government's service. This spanned the Civil Service Commission as well as the Atomic Energy Authority, the E.E.C. and the Board of Crown Agents. For his part, Snow dedicated Homecomings (1956) to Cooper.
52. This was confirmed to me in dozens of letters from scholars who met Snow in America during this period.
53. C.P. Snow, "Storytellers for the Atomic Age", op.cit., p. 1.
54. See John R. de la Mothe, "Everywhere the Electric: Science and Literature in the Age of the Cyber", in Canadian Journal of Political and Social Theory, 13, No. 1-2, 1989, p. 167-175.
55. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 1.
56. C.P. Snow, "Challenge to the Intellect", The Times Literary Supplement, 2 August 15, 1958, p. 3.
57. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 1

58. Ibid., p. 12.
59. C.P. Snow, "The Scientific Profession and Degrees of Freedom", Unpublished MSS., Notes for an address to Loyola University of Chicago, 1969, Harry S. Ransom Humanities Research Centre, Austin Texas, p. 2.
60. Raymond Williams, Marxism and Literature, Oxford, Oxford University Press, 1978, p. 49; Andrew Molloy, Raymond Williams and Cultural Hegemony in Western Canada, Doctoral dissertation in progress, Montreal, Concordia University, 1989.
61. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 1.
62. Ibid., p. 2.
63. Useful outlines of the sequence can be seen in the work of William Cooper, Frederick Karl, Saguna Ramanathan and Jerome Thale.
64. See Malcom Bradbury, No, Not Bradbury, London, André Deutsch, 1987, p. 176-181.
65. Malcolm Bradbury, op.cit., p. 178.
66. Georg Lukacs, The Meaning of Contemporary Realism, London, Merlin, 1979; J.P. Stern, op.cit..
67. This is true despite the thesis by Susan Turnquist Meixner (Partisan Politics and the Sequence Novels of Evelyn Waugh, C.P. Snow and Anthony Powell, Unpublished Doctoral Dissertation, University of Kansas, 1979) which argues that Snow was consistently a spokesman of the British Labour Party.
68. C.P. Snow, "Preface", The Realists, op.cit., p. 7.
69. See for example, Rubin Rabinovitz, "C.P. Snow vs The Experimental Novel", in Columbia University Forum, New York, 1967.
70. Frederic Jameson, The Ideologies of Theory: Essays, 1971-1986, Volume 2, Minneapolis, University of Minnesota Press, p. 135.
71. Georg Lukacs has made a considerable contribution to our understanding of this process. For a useful discussion, see Frederic Jameson, "Reflections on the Brecht-Lukacs Debate", in The Ideologies of Theory, Vol. I, Minneapolis, University of Minnesota Press, 1988.
72. See, for example, Bernard Gendron, op.cit..

73. C.P. Snow, "Storytellers for an Atomic Age", in op.cit., p. 28.
74. See Theodore Adorno and Max Horkheimer, The Dialectic of Enlightenment, New York, Prism Books, 1984; and Walter Benjamin, "The Work of Art in an Age of Mechanical Reproduction", in Illuminations, New York, Schocken, 1969.
75. C.P. Snow, "Storytellers for the Atomic Age", op.cit., p. 1.
76. "The Many Sided Life of Sir Charles Snow", in Life, April 6, 1961, p. 136.
77. C.P. Snow. "Storytellers for the Atomic Age", op.cit., p. 1.
78. J. Robert Moskin, "A Conversation with C.P. Snow", in Saturday Review, April 6, 1974, p. 21; C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 6.
79. Pamela Hansford Johnson, "Three Novelists and the Drawing of Character: C.P. Snow, Joyce Cary and Ivy Compton-Burnett", in Essays and Studies, London, 3, 1950, p. 83.
80. C.P. Snow, The Realists, op.cit., p. 7.
81. Pamela Hansford Johnson, op.cit., p. 82.
82. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 13.
83. Frederick Karl, op.cit., p. 20-21.
84. C.P. Snow, "Science, Politics and the Novelist", op.cit., p. 15.
85. Ibid., p. 16-17.
86. C.P. Snow, "The English Realistic Novel", in op.cit., p. 267-268.
87. Ibid., p. 84.
88. C.P. Snow, The Search, op.cit., p. iv.
89. Jerome Thale, op.cit., p. 89.
90. Bernard Bergonzi, "The World of Lewis Eliot", in Twentieth Century, March 1960, 167, p. 216.
91. Ruth Walsh, op.cit., p. 23.

92. Helen Gardiner, "The World of C.P. Snow", in New Statesman, March 1958, p. 409.
93. This theme is developed in John R. de la Mothe, C.P. Snow's Conception of the Human Condition, Concordia University Working Paper, Program in Science and Human Affairs, Montreal, September, 1982; see Charles Child Walcutt, Man's Changing Mask, Minneapolis, University of Minnesota, 1966, p. 18.
94. C.P. Snow's 'Author's Note' to The Conscience of the Rich, Macmillan, London, 1958, p. vii.

NOTES - CHAPTER FIVE

1. This is Goya's title for one of his Caprichos, inscribed on the etching itself. It also provided the title of C.P. Snow's The Sleep of Reason, 1968.
2. At the heart of the rhetoric surrounding the principle of complete neutrality and its denial of the role played by constitutive and contextual values in guiding factual research is adherence to the famous tenet of positivism. This is the fact-value dichotomy or the belief that facts and values are completely separable, and that there are facts which are not value-laden. Despite the fact that scholars including John S. Mill, Lionel Robbins, Milton Friedman, and others have affirmed the fact-value dichotomy, there are a number of serious reasons for doubting both it and the pure science ideal associated with it. For example, to ascribe to such a belief is to subscribe to the belief that there can be 'pure facts' as well as pre-suppositionless research.

See Norwood Russell Hanson, Patterns of Discovery, London, Cambridge University Press, 1958; Thomas S. Kuhn, The Structures of Scientific Revolution, Chicago, University of Chicago Press, 1962; Michael Polanyi, Personal Knowledge, Chicago, University of Chicago Press, 1960; Stephen Toulmin, Foresight and Understanding, New York, Harper and Row, 1961; and Karl Popper, The Open Society and Its Enemies, Cambridge, Cambridge University Press, 1979.

See also M.C. Tool, The Discretionary Economy: Towards A Normative Theory of Political Economy, Santa Monica, Goodyear, 1979.

3. See Aldous Huxley, Literature and Science, London, Chatto and Windus, 1963, p. 1.
4. See, for example, John Forge, "A Realistic Theory of Science?", in Social Studies of Science, 19, 1989; Roy Bhaskar, Scientific Realism and Human Emancipation, London, Verso, 1987; and Jarrett Leplin (ed.), Scientific Realism, Berkeley, University of California Press, 1984.
5. "In order to ensure that theoretical terms were meaningful in their lights, positivists required that these terms be explicitly defined with respect to observational terms. So 'electron' would not be interpreted literally, but would be defined with respect to such things as clicks in Geiger tubes, flashes on fluorescent screens and other phenomenon normally regarded (that is, by non-positivists) as observable manifesta-

tions of electrons. Moreover the theoretical statements are not, in the positivist view, supposed to describe the world. Rather, their role is to provide an economical basis for generating predictions about observable matters. While the positivist criteria for meaningfulness and the demand for the explicit definition of theoretical terms has been largely abandoned as a basis for reconstructing science, empiricists and others have nevertheless tended to retain the positivists' conception of the role of theoretical statements." John Forge, 'A Realistic Theory of Science?', in Social Studies of Science, 19, 1989, p. 182.

6. John Forge, op.cit., p. 183.
7. See Roy Bhaskar, Scientific Realism and Human Emancipation, London, Verso, 1986; Joseph Rouse, Knowledge and Power: Toward A Political Philosophy of Science, Ithaca, Cornell University Press, 1987; Jarrett Leplin (ed.), Scientific Realism, Berkeley, University of California Press, 1984; and Ernan McMullin, "The Case for Scientific Realism", in Leplin, Ibid.. As Ian Hacking has pointed out, it is not surprising that Snow was a scientific realist as both physics and physical chemistry provide the strongest evidence for this form of realism. See Ian Hacking, "Experimentation and Scientific Realism", in Leplin, Ibid., p. 154.
8. Ibid., p. 5.
9. Ibid., p. 5.
10. Interview with Thomas Kuhn, February 1989.
11. These are New Lives For Old, (1933) The Search, (1934) The Light and the Dark, (1947), Time of Hope, (1949), The Masters, (1951), The New Men, (1954), Homecomings, (1956), The Conscience of the Rich, (1958) The Affair, (1960), and The Corridors of Power (1964).
12. Snow himself makes this claim in John Halperin, C.P. Snow: An Oral Biography, Brighton, Harvester Press, 1984, p. 59. However, this is also verified by the Kapitza Club membership lists of 1931-32 which includes the names of J.D. Bernal, Patrick Blackett, John Cockcroft, Philip Dee, Paul Dirac, Neville Mott, Mark Oliphant, W.A. Wooster, and C.P. Snow. My thanks are due to the Cavendish Laboratory Archives for information on this point.
13. The exception here is provided in W.H. Brock, "C.P. Snow: Novelist or Scientist?", in Chemistry in Britain, April 1988, p. 345-347.
14. Ibid.

15. See Ron Freedman, "The Science Policy Foundation, 1964-1984", in Science and Public Policy, 11, No. 3, June 1984, p. 161-172.
16. In an interview with Gary Werskey in London, May 1987, it was asserted that Snow was a member of the club. See Gary Werskey, The Visible College, p. 263-264. However, Sir Solly Zuckerman, in a description of the dining club which he began, makes no mention of Snow's involvement. See Solly Zuckerman, From Apes to Warlords, London, 1980, Appendix 1.
17. Michael Polanyi, "The Republic of Science", in Minerva, 1, 1962, p. 54-73. Polanyi was Professor of Physical Chemistry and Social Studies at the University of Manchester.
18. "The First Excitement That Knowledge Gives", Discovery, April 1939.
19. *Ibid.*
20. *Ibid.*
21. The Snow household library included: Neumann's The History of Music, Arthur Mee's 8 volume Children's Encyclopedia, Discoveries and Inventions of the Nineteenth Century, Ports of Britain, Anita Loos' Gentlemen Prefer Blondes, Heroes of the Great War, bound volumes of The Penny Magazine, and P.F. Warner's My Cricketing Life. Among the periodicals to appear regularly in the Snow home were: The Tatler, The Graphic, The Illustrated London News, John o' London's, Wide World Bystander, Strand, Punch, The Times, The Daily Herald, Morning Post, Daily Telegraph, News Chronicle, The Leicester Mercury, The Leicester Evening Mail, and the Leicester Chronicle. According to Philip Snow, Charles was a voracious reader of them all. Interview with the author, Angmering on Sea, Sussex, May 1985.
22. The Search, p. 3-4. These events are also based on fact, as was attested to by Philip Snow in an interview at Angmering on Sea Sussex, May 29, 1984. See also Philip Snow, op.cit.; and C.P. Snow, Preface to the Omnibus Edition of Strangers and Brothers, New York, Scribner's Sons, 1971.
23. When Snow attended, the School was divided into two schools - one for boys and the other for girls. In 1959, the two schools were joined and the 'new' unified school as formally opened by Charles Snow.
24. *Ibid.*, p. 9.

25. C.P. Snow, The Search, New York, Charles Scribner's Sons, 1958 edition, p. 13.
26. This is the equivalent of today's GCE O levels.
27. Philip Snow, op.cit., p. 17.
28. Ibid., p. 10.
29. Ibid..
30. Ibid., p. 11.
31. Telephone interview with W.H. Brock, Director of the Victorian Studies Centre, Leicester University, June 1988.
32. Bert Howard (1900-1963) was to become the character of George Passant in Snow's novels. Snow acknowledged his influence on the period between 1922 and 1927 in particular, but remained in touch with him until his death. Howard attended Snow's wedding in 1950.
33. C.P. Snow, in an interview with John Halperin, quoted in John Halperin, op.cit., p. 21.
34. Ibid., p. 85. This is contrary to the views put forward by J.C.W. Brand.
35. See H.G. Orme and W.H. Brock, Leicestershire's Lunatics: Institutional Care of Leicestershire's Lunatics During The Nineteenth Century, Leicester, 1987.
36. This was done until 1957 when Leicester University gained full university status.
37. Louis Hunter, 1899-1986, took his DSc from London University in 1928 for his investigations into the role of hydrogen bonding in organic chemistry. After many years of both teaching the full range of subjects in chemistry and managing to initiate a successful research focus with only limited resources, Hunter was appointed to Leicester University's first Chair in Chemistry and was made Vice-Principal for the period 1952-1957. Following this he was made Pro-Vice-Chancellor (1957-1960) after which, in 1965, he retired from the University. Throughout his career, he played an active role in the Royal Institution of Chemistry, the Chemical Society and the British Association for the Advancement of Science. See Chemistry In Britain, September 1987, p. 878.

A.C. Menzies, 1897-1974, was educated at Christ's Hospital. After World War I, he took up the Open Scholarship at Christ's College, Cambridge and subsequently obtained a First in the Natural Science Tripos in 1921. After four years as a lecturer in Physics at the University of Leeds, he then went to the University College at Leicester and later, in 1932, to the University of Southampton where he was Professor of Physics. During this early period, he made significant original contributions to atomic and Raman spectroscopy. In 1945 he became director of research at the scientific instrument maker, Adam Hilger Ltd. He continued in this post until his retirement in 1964. C.P. Snow was his first research student. See The Times, London, June 7, 1974, p. 21.

38. In interviews with Philip Snow, Maurice Goldsmith, J.C.D. Brand, and Sir Herman Bondi, I was informed about Snow's lack of experimental acumen.
39. Philip Snow, op.cit., p. 25.
40. Interview with W.H. Brock, the Victorian Studies Centre, University of Leicester, June 1988; see his brief article on "C.P. Snow: Novelist or Scientist", in op.cit., April 1988, p. 345.
41. Raman Spectroscopy is named after the Indian physicist, Sir Chandrasekhara Venkata Raman. It is that form of spectroscopy which is based upon the Raman Effect which may be described as the scattering of light of several frequencies from a transparent gas, liquid, or solid which is illuminated by light of a single frequency. This scattered 'Raman light' is of low intensity and results from an exchange of energy between the photons of light from the source and the molecules of the substance. Those photons that absorb energy from the molecules emerge with a higher energy whereas those that yield energy to the molecules emerge with a lower frequency. The study of such energy exchange gives important information about the structure of the molecules and is used in chemical analysis. C.V. Raman began his work on the scattering of light in 1921. The Raman Effect was discovered in 1928 and he received the Nobel Prize for his work in 1930.
42. Reports and Accounts, Leicester, University College, December 1, 1927, p. 11.
43. These can be found in The Philosophical Magazine, London, 1928 and La Réunion Internationale de Chimie Physique, Paris, 1929 respectively. The second of these was delivered at the invitation of Menzies

who was the convenor of both the Spectroscopy Group of the Physical Society and the Colloquium Spectroscopium Internationale.

44. C.P. Snow, "The Relation Between Raman Lines and InfraRed Bands", in The Philosophical Magazine, Series 7, Volume 8, No. 50, September 1929, p. 379.
45. This is recalled in a letter written from Christ's College by Sydney Grose in 1964 which is cited in Philip Snow, op.cit., p. 160.
46. C.P. Snow, in John Halperin, op.cit., p. 85.
47. C.P. Snow, in an interview with John Halperin, in John Halperin, op.cit., p. 21.
48. See The Search, op.cit., p. 171.
49. Interviews with Harry Hoff and Maurice Goldsmith, London, May and June 1987.
50. As Snow wrote in The Search, "there was Rutherford himself; Neils Bohr, the Socrates of automatic science, who talked to us amiably one right in his Danish-English for something like two and a half hours; Dirac, of whom I heard it prophesized very early that he would be another Newton; Kapitza, with a bizarre accent and an unreproducible genius; Eddington, who made some of his Carroll-like jokes; and all the rest, English, Americans, Germans, Russians, who were in atomic physics at the time when the search was hottest." p. 88-89.
51. C.P. Snow, The Search, op.cit., p. 86. Snow echoed this sentiment repeatedly throughout his life. As an example, see his unpublished lecture at the University of Texas at Austin on the history of physics (March 29, 1978), C.P. Snow Archives, Harry S. Ransom Humanities Research Centre of the University of Texas at Austin.
52. C.P. Snow. The Search, op.cit., p. 107.
53. C.P. Snow quoted in John Halperin, op.cit., p. 17.
54. C.P. Snow, The Search, op.cit., p. 26. The character of Austin was actually a caricature of F.W. Aston, DSc, FRS, FIC, Nobel Laureate, Fellow of Trinity College, Cambridge and author of Mass Spectra and Isotopes (Edward Arnold, London, 1933) of which Snow wrote Chapters XIV and XV on "Isotope Effect and Molecular Spectra" and "The Isotope Effect in Atomic Spectra" respectively in the 1933 and 1942 editions.

55. These sections represent pages 25-47 and 167-176 of The Search respectively.
56. Ibid., p. 26-27.
57. C.P. Snow, The Search, op.cit., p. 35.
58. See Part 2 of John Halperin, op.cit..
59. Jacob Bronowski, Science and Human Values, New York, Harper and Row, 1965, p. 63).
60. Op.cit., p. 39.
61. Following Kuhn, 'normal science' can be defined as science the uses past achievement as a model and as a guide for formulating and solving new problems about the world. Since the paradigm cannot be reduced to any set of explicit rules, neither can normal science work on new problems. Clearly not all science can be 'normal'. At times of both major and minor paradigmatic challenge, as was the case (potentially) the case with the Ponds/Fleischman cold fusion experiments of 1989, normal science is forced into a period of re-evaluation.
62. An important development in the replacement of the Bohr theory was the formulation of the Uncertainty Principle in 1926 by Werner Heisenberg. This principle set the limits of accuracy which may be attained in simultaneous measurement of the position and velocity of such particles as electronics and atoms, or in the simultaneous measurements of energy and the time for such systems.
63. Op.cit., p. 170-171.
64. A.S. Eddington, The Nature of the Physical World, Cambridge, Cambridge University Press, 1930, p. 352.
65. Op.cit., p. 170-172.
66. C.P. Snow, The Search, op.cit., p. 168.
67. Ibid., p. 30.
68. Ibid., p. 168-169. The scientist of whom Snow referred was Paul Dirac.
69. C.P. Snow, The Search, op.cit., p. 47.

70. Snow himself makes this point in Halperin, op.cit..
71. Personal correspondence between the author and Sir Hans Kornberg, Master of Christ's College, Cambridge, October 21, 1985. On page 17 of Halperin, op.cit., Snow claimed to have worked at the Cavendish. This however was not true as the labs only became a sub-department of the Cavendish in 1930. See Biographical Memoirs of Fellows of the Royal Society, (E.K. Rideal), Vol. 22, 1975.
72. C.P. Snow in Biographical Memoirs of Fellows of the Royal Society, Vol. 15, 1969, p. 4.
73. Eric Keightley Rideal, 1890-1974; Elected F.R.S. 1930; pursued a wide range of research from pure physics to biology and published research articles and books from 1912 to 1974. He authored papers with, among others, Snow, Blackett and Philip Bowden. See Biographical Memoirs of Fellows of the Royal Society, Volume 22, p. 381-413.
74. Quoted in Ibid., p. 385.
75. Philip Bowden, quoted in Biographical Memoirs of Fellows of the Royal Society, Vol. 15, 1969, p. 3.
76. Rideal's research interests extended to insoluble monolayers on the Langmuir trough, colloids and surface chemistry, homogenous kinetics, and his articles occasionally included biological problems as well.
77. Quoted from an unpublished manuscript dated March 14, 1968, C.P. Snow Archives, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.
78. R.W.G. Norrish, op.cit..
79. C.P. Snow, The Search, op.cit., p. 312.
80. C.P. Snow, "Chemistry", in University Studies Cambridge 1933, Harold Wright (editor), p. 97. As W.H. Brock also notes in "C.P. Snow: Novelist or Scientist?" (Chemistry in Britain, April 1988), this essay also represented Snow's first, and very successful, attempt to explain the nature of scientific activity in lay terms. This was an accomplishment which was to become important to him in his role of Editor of Discovery (1938-1940).
81. These were: "Band Spectra of Molecules Without Unused Valency Electrons", in Reunions Internationale de Chimie Physique, Paris, 1928; "The Relation Between Raman Lines and Infra-Red Bands", in

- The Philosophical Magazine, London, 8, 1929; "Infra-Red Investigations I", in Proceedings of the Royal Society, 124A, 1929, p. 442-452 (with A.M. Taylor); Ibid. II, 124A, 1929, p. 453-464 (with Rawlins and Rideal); Ibid. III, 125A, 1929, p. 462-483 (with Rideal); Ibid. IV, 126A, 1930, p. 355-359, (with Rideal); Ibid. V, 128A, 1930, p. 294-316; "Optical Rotatory Power of Quartz", in Proceedings of the Royal Society, 127A, 1930, p. 271-278 (with Lowry); "Excited Radicals", in Physical Review, 35, 1930, p. 563-564; "Vibration-Rotation Spectra", in Transactions of the Faraday Society, 1929, p. 930-936; "Colours of Inorganic Salts", in Nature, 125, 1930, p. 349-350 (with Rawlins); "Fine Structure of Absorption Bands", in Proceedings of the Cambridge Philosophical Society, November 23, 1931; "Photochemistry of Vitamins", in Nature, 129, May 14, 1932, p. 720 (with Bowden); Idem., in Nature, 129, June 25, 1932, p. 943 (with Bowden); Idem., in Nature, 130, November 19, 1932, p. 774 (with Bowden); "Absorption Spectra of Vitamin A", in Nature, 131, 1933, p. 582-583 (with Bowden and Morris); "Modified Ionic States", Proceedings of the Cambridge Philosophical Society, 28, 1931-1932, p. 522-530 (with Rawlins).
82. For example, see Snow's 1966 American Association for the Advancement of Science lecture entitled "Government, Science and Public Policy" in Science, February 11, 1966, Vol. 151, # 3711, p. 650.
 83. See for example John Halperin, op.cit.; Nora Graves, "The Two Cultures Theory in C.P. Snow's Novels", in The Swansea Review, October, 1969; personal communication with Saguna Ramanathan, July, 14, 1987; personal communication with W.H. Brock, June 29, 1988; and personal communication with R. Norman Jones, July 7, 1988.
 84. As Snow says in Halperin, op.cit., "I made an infrared [spectroscope]. I changed that: I don't know why." (p. 82.)
 85. Snow briefly describes his 1939 meeting with Bragg on the Cambridge train platform in The Two Cultures and the Scientific Revolution. As a result, Snow became Technical Director of the Ministry of Labour from 1940 to 1944 during which time he interviewed the thousands of scientists and engineers which he described in the Rede lecture with his friend, the scientist/author, Harry S. Hoff (a.k.a. William Cooper). This detail was discussed in an interview with Harry Hoff at the Athenaeum, London, May 1987.
 86. John Halperin, op.cit., p. 61.
 87. The insert regarding Bernal is my own. C.P. Snow, The Physicists, Little Brown, 1981, p. 153.

88. Ibid., p. 153-154.
89. See for example, *ibid.*, C.P. Snow, in Halperin, *op.cit.*: C.P. Snow, in Wright, *op.cit.*.
90. Not the 11 attributed to Snow by Paul Boytinck, C.P. Snow: A Reference Guide, Boston, G.K. Hall, 1980; nor the 22 attributed to Snow by W.H. Brock, "C.P. Snow, Novelist or Scientist", in Chemistry in Britain, April 1988, p. 346.
91. Bowden appears as Francis Getliffe in The Conscience of the Rich, The Light and the Dark, The Masters, The New Men, The Affair, Corridors of Power, The Sleep of Reason and Last Things. See Snow's note on Bowden in Biographical Memoirs of Fellows of the Royal Society, Volume 15, 1969.
92. According to Aston's Preface, Snow wrote Chapters 14 and 15 entitled "Isotope Effect in Molecular Spectra" "The Isotope Effect in Atomic Spectra" respectively. See F.W. Aston, Mass Spectra and Isotopes, London, Edward Arnold, 1933. Reprinted in 1942, 1944, 1946, 1948 and 1960.
93. Originally thought of as a form of peer review, authors wishing to have papers submitted to reputable journals had senior scientists communicate their work on their behalf. By the 1960s, this practice had practically stopped and authors submitted their own papers.
94. For my discussion on Snow's research, I am deeply indebted to a small number of people. Firstly, I am especially grateful to Dr. J.C.D. Brand, Professor Emeritus, Department of Chemistry, the University of Western Ontario. His article entitled "The Scientific Papers of C.P. Snow" (History of Science, 2, Part 2, Number 72, June 1988, p. 111-127) represents the only substantive assessment of Snow's research to date. I would like to thank Dr. Brand, for discussions and permission to quote from his article and from a pre-publication draft. I would also like to note my thanks in this regard to Dr. W.H. Brock (Leicester University), Dr. Gerhard Herzberg (National Research Council, Canada) and Dr. Michael Hogben (Concordia University, Montreal) for discussions and, in the case of Dr. Brock, correspondence which helped me in understanding Snow's scientific research more fully than I would normally have been able to.
95. As J.C.D. Brand has pointed out, examples of this include Hund and Mulliken who had both begun to develop a theory of states of individual electrons which are now called molecular orbitals, and Hill and Van Vleck who had explained the fine details of the energy levels

for pi and sigma states in terms of the coupling of molecular rotation and electron spin. See F. Hund, "Molecular Spectra", Zeitschrift für Physik, 1928, p. 759-795; R.S. Mulliken, "Assignment of Quantum Numbers for Electrons in Molecules", in Physical Review, XXXII, 1928, p. 761-772; and E. Hill and J.H. Van Vleck, "Rotational Distortion in Multiplets in Molecular Structure", in Physical Review, XXXII, 1928, p. 250-272.

96. C.V. Raman and K.S. Krishnan, "A New Class of Spectra Due To Secondary Radiation", in Indian Journal of Physics, II, 1928, p. 399-419.
97. C.P. Snow and A.M. Taylor, "Infrared Investigations of Molecular Structure, Part 1, Apparatus and Technique", in Proceedings of the Royal Society, A, CXXIV, 1929, p. 442-452; C.P. Snow, F.I.G. Rawlins, and E.K. Rideal, "Infrared Investigations of Molecular Structure, Part 2, The Molecule of Nitric Oxide", in Proceedings of the Royal Society, A, CXXIV, 1929, p. 453-464; C.P. Snow and E.K. Rideal, "Infrared Investigations of Molecular Structure, Part 3, The Molecule of Carbon Monoxide", in Proceedings of the Royal Society, A, CXXV, 1929, p. 462-483; C.P. Snow and E.K. Rideal, "Infrared Investigations of Molecular Structure, Part 4, The Overtone of Nitric Oxide", in Proceedings of the Royal Society, A, CXXVI, 1930, p. 355-359.
98. A spectrometer is an instrument used to measure spectra or to determine wavelengths of the various radiations or separations of the particles according to their energies.
99. See J.C.D. Brand, op.cit..
100. Op.cit..
101. R.H. Gillette and E.H. Eyster, "The Fundamental Rotation-Vibration Band of Nitric Oxide", in Physical Review, LVI, 1939, p. 1113-1119, quoted in Brand, op.cit., p. 7.
102. E.K. Plyler and E.F. Barker, "The Infrared Spectrum and Molecular Configuration of N_2O ", in Physical Review, XXXVIII, 1931, p. 1827-1836.
103. This can be summarized in a table:

<u>Mode of Vibration of CO_2</u>		<u>Raman</u>	<u>Infra-Red</u>	<u>CM¹</u>
$\begin{array}{c} \leftarrow \qquad \rightarrow \\ \text{O} - \text{C} - \text{O} \\ \uparrow \qquad \uparrow \end{array}$		active	inactive	1330

ν_2 :bend	$\begin{array}{c} \text{O} - \text{C} - \text{O} \\ \downarrow \end{array}$	$\begin{array}{c} \rightarrow \leftarrow \rightarrow \\ \text{O} - \text{C} - \text{O} \end{array}$	inactive	active	667
ν_3 :asymmetric stretch			inactive	active	2349

104. See "The Rotational Raman Spectrum of Nitrogen and Oxygen", in Zeitschrift für Physik, LXI, 1930, p. 600.

105. The modern assignment for N_2O is:

<u>Mode of Vibration of NNO</u>		<u>Raman</u>	<u>Infra-Red</u>	<u>CM^{-1}</u>
ν_2 :bend	$\begin{array}{c} \uparrow \quad \quad \uparrow \\ \text{N} - \text{N} - \text{O} \end{array}$	inactive	active PQR	589
ν_1 :symmetric stretch	$\begin{array}{c} \leftarrow \quad \quad \rightarrow \\ \text{N} - \text{N} - \text{O} \end{array}$	active	active PR	1285
ν_3 :asymmetric stretch	$\begin{array}{c} \rightarrow \leftarrow \rightarrow \\ \text{O} - \text{C} - \text{O} \end{array}$	active	active PR	2224

106. Dennison's swift analytical mind had evidently seen through Snow's N_2O problem and he relayed this to Barker upon his return to Michigan.

107.

108. J.C.D. Brand, op.cit., p. 117.

109. J.C.D. Brand, op.cit., p. 118.

110. J.D. Bernal, "Properties and Structures of Crystalline Vitamins", in Nature, CXXIX, 1932, p. 721.

111. C.P. Snow, The Search, op.cit., p. 172.

112. F.P. Bowden and C.P. Snow, "Photochemistry of Vitamins A, B, C, D", in Nature, CXXIX, 1932, p. 943.

113. I.M. Heilbron and R.A. Morton, "Photochemistry of Vitamins A,B,C,D" in Nature CXXIX, 1932, p. 866-867.

114. All above quotes are from I.M. Heilbron and R.A. Morton, "Photochemistry of Vitamins A, B, C, D" in Nature, June 11, 1932, p. 886-867.

115. For invaluable comments on IR spectra, I am indebted to Professor S. Daunt and Professor M.G. Hogben (Department of Chemistry, Concordia University).
116. J.C.D. Brand, op.cit., p. 118.
117. C.P. Snow in Halperin, op.cit.. Although the episode was certainly a set-back, its impact need not necessarily have been terminal for Snow's research career. After all, Bowden went on to have a most successful career, albeit he never dabbled in photochemistry again.
118. C.P. Snow, The Search, op.cit., p. 271.
119. H. Bethe, "Term Splittings in Crystals", in Annalen der Physik, III, 1929, p. 133-208.
120. H. Sauer, "The Line Absorption of Chrome Alum Crystals", in Annalen der Physik, LXXXVII, 1928, p. 197-237.
121. J.C.D. Brand, op.cit., p. 119.
122. See James R. During, Chemical, Biological and Industrial Applications of Infrared Spectroscopy, New York, Wiley, 1985.
123. This proposed research dealt with the isoelectronic molecule glyoxal (CH₂-CHO). Snow and Eastwood commented on the exceptionally sharp lines and close spectral resemblance to acrolein. Through such research, Snow and Eastwood were at the point of doing significant work, notably because they would have had access to the high performance instruments at Manchester University through W.L. Bragg.
124. C.P. Snow, The Search, op.cit., p. 150.
125. J.D. Bernal, "Letter to the Editor", Spectator, 208, March 23, 1962, p. 365.
126. C.P. Snow in Halperin, op.cit., p. 21.
127. Ibid., p. 67 and 87.
128. C.P. Snow, The Physicists, op.cit., p. 68.
129. See C.P. Snow, "J.D. Bernal", in Maurice Goldsmith and Alan Mackay, The Science of Science London, Souvenir Press, 1964, p. 22; C.P. Snow's introduction to G.H. Hardy, A Mathematician's Apology.

London, Cambridge University Press, 1982. Dates were also confirmed in interviews with Maurice Goldsmith (London, June 1987), Erik Millstone and Brian Easlea (Brighton, February 1984), Gary Werskey (London June 1986), Joe Palca (Washington, April 1987), and Collin Divall (Manchester, June 1987) whom I would like to thank for bringing the Snow/Huxley correspondence held in the Huxley archives at Rice University to my attention.

Snow distinguished the intellectual left from the trades union left calling it a typically New Statesman sort of thing. See his comments in Halperin, op.cit., p. 67.

130. C.P. Snow in Halperin, ibid., p. 67.
131. Ibid., p. 67.
132. C.P. Snow, The Search, op.cit., p. 218-219.
133. Ibid., p. 35-36.
134. Unpublished MSS. Notes for a talk at Northwestern University, 1975. C.P. Snow Archives, Harry S. Ransom, Humanities Research Centre, University of Texas at Austin.
135. Quoted in Nail Bezel, Annals of Science, 32, 1975, p. 555.
136. Ibid., p. 21.
137. Including J.C.D. Brand.
138. It is important to note that Youth Searching and The Devoted were not the same book, as W.H. Brock has claimed. ("C.P. Snow: Novelist or Scientist", in Chemistry in Britain, April 1988, p. 346). Indeed, Youth Searching was written and destroyed before Snow ever went to Cambridge. The Devoted was partially written in 1939, never appeared in book form, but was cannibalized into Strangers and Brothers (1940). The name of Snow's girlfriend at that time is now forgotten.
139. For example, Snow would certainly have disapproved of J.B.S. Haldane's attempt at stirring up 'United Front' meetings in the Trafalgar Square. An example of Snow's reaction to such matters can be seen in his portrayal of relations between Martin and Lewis Eliot regarding the Atomic bomb in his novel The New Men.
140. Unpublished (and undated) MSS, the C.P. Snow Archives, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.

141. Unpublished MSS entitled "Man's Idea of Himself: Is It Changing?", undated but which was most likely written in 1977. The C.P. Snow Archives, Harry S. Ransom, Humanities Research Centre, University of Texas at Austin, p. 3.
142. See, for example, his notes and hand written corrections to speeches he gave in the United States and India between 1966-77 entitled, or ear-marked, "Science and Technology: Our Common Problem", "Science and the Advanced Society" and "Man's Idea of Himself: Is It Changing?". Unpublished MSS, Harry S. Ransom, C.P. Snow Archives, Humanities Research Centre, University of Texas at Austin.
143. These are what Snow called "our modest criteria" for defining an advanced society ("Science and the Advanced Society", *op.cit.*, p. 2). Of course, anyone aware of the enormous problems currently being faced by our countries' very large populations of 'street people' and illiterates would have very substantial grounds for bickering with Snow.
144. C.P. Snow, "Science in a Modern World", *Discovery*, Vol. 1, 7, October 1938, p. 317.
145. Notes for an address given at the British Embassy in Washington, D.C. by C.P. Snow on January 26, 1966 entitled "Science & the Advanced Society". Unpublished MSS, Harry S. Ransom, Humanities Research Centre, University of Texas at Austin, p. 7.
146. "Science and Technology: Our Common Problem", *op.cit.*, p. 1.
147. See William Leiss, The Domination of Nature, Boston, Beacon Press, 1972; Brian Easlea, Liberation and the Aims of Science, Brighton, University of Sussex Press, 1982.
148. C.P. Snow. Unpublished MSS. Notes for "Science and Technology: Our Common Problem" delivered in India, 1977, p. 1-2. C.P. Snow Archives, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.
149. *Ibid.*, p. 2.
150. See The Frascati Manual published by the Organization for Economic Cooperation and Development, Paris, 1980.
151. C.P. Snow, "Scientific Prophecies", *Discovery*, Vol. 2, No. 10, January 1939, p. 1.

152. Ibid., p. 2.
153. C.P. Snow, "Science and Technology: Our Common Problem", op.cit., p. 4.
154. C.P. Snow, "Science and the Advanced Society", op.cit., p. 2.
155. Ibid., p. 2.
156. C.P. Snow, "Science and the Advanced Society", Ibid., p. 3.
157. Unpublished MSS. "Man's Idea of Himself: Is It Changing?" p. 4, 12, 13, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.
158. Carlota Perez, "Microelectronics, Long Waves and World Structural Change", in World Development, 13, 3, 1985, p. 441-63; Harry Braverman, Labour and Monopoly Capital, New York, Monthly Review Press, 1974.
159. See Marie Jahoda, The Social Psychology of Unemployment, London, Macmillan, 1978.
160. C.P. Snow, "Science and the Advanced Society", unedited record, Washington, January 26, 1966; Harry S. Ransom Humanities Research Centre, University of Texas at Austin, p. 4-5.
161. C.P. Snow, "Science and Technology: Our Common Problem", op.cit., p. 5-6.
162. C.P. Snow, quoting his friend Alexander Dvardovsky, in "Science and Technology: Our Common Problem", op.cit., p. 7.
163. Ibid., p. 5.
164. C.P. Snow, "The Moral Un-Neutrality of Science", delivered to the American Association for the Advancement of Science (AAAS) in 1960, published in Science in 1961 and re-printed in Public Affairs, London, Macmillan, 1971, p. 187.
165. C.P. Snow, "Science in a Modern World", in Discovery, 1, 7, October 1938, p. 318.
166. C.P. Snow, Unpublished notes for an address at M.I.T. entitled "Scientists and Decision-Making", Harry S. Ransom Humanities Research Centre, University of Texas at Austin, p. 2-3.

167. Ibid., p. 4.
168. C.P. Snow, "Science in a Modern World", op.cit., p. 318. Two salient points need be made here. One is that Snow exactly echoed the views of G.H. Hardy regarding scientists and war when he wrote at the same time that "incidentally, military inventions do not require Rutherfords or Bohrs; second-rate technicians are quite adequate" (p. 318); and secondly, despite the questions that arise out of scientific research Snow vehemently disagreed that there are "things that men should not even try to know". "I do take, however, that there is a responsibility to understand [what we are trying to know and] to persuade....people that this [search] is part of life - an interesting, valuable part of life that may in fact affect us deeply". "Science in an Advanced Society", op.cit., p. 5.
169. C.P. Snow, "Science in a Modern World", op.cit., p. 319.
170. Ibid., p. 319.
171. See John Halperin, op.cit., p. 96.
172. Ibid., p. 87.

NOTES - CHAPTER SIX

1. De Augmentis Scientiarum.
2. Heart of Darkness, 1902.
3. Quoted in Irving Howe, The Political Novel, New York, Random House, 1978.
4. Unlike the thesis put forward by Susan Turnquist Melxner in Partisan Politics and the Sequence Novels of Evelyn Waugh, C.P. Snow and Anthony Powell, op.cit., in which Snow is tightly associated with the British Labour Party. It should be noted, however, that in a regular series of meetings which were held from 1956-1962 at the expense of Marcus Brumwell - who was a devoted Labour supporter and a successful advertising agency - Snow did meet with Harold Wilson, Hugh Gaitskell, Frank Cousins, P.M.S. Blackett, Solly Zuckerman and Jacob Bronowski to advise the Labour Policy on science policy. Bernal, sent his advice through Blackett and Snow but was not present himself as Wilson would have nothing to do with 'the Red scientist'. These details were confirmed by Maurice Goldsmith in interviews, held at the London Athenaeum in May 1987. They are also briefly discussed in Maurice Goldsmith's biography of Bernal (Sage: A Life of J.D. Bernal, London, Hutchinson, 1980, p. 140-141).
5. Unlike suggestions to the contrary made by Frederick Karl, C.P. Snow: The Politics of Conscience, op.cit..
6. Snow's concern in public affairs is discernible from as early as July 1924 when Snow wrote an Editorial in The Newtonian (the Alderman Newton school newspaper), continuing through his years as Editor of Discovery (1937-1940), his fiction (1932-1979), his lectures and public talks at colleges and universities in the U.S., Canada and the Soviet Union, and ending in 1981 with the posthumous publication of The Physicists: A Generation That Changed the World.
7. Morris Speare, The Political Novel: Its Development in England and in America, 1924, rpt. 1966, New York, Russell and Russell, p. ix.
8. For Snow, the phrase 'social form' was interchangeable with 'political system'. See "Grounds for Hope?" in the New York University Education Quarterly, 7, 4, 1977, p. 1.

9. Snow's novels dealt with the reforming and liberating spirit of the 1920s, the Iberian conflict of the 1930s, Nazism, the Bomb, the narrowing of loyalties in the Cold War, and generally (but consistently) with the problems of power and conscience in a managerial society.
10. C.P. Snow, The Realists, op.cit., p. 1.
11. Quoted in Philip Snow, Stranger and Brother, op.cit., p. 171.
12. An extensive examination of unpublished manuscripts and notes for lectures in the U.K., the U.S., India and Canada reveals no direct references to party politics or policies. Even in invited talks to Labour Party meetings, Snow's presentations were extremely general. I am indebted in this search to Philip Snow, the C.P. Snow Archives (Harry Ransom Humanities Research Centre, the University of Texas at Austin), the Julian Huxley Papers (Woodson Research Centre, Rice University), and to Gery Werskey.
13. C.P. Snow, Public Affairs, op.cit., p. 7.
14. The English Dreamers spoke out against the ills of industrialized society. Eliot's stance on modern culture articulated a preservation of the traditions of society (at the cost of democracy if necessary) while Leavis defined modern culture as a moral ideal which was to be similar to the ideals of the Romantic poets. See Lesley Johnson, The Culture Critics, London, Routledge and Kegan Paul, 1978.
15. See Paul Boytinck, C.P. Snow: A Reference Guide, op.cit..
16. C.P. Snow, "Science, Politics and the Novelist: or, the Fish and the Net", in Kenyon Review, 23, 1961, p. 15.
17. Benjamin Barber, Strong Democracy, Los Angeles, University of California Press, 1984, p. 11.
18. See Joseph Grimond, The Liberal Challenge, London, Hollis and Carter, 1963, p. 13.
19. C.P. Snow, Public Affairs, op.cit., p. 9-10.
20. This is a phrase which Snow used repeatedly after 1968 - a date which can be closely used to identify his emerging "darkening vision." This aspect of Snow's perspective is examined in some detail towards the end of this chapter.

21. Saguna Ramanathan, The Novels of C.P. Snow, London, Macmillan, 1978. I am grateful to Professor Ramanathan for her correspondence and her support on delicate points centred to his study.
22. C.P. Snow, Scientists and Decision-Making, talk given at M.I.T. in 1966. Quoted from an unpublished transcript provided by the Harry Ransom Humanities Research Centre, University of Texas at Austin.
23. "Science in a Modern World", in Discovery, Vol. 1, No. 7, October 1938, Cambridge, p. 320.
24. The Godkin Lectures on the Essentials of Free Government and the Duties of the Citizen were established at Harvard University in memory of Edwin Lawrence Godkin (1831-1902). The theme of the lecture by Snow was one which he revisited frequently during the next five year period. See, for example, the text of his presentation to the U.S. House of Representatives (delivered on January 25, 1966) and reprinted under the title of "Government, Science and Public Policy" in Science, February 1966, p. 650-653. For a report of the lectures themselves, see The Harvard Crimson for Wednesday November 30, 1960 (p. 1 and 2) and Friday December 2, 1960 (p. 1 and 3).
25. David Shusterman usefully outlines Snow's argument in C.P. Snow, Boston, G.K. Hall, 1975, p. 27-31. The outline presented here closely follows this outline.
26. C.P. Snow, Science and Government, op.cit., p. 10. For Lord Cherwell's reaction to Snow's rendering of events, see The Earl of Birkenhead, The Prof in Two Worlds: The Official Life of Professor F.A. Lindemann, Viscount Cherwell, London, Collins, 1961.
27. C.P. Snow, ibid., p. 48-49.
28. Ibid., p. 51.
29. Ibid., p. 63.
30. Ibid..
31. Ibid., p. 64.
32. Ibid., p. 27.
33. Ibid., p. 82-83.

34. C.P. Snow, Appendix to Science and Government, Cambridge, Harvard University Press, 1962, p. 3, 13, 36.
35. C.P. Snow, Public Affairs, op.cit., p. 9-10.
36. Jacques Ellul, Technological Society, New York, Vintage, 1964, p. 85.
37. The position of the technological utopians is outlined by Bernard Gendron in Technology and the Human Condition, op.cit.. Snow is included, by Gendron, in this group. (p. 13)
38. See Snow's pre-war editorials in Discovery which in many ways reflect the views of the Science of Science radicals regarding the social function of science.
39. See G.H. Hardy, A Mathematician's Apology, London, Cambridge University Press, 1982, p. 81.
40. See Kenneth Prewitt, "Scientific Illiteracy and Democratic Theory", in Daedalus, Spring 1983, p. 49-64; Jon D. Miller, "Scientific Illiteracy: A Conceptual and Empirical Review", in Daedalus, Spring 1983, p. 29-48; Jon D. Miller, The American People and Science Policy, New York, Pergamon, 1983; Morris Shamos, "The Myths of Scientific Literacy", in Graham Orpwood (ed.), Science Culture and Public Policy, Special Issue of Science and Public Policy, May 1990 (upcoming); Jurgen Schmandt and Hilliard Roderick (ed.), Acid Rain and Friendly Neighbours: The Policy Dispute Between Canada and the United States, Durham, Duke University Press, 1985; and John de la Mothe and Louis-Marc Ducharme (eds.), Science, Technology and Free Trade, London, Pinter, 1989.
41. A third theme was "possessive love". This will be discussed later in the chapter as, although it represents a weak link - or even a failure - in Snow's work it does become animated as yet another nuance of power relationships....those dealing with private power. C.P. Snow, Preface, Strangers and Brothers, Omnibus Edition, Volume 1, New York, Scribners, p. xli.
42. The term "counter-culture" is one which is both broad and vague. I use it here in a very general way to include the writings of Theodore Rozsak, Ivan Illich and others who tend to be associated with the late-sixties anti-technology movements; the "dystopians" such as Aldous Huxley, Herbert Marcuse and B.F. Skinner; and the writers - such as Langdon Winner and Marshall Berman - who refresh our memories of the classic tales by Goethe, Shelley and Von Harbou.

43. C.P. Snow, The Two Cultures and the Scientific Revolution, op.cit., p. 23.
44. C.P. Snow in John Halperin, op.cit..
45. C.P. Snow, Science and the Advanced Society, talk given at the British Embassy, Washington, D.C., January 26, 1966. Unpublished MSS, Harry S. Ransom Humanities Research Centre, University of Texas at Austin. (p. 8)
46. C.P. Snow, The Scientific Profession and Degrees of Freedom, 1970. Quoted with permission.
47. C.P. Snow, The Scientific Profession and Degrees of Freedom, op.cit., p. 9.
48. Throughout Snow's career he only initiated, or threatened to initiate, legal actions against two individuals as a result of "literary exchanges". This includes the period of the sometimes notorious "two cultures" debate. One of these threats was carried out and settled out of court. The other remained only a threat.
49. Talks given at the Education Faculty of New York University and published in the New York Education Quarterly, dated Summer 1976 (p. 2-5); and the New York City campus of Pace University on April 27, 1977. The quote is from p. 64-65 of the Pace University archive transcripts. Quoted with permission.
50. This phrase, which Snow was very fond of quoting, comes from Blaise Pascal and means "we die alone".
51. C.P. Snow, The New Men, op.cit., p. 301.
52. Ibid..
53. See Kenneth Hamilton, "C.P. Snow and Political Man", in Queen's Quarterly, 69, 3, Autumn, 1963, p. 425.
54. Jacques Ellul, The Technological Society, New York, Mentor Books, 1968, p. 87.
55. It should not be construed from this that Snow is a crude environmentalist. The role of rationality allows Snow and his heroes to act understand and act upon the environment.

In addition, Snow puts very little faith in modern psychology and psychoanalysis and states that "this was the trouble with psychoanalysis from the beginning. The concepts were such that they could neither be verified nor falsified. They were circular systems. Very pleasant for the operators, not very pleasant for the person with any sort of critical mind. They were more like certain kinds of art. Art, as it happens, of a sort that I'm not especially fond of." Talk given by C.P. Snow, April 26, 1977 on the Pleasantville Campus of Pace University, New York City. Quoted with permission of Pace University.

56. See, for example, Brian Easlea, Liberation and the Aims of Science, op.cit.; and William Leiss, The Domination of Nature, op.cit..
57. John Dewey, School and Society, Chicago, University of Chicago Press, 1979, p. 123.
58. Lord Annan, The Curious Strength of Positivism in English Political Thought, London, Free Association, 1959, 187.
59. C.P. Snow, "Science, Politics and the Novelist: or, the Fish and the Net", op.cit., p. 3. Although this definition sounds characteristically Snowian in its simplicity, it is not very far from the definition used by others who have pursued the problem at great length. See, for example, John Kenneth Galbraith, The Anatomy of Power, London, Hamish Hamilton, 1984.
60. C.P. Snow, The Scientific Profession and Degrees of Freedom, address given at the Symposium on "Freedom and the Human Sciences", held in January 1970 at Loyola University of Chicago. Quoted from page 2 of the unpublished transcript, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.
61. C.P. Snow, untitled address given on April 27, 1977 at the New York City campus of Pace University. Quoted, with permission, from page 51 of the unpublished transcript, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.
62. Bertrand Russell, The Impact of Science on Society, London, Allen and Unwin, 1971, p. 71.
63. C.P. Snow, "Grounds For Hope?", New York Education Quarterly, Summer 1976, p. 3.
64. Ibid., p. 3.

65. "Interview With C.P. Snow", Review of English Literature, July 3, 1962, p. 105.
66. C.P. Snow, Public Affairs, op.cit., p. 9-10.
67. Snow quoted this phrase often. See, for example, his address at Westminster College in Fulton, Missouri entitled The State of Seige (reprinted in Public Affairs). This phrase is in fact inscribed on the base of Snow's memorial urn which is in the Fellow's Garden of Christ's College, Cambridge.
68. Confirmed in an interview with Harry S. Hoff in London, May 21, 1987.
69. C.P. Snow, Strangers and Brothers, New York, Scribner's Sons - Hudson River Edition, 1977, p. 29.
70. Ibid., p. 48.
71. Frederick Karl, C.P. Snow, op.cit., p. 20-21.
72. Jerome Thale, "C.P. Snow and the Art of Worldliness", in Kenyon Review, 23, 1960, p. 33.
73. See Denis Hollier, The Politics of Prose, University of Minnesota Press, Minneapolis, 1986; and David L. Schalk, The Spectrum of Political Engagement: Mounier, Benda, Nizan, Brasillach, Sartre, Princeton, Princeton University Press, 1979.
74. Stanley Aronowitz and Henry Giroux, "Radical Education and Transformative Intellectuals", in Canadian Journal of Political and Social Theory, IX, 3, Fall, 1985.
75. J.D. Bernal, The Social Function of Science, Cambridge MA., M.I.T. Press, 1979, p. 71.
76. The available literature on this point is wide and varied. See John Kenneth Galbraith, The New Industrial State, Mentor, New York, 1968; and Cecelia Tichi, Shifting Gears: Technology, Culture, Literature in Modernist America, Chapel Hill, University of North Carolina Press, 1987.
77. Op.cit., p. 135.
78. Ibid., p. 16.
79. C.P. Snow, New York Education Quarterly, op.cit., p. 3.

80. C.P. Snow, Pace University, op.cit., p. 47.
81. Ibid., p. 35-36.
82. C.P. Snow, The Scientific Profession and Degrees of Freedom, op.cit., p. 6.
83. Ibid., p. 4.
84. See Dorothy Zinberg, "Science as a Commodity", in John de la Mothe and Louis-Marc Ducharme, (eds.), Science, Technology and Free Trade, London, Pinter, 1989.
85. Don K. Price, The Scientific Estate, Cambridge MA, Harvard University Press, 1967, p. 270.
86. See for example, Morris Berman, Social Change and Scientific Organization: The Royal Institution, 1799-1844, Ithaca, Cornell University Press, 1978; Robert Schofield, The Lunar Society of Birmingham, Cambridge MA, Harvard University Press, 1965; and John R. de la Mothe, Ideology and Scientism: Educational Aspects of Scientific Associations in England, 1650-1851, unpublished Master of Arts thesis, Montreal, Concordia University, 1982.
87. See Norman J. Vig, Science and Technology in British Politics, London, Pergamon Press, 1968; Philip Gummett, Scientists in Whitehall, Manchester, Manchester University Press, 1980; Thomas Kuhn, The Structure of Scientific Revolutions, Chicago, University of Chicago Press, 1968.
88. C.P. Snow, Notes for a presentation made at M.I.T. in 1966 on Scientists and Decision-Making, Harry S. Ransom Humanities Research Center, University of Texas at Austin.
89. C.P. Snow, Science and Government, op.cit., 1964, p. 132.
90. Ibid., p. 132.
91. Ibid., p. 133
92. Ibid., p. 133-134. Snow's reference to General Electric is interesting given that Snow was in fact invited in 1945 to join the English Electric Company (later General Electric) as the Director of Technical Personnel by Sir (later Lord) George Nelson who was then Chairman. Snow had met Sir George while at the ministry of Labour and accepted the post-war position on March 3, 1947. He stayed with the firm until October

22, 1964 when he left to become Parliamentary Secretary in the House of Lords to the Ministry of Technology. During this period Snow continued to write his novels while in a basement office of the International Science Policy Foundation in Craven Street, London. These were provided by his friend and Director of the Foundation, Maurice Goldsmith.

93. Ibid., p. 135.
94. Ibid..
95. Ibid..
96. Ibid., p. 135-136.
97. C.P. Snow, The Masters, op.cit., p. 36.
98. These individuals, many of whom are based loosely on real characters, are found in the fiction of C.P. Snow. Arthur Miles is the main character in The Search (1934). Jack Cotery is found in Time of Hope (1949) and Strangers and Brothers (1940). George Passant is in these as well as in The Masters (1951) and Homecomings (1956). Martin Eliot is in Time of Hope, Homecoming (1956), The New Men (1954), and The Affair (1960). Charles March is in The Conscience of the Rich (1958).
99. Snow had been a reader of Wells since he was a child in Leicester, but he only met Wells in October 1934 and although they got along well, they did not become friends. Despite the arguments made by J.C.D. Brand, Snow did not get his 'two cultures' thesis from Wells. See C.P. Snow, "H.G. Wells", in Variety of Men, New York, Scribners, 1966.
100. Interview with William Cooper (Harry S. Hoff) in London, May 21, 1987. Cooper also makes this point in his 1962 pamphlet, C.P. Snow, London, Longman, Green and Co., p. 13.
101. The idea of a rejuvenating agent was something of a pre-occupation during this period. H.G. Wells wrote of a rejuvenating process while Somerset Maugham was to take the topic seriously enough to endure the injections that are believed to have extended his physical, if not his mental, life.
102. New Lives For Old, p. 239.
103. Ibid., p. 358.
104. C.P. Snow, Discovery, April, 1939.

105. C.P. Snow, The Search, op.cit., p. 38.
106. C.P. Snow, talk given at London School of Economics Student Union, February 1967.
107. Ibid., p. 259.
108. Ibid., p. 197.
109. Ibid., p. 309-310.
110. Ibid., p. 214-215.
111. Ibid., p. 276-278.
112. Nature, 1935 and the cover of 1958 Scribner's edition.
113. Strangers and Brothers, op.cit., p. 22. This relationship parallels Snow's own relationship with H.E. Howard on whom Passant is based. For details see Philip Snow's book.
114. The character of Roy Calvert is based on Charles Allbury, a close friend of Snow's, who was killed in 1941.
115. The Light and the Dark, op.cit., p. 195.
116. Ibid..
117. Ibid., p. 318-319.
118. See Snow's preface to the English edition of Conscience of the Rich.
119. Conscience of the Rich, p. 19.
120. Ibid., p. 34.
121. See Robert Gorham Davis, C.P. Snow, op.cit., p. 31; Frederick Karl, C.P. Snow, op.cit., p. 67; Hortense Calisher, "Can There Be An American C.P. Snow?", in Reporter, XV, November 1, 1956, p. 41.
122. C.P. Snow, The Masters, op.cit., p. 16.
123. Ibid., p. 22.
124. Ibid., p. 18.
125. Ibid., p. 47.

126. Ibid., p. 4.
127. Ibid., p. 313.
128. The machinations described by Royce's family in dealing with his illness are also clear examples of "private power" of the sort portrayed in Conscience of the Rich.
129. Nora Graves, The Two Cultures Theory in C.P. Snow's Novels, op.cit., 1967, p. 80.
130. While it has been said - whether it matters or not, by an American - that the events described by Snow seem overdone, I am assured by an existing Cambridge Master that a recent election at Snow's old College very much replicated those described in The Masters. "The Loser" now holds a prominent diplomatic position.
131. Op.cit., p. 27.
132. Ibid., p. 27-28.
133. Ibid., p. 51-52.
134. Ibid., p. 232-233.
135. Ibid., p. 49.
136. Ibid., p. 69.
137. Ibid., p. 34.
138. Ibid., p. 33.
139. Ibid., p. 71.
140. Ibid., p. 71.
141. Ibid., p. 70.
142. Ibid., p. 266.
143. Ibid., p. 100
144. Ibid., p. 99-100.
145. Ibid., p. 191.

146. As Howard claims during the hearings: "I'm not interested in any damned discoveries. All I'm interested in is cooking up a thesis. Then I can publish a paper or two by hook or by crook. That's the way everyone's playing the game. And I'm going to play the same game too." p. 324.
147. The Affair, p. 824.
148. Ibid., p. 871.
149. Ibid..
150. Ibid..
151. See "Grounds For Hope?", op.cit..

NOTES - CHAPTER SEVEN

1. Unpublished letter dated October 24, 1964.
2. C.P. Snow, Unpublished MSS, 1974, Harry S. Ransom Humanities Research Centre, University of Texas at Austin.

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