

C. P. SNOW

*Kinds of
Excellence*

University of Kansas Libraries

*The Kenneth Aldred Spencer
Lecture for 1968*

*The Kenneth Aldred Spencer
Lecture*

*given on the occasion of the
dedication of the*

Kenneth Spencer Research Library

November 8, 1968

C. P. SNOW

*Kinds of
Excellence*

University of Kansas Libraries

COPYRIGHT 1970 BY THE UNIVERSITY OF KANSAS LIBRARIES
PRINTED BY THE UNIVERSITY OF KANSAS PRINTING SERVICE
LAWRENCE, KANSAS, U.S.A.

Foreword

AT THE UNIVERSITY OF KANSAS
on November 8, 1968, a group of people gathered from many parts of the nation for a unique and happy event in the life of the University—the dedication of a beautiful, new research library building.

There was a brief ceremony on the terrace of the library during which remarks were made by Mrs. Kenneth A. Spencer, Mr. C. N. Cushing, chairman of the Kansas Board of Regents, Lord Snow, Dr. Earle B. Jewell, and by me. A chill wind swept the terrace; the remarks were not brief because of it but because in moments of great meaning the heart speaks swiftly.

Afterwards, the guests were shown the magnificent interior of the library and some of the collections it houses. Then they walked to Hoch Auditorium to hear the dedicatory lecture which is printed here.

It was a remarkable afternoon, one which was solemnized by the nature of the occasion and elevated by the contributions of the participants, the presence of a novelist, philosopher, and man of world affairs such as Lord Snow; and the presence in his audience of his wife and fellow author, Lady Snow; the donor of the Kenneth Spencer Research Library, the delightful Mrs. Kenneth A. Spencer; and her guests, the students, the faculty. . . .

The event had some of the inevitability of fate, the underlining of coincidence. Kenneth Spencer's preoccupations with science, the scientist, and the future were paralleled in Lord Snow's career, and Kenneth Spencer's

delight in England, typified in the old English rooms built into his home, was embodied in the distinguished English visitors. Indeed, the Kenneth Spencer room in the new library, an original English 18th century room, came from Kirkby Mallory Hall, Earl Shilton, near Leicester, not far from the birthplace of Lord Snow.

Kenneth Spencer would have enjoyed it all.

Now this pioneer industrialist and man of vision is memorialized in a building dedicated to learning and the future. Appropriately his memorial is situated on the campus he loved so well and enhances his native region—an enhancement that had been the driving thrust of his career. Graduated from the University of Kansas in 1926, Kenneth Aldred Spencer (1902-1960) was honored by the University at various times as an undergraduate with memberships in Tau Beta Pi, Sigma Gamma Epsilon, and Alpha Kappa Psi, and as a graduate with the conferring of the Distinguished Alumnus Citation and the Erasmus Haworth Award in geology. Mr. and Mrs. Spencer, always generous and staunch supporters of the University, deeded their home in Mission Hills, Kansas, to the University, just a year before his death, as a residence for the Dean of the School of Medicine and also agreed to underwrite for a term of years a Professorship in the Center for Research in Engineering Science.

At the time of his death, relatives and friends of Mr. Spencer established the Kenneth Aldred Spencer Lecture fund to bring to Kansas City and to the campus of the University of Kansas in Lawrence renowned lecturers and scholars in the fields of engineering, science, and business. The Lectureship has been held by the late Sir John Cockcroft, by Mr. Frederick R. Kappel, and by Dr. Simon Ramo.

Mr. Spencer started his business career with the Pittsburg & Midway Coal Mining Company, established by

his father in 1885. In 1941, when he was vice president and general manager of the coal company, he founded what was to become his outstanding business accomplishment, the Spencer Chemical Company. At the time of his death Mr. Spencer was chairman of the board and chief executive officer of the Spencer Chemical Company, as well as president and chief executive officer of The Pittsburg & Midway Coal Mining Company.

Mr. Spencer is remembered as one of the founders of the Midwest Research Institute of Kansas City, Mo., and as a director of several locally based companies, as well as an active director of some of the nation's finest basic industrial corporations, such as American Telephone & Telegraph Company, Armco Steel Corporation, Good-year Tire & Rubber Company, and International Harvester Company. He was a long-time member of the Business Advisory Council of the Department of Commerce, Washington, D.C.

He will be remembered for the decades and the centuries yet to come as the inspiration for the beautiful and valuable building on the University of Kansas campus at Lawrence, the Kenneth Spencer Research Library, the gift of Mrs. Kenneth A. Spencer, in his memory.

This lecture is a tribute to that man and to that library.

W. CLARKE WESCOE
Chancellor

There are times

when I actively dislike my name. The reason why I actively dislike my name, which is a perfectly good and very old Anglo-Saxon one, is that it makes me subject to a good many jokes. And it also seems to make me subject to a good many climatic catastrophes, so that often traveling about this continent in perfectly good weather I find myself in the middle of a blizzard and I find headlines saying "Snow Falls on Washington" and "Catastrophic Snow in Colorado" or wherever. I sometimes think that the occasional bursts of negative popularity which have erupted in my life are partly owing to this unfortunate piece of nomenclature. Snow, like most things beginning with 'sn,' is a rather unpleasant word. However, here I am, and I thought for some time about what I should say this afternoon: a happy occasion, an occasion of extraordinarily enlightened philanthropy, the erection of what is certainly one of the best libraries in the entire world. It seemed to me unsuitable to make a really gloomy speech about the world situation, and I am afraid that any speech I did make about the world situation would be gloomy. That, I thought, was wrong, so I thought that amidst this encircling sombreness one ought to try and find something, where at least we can be interested, where we can to a modest extent talk about things which are important to us all and are connected with some of the better scientific achievements, some of the better human achievements. Having seen at first-hand now what I could only study on paper, that seems to me a sensible choice. Having

seen this wonderful library, having seen the kind of excellence that the Spencers have been interested in and devoted themselves to, then I think it right and proper that we should talk a bit about kinds of excellence this afternoon.

In particular, the kind of excellence which is rare, which we have to educate if we are going to bring a certain kind of talent to its fullest pitch. That is the kind of excellence I am going to discuss with you today and I am going to be especially concerned with the early education of people with an unusual kind of talent.

The moment you say that, you meet immediate psychological resistance. The moment you say there are certain people chosen from all of us, apparently by chance, who have intellectual talents that we do not possess, then you are looked at often with an extremely stony stare. It seems unfair, it seems a denial of the optimistic dreams of people. You know, we all have a good deal of Walter Mitty in us: Charles Snow the ruler of the world; Charles Snow the owner of yachts; Charles Snow the supreme baseball player; Charles Snow the most romantic figure of the age; Charles Snow the man beside whom Einstein seemed shallow. These are dreams which nearly all of us had when we were children, and curiously they linger much longer than most of us care to confess. The young think dreams end when you lose your hair. Let them not suffer under that illusion; they will find that dreams go on. The ego is very strong. But this Walter Mitty component of ours makes us peculiarly stupid and peculiarly insensitive about the ways in which we differ from each other and about the kinds of things which we could never possibly do—even granted all the luck, all the involvement, all the training in the world.

Curiously enough this peculiar Walter Mitty life of

ours doesn't often extend into non-intellectual things, at least there it is not so strong. I had the pleasure of meeting Mr. Jim Ryun this afternoon. I suppose most of us except in our more deluded moments don't think we could chase Mr. Ryun, even given all the training in the world, even imagining that we had thought of nothing else from the age of one. Most of us, I think, would admit we should finish somewhere rather far behind over a mile or whatever suitable distance. In the same way most of us don't really think that granted all the training, as I say, all the environment, all the resources that life can offer, all the wonderful athletic facilities that you have in this country—which are the best in the world—we still don't think, except in our most hallucinatory moments, that we could really compete with Mr. Tommie Smith or Mr. Lee Evans, or jump as far as Mr. Bob Beamon. There an element of realism comes into our fantasies. We are prepared to admit that there is inequality. We are prepared to admit that there is innate inequality, because there is no other explanation why Mr. Beamon should jump 29 feet and why most of us even with every possible concentrated effort for a lifetime might perhaps manage something just over half that distance. You have to admit there is some difference in endowment. It has of course to be trained, but the difference is innately there. That is, all men are equal in the sight of God but all men are not equal as potential long jumpers or mile runners.

That, as I say, most of us accept. Now I want you to accept the same about some of the intellectual talents. It is of course quite manifest that the same applies. There are some things that no-one in this audience could possibly have done if we had been trained from the moment we were born, been given the highest professional education, had every kind of encouragement, we still shouldn't

have been within touching distance of the real masters. There are many kinds of these special intellectual talents. Music is a very obvious one, mathematics is just as sharp. I suspect that some kinds of verbal talent are almost as sharp, though not quite. But anyway, we could all spell out a list of high talents which we admire. Which we rightly admire. Which belong to some people by an act of pure unfairness to a degree that the rest of us will never know.

Let me tell you a story: in the year 1913, someone who much later became a great friend of mine was at that time one of the best mathematicians in the Western World. Sitting at breakfast he received an enormous envelope, rather crudely addressed, covered with Indian stamps, and he took from this envelope lots of very badly written formulae—equations, theorems—on torn, smelly paper. He looked at it with some boredom, because great mathematicians are always being persecuted by people who think that the Great Pyramid contains the secret of the universe. He looked at it, thought about it vaguely all day, saw his best and closest mathematical colleague after dinner, and asked a very simple question: is a fraud of genius more or less unlikely than an unknown Indian mathematician of genius? Well, clearly the second is more likely than the first, and before the end of that evening they knew that they had on paper before them evidence of someone of the most profound mathematical power.

With considerable energy the matter was pursued, and the writer of these strange theorems turned out to be an unknown Indian clerk in Madras earning £20 a year, about \$100 at that time. He was brought to England, where he did work of extraordinary originality and insight, and died at the age of 32 with a reputation as one of the world's great mathematicians. Now there are two points in this story. One is that not one person in ten

million has the kind of initial endowment which this Indian, whose name was Ramanujan, happened to be blessed with. Not one in ten million—they are as rare as that, as rare as great long-distance runners, perhaps rarer still, as rare as long jumpers. And the second point, which is really why I'm pressing this upon you, is that my friend, whose name was G. H. Hardy, used to say that the tragedy was that although Ramanujan did work of enormous originality and made his world reputation, if he had been selected early and trained properly, he would have been even greater than he was. But mathematicians' lives are short; there wasn't time to train him properly when he appeared at the age of 22, and a lot of his potential contribution was wasted simply because he hadn't been properly educated. It was as simple as that.

There then is a clear case of the kind of thing that I am now concerned with. I don't pretend that this is a major concern by the side of world problems, but I believe it is one that we should give at least the fringe of our minds to. It presents us with very difficult social problems. Oddly enough, problems which may be more active in my own country or in Sweden, in Northern Europe in general, than here—in countries where egalitarianism in some ways goes further than with you. There is a certain dislike of the idea of doing anything utterly out of the ordinary for small groups of people. I shall come to that a little later. I believe the balance lies clearly in the opposite direction. I believe that we must do what we can for supreme talent. But I admit there are genuine objections.

Let us think a little more about mathematics. I don't want you to think that I'm myself preoccupied with mathematics: if I could talk about music, I would. I could talk about verbal things, but there the edges are not so sharp and the problem not so clearly defined. And so, I

am going to talk a bit more about mathematics, provided you remember that I am using this as a type or symbol of a special talent which is very important to us all. It's very important to the whole creative intellectual enterprise of the human race. Mathematics is a very odd thing: comparatively very few people possess its skills to anything like the height of Ramanujan. A moment ago I said it might be one in ten million. Perhaps less. A lot of people of very high intelligence seem not to possess such skills at all. I have met people whom I regard as among the cleverest and deepest people I've ever known, who are something like mathematically blind to about the same extent I think that I myself am tone-deaf. That is incidentally why I cannot talk to you very sensibly about music.

The best example of mathematical blindness I can think of was provided by a character called Wallace Budge. Wallace Budge later became an extremely distinguished Egyptologist, one of the best of the early part of this century, but it would be an error to think that he had deep mathematical insight. And I remember when I was a young man at Cambridge hearing someone who had the ill-fortune to have to try to coach Budge for an extremely simple examination which at that time in Cambridge was known as the 'Little Go.' It was an examination so elementary that it has now passed completely out of our system. We now have far more difficult tests for qualifying people for admission. And this old man was rather a lugubrious old man, to be honest, at the best of times—with a very long drooping moustache.

He used to tell me, "Yes, I had to coach Budge, and I used to ask Budge, 'Budge, if $2x$ equals 1, what does x equal?' And Budge would think, and think, and think, and then Budge would turn his great wise eyes at me and

say 'Minus 2.' " By the by, there is a certain edge to that story: people who don't laugh very rapidly are likely to be somewhat mathematically blind themselves. Well, the Budes are an extreme case, of course. Most mathematicians find it impossible to believe that intelligent people do suffer from this degree of mathematical blindness. Most psychologists tend to blame it on to blockages or similar early impediments. I must say I confess I think the experimental evidence is against them, but that's rather an academic argument. What is quite certain is that the level of mathematical comprehension seems to go in extremely sharp cutouts. Some people can understand mathematics up to something like university entrance level, some people can go a little further. I myself could never have done creative mathematics at all, although I in fact did get some sort of mathematical degree.

The same applies at the very highest levels: there are only a very few, one in a million perhaps, or if we are lucky one in a hundred thousand, who can really possess a high degree of mathematical insight. That is what I mean by a special talent. The same is true of music, the same is true of some verbal gifts, and you can stretch the number of these talents quite a long way. We should all, I think, agree without argument, that the products of these talents are necessary for us if we're going to have a good society. It is quite clear that without music society loses one of its most important elements. It is quite obvious that without the products of certain verbal gifts we should lose one of our great contributions to the human achievement. It is obviously true that without mathematics we should have found it harder to climb out of the caves and produce several of the things which we see around us this afternoon. It is only through mathematics in fact that organized science has made its astonish-

ing revolution of the last three hundred years, and that is partly why mathematics has become the most argued about and the most investigated of these particular special talents of which we are now thinking.

Now what do you do with persons lucky enough, fated enough to have one of these special talents? I can tell you what is being done in other societies, and again the example I shall have to begin by giving you is mathematics, though the same process is being extended into quite a lot of different fields. I am going to tell you about what the Soviet Union is now doing. Education in the Soviet Union is based on very similar lines to yours. It's nationwide; in fact, it's one of their greatest achievements: it wiped out illiteracy within a generation, which was an astonishing feat. But the ordinary high school which goes from, I think, seven-plus to seventeen, normally ten years, is rather like certain high schools that I have seen here, though yours are less homogeneous. The Soviet high schools are strictly non-selective, non-streamed (that is, everyone starts in the same group and moves steadily up the school according to age), strictly co-educational. The syllabus, which is the same throughout the country, is very general. The teaching to most of us would seem rather old-fashioned, but also rigorous and serious. By and large, this education has performed its purpose for most people, and has produced a population educated over most of the country until the age of about 17. Still, there was some disquiet about fifteen years ago from the top academics of the Soviet Union. They said "Fine, this is a laudable social achievement, but we are lacking people who are trained sharply enough, deeply enough before they go to the university. We are wasting two or three years out of the lives of the very clever." The Soviet academicians, scientists, happened to be very powerful,

and they decided that this wasn't good enough, and that something must be done for possessors of high talent. It wasn't quite so hard to achieve as you'd expect, partly because the Russians have been doing this with people who want to be ballerinas or various kinds of musician for a very long time. That tradition of extremely elite education went on continuously through the revolution. So these special schools, as they call them, were set up, mainly by the initiative of individual mathematicians. The very fine mathematician Kolmogorov set up one of his own attached to Moscow University, where being a man of great energy he acted as head master as well as University professor of mathematics and one of the best mathematicians in the country. I've seen one or two of these: there are now quite a number in the whole country, perhaps as many as 30. They are normally about 300 strong, selected at the age of 15 by an old-fashioned competitive examination, and going on until 17. They are boarding schools and the children are looked after extremely well, and paid handsomely to go there. Of course they have great advantages in going to universities afterwards. In theory the schools are co-educational but they have found that at least in their scientific or mathematical schools only about 10% girls qualify through the competitive examination. I don't know what that proves, since the original education is just the same, but, in fact, the schools you visit show a curious picture of about 90% boys, 10% girls. This produces certain problems, and the girls have a very good time. After this, at the age of 17, the products of these special schools take part in another competition which is called rather bizarrely an olympiad. These are very difficult: in mathematics or in physics, and now in chemistry and other subjects, the standard of this examination becomes very high indeed. By most English

or American standards it is the sort of thing we should expect from extremely clever young people of 20 or 21, and great prestige is given to the people who come out at the top layer of these olympiads. They get handsome money prizes, choice of university, handsome scholarships to universities and what not.

Then, as a final elaboration of this same process they have now started international olympiads where the best eight selected from the Soviet Union competes with the best eight selected from all the other east European countries and with several western European countries. We in Great Britain had the courage two years ago to compete in this international olympiad and I was rather proud that we came fourth. The first was the Soviet Union, the second was East Germany, which is remarkably successful in producing and looking after talent of this kind, the third was Hungary, always extraordinarily skillful at producing high level talent of almost any kind—no small country has ever produced more and no country on earth has ever produced so many per head—and Great Britain came fourth. The rest of the western European countries, France, West Germany, Italy, Sweden, came very very far behind indeed. The French, very typically, quarrelled with the questions. And we competed again this year, and with almost exactly the same result. Once more we came fourth. We have one real star by any standard, as good as anything in the competition, and a reasonably adequate team. This gave us some indication of our standard, of how our really high-level competitors in this field compare with their eastern European counterparts. Obviously there is not much in it, all countries throw up very high talent—as I said, we have one of supreme talent, whom we have been able to identify and train. I very much wish that you also took your courage in your hands and com-

peted. It would give you a very good idea of how your high talent compares. In a country of this size, this resource, this intelligence, there must be people who would hold their own with ease. But it would be very nice to know how many there are and how they compare with other young people in other societies.

Well, that is how the problem is being tackled. There is nothing mysterious in this. It's being applied now in the Soviet Union to physicists, young chemists, young engineers, and recently to young people whom we should call verbalists. Various kinds of linguistic skills can be trained in the same way. And in a sort of amateur fashion, of course, my country has been doing this for a long time, with our scholarship system, with the schools we humorously call public, meaning private. We have in fact, with great social unfairness and so on, selected a number of very able people and given them a similar kind of intense training, and we've lived on that for a good many years. Lived on it more than we should, because it's helped us not to educate as many people as we really require. Still we had that particular advantage. There is, as I say, nothing at all mysterious about why this method, if you are thinking only of giving high talent its best chance, is probably the right way to do it. It isn't really that the teaching is so much better in the select schools though obviously if you have got concentration of high ability in the pupils, teachers tend to want to teach them.

Nevertheless I don't believe that is really the answer. The answer seems to be much more that people of very high ability tend to teach each other. That's why musicians' families tend to congregate, why Yehudi Menuhin started his own special school just for musicians. It seems to me a phenomenon of what physicists would call the critical mass: that if you get a number of people together

there is a point where they become very much better than they would be if they were distributed in penny packets all over a largish country.

So I think most people who study the problem believe that if you are thinking only of educating really high talent, that is the way to do it. Further, most of us believe that if a society doesn't produce good musicians, good mathematicians, good verbal specialists, and so on, then there is something wrong either with that society or with its education, or both. And yet there are objections. There are certain objections in the effect upon the people who have the talent, and the luck, and are selected for this kind of treatment. One is that the people who are enormously good, at the very top of these special schools, tend to feel a reasonably acute strain. I don't believe this is too serious, I think in any venture of this kind you're going to get some casualties. High talent has its own risks as well as its own great rewards and we must not be sentimental about it. Almost whatever we do there will be some casualties along the way.

The second and more serious difficulty is the people who are exposed to this sort of extremely serious education, if they're not quite good enough, tend to feel it very bitterly, so that the people at the bottom of these select schools are likely to get into a kind of despair. That again is a price which one has to be prepared to pay. Third, there is a social objection which in England and in Scandinavia is felt more strongly, and that is: ought one really to do this at all? Ought one to give this enormous privilege to people who are already blessed? Oughtn't they to take their chance, oughtn't they to be helping educate the others, oughtn't they to be just treated like ordinary human beings and hope that in the end their great gifts will bring them through? It's a perfectly rea-

sonable argument, which I've heard argued passionately in Sweden. I personally don't believe it. I believe that the release of the best we can get out of our best people is worth the kind of—social injustice is the phrase, I think, a very popular phrase now—the kind of social injustice which we are perpetrating. You can't have everything; life isn't as easy as that. The idea that if you go on in what is obviously the amiable fashion, then automatically the best will happen, that is dead untrue. Life is very unfair: God gives you a hand of cards, a different hand of cards from everyone else's. You may have the luck to have a remarkable endowment, you may have the luck to be born into a family which is interested in education, and have books, which is far more important, of course, than being born rich. You may have that. If you don't, whatever happens you're going to be handicapped, and there's no method of equalising all these chances of life except not educating anyone at all, which would be the most perfect, though somewhat negative, form of social justice.

And so I think we have to accept that in order to get the best out of the very best of the people far more talented than most of us, then we've got to accept that to him who hath shall be given. It's unfortunate, it's life, and we've got to weigh our values. For me, I wouldn't like my own country to be without its share of the people who contribute most to the real peaks of the human achievement wherever they are, and I suggest to you that applies to any country which is really going to make its absolute maximum contribution to the world.



Text set in 12 pt. Linotype Baskerville, with display headings in Linotype Bodoni Italic. Printed on 60 lb. Mountie Antique Offset. Cover: 65 lb. Beckett. Designed by James Helyar. Printed by the University of Kansas Printing Service.